

HOME

LEARNING

YEAR *by* YEAR

HOW *to* DESIGN *a* CREATIVE
and COMPREHENSIVE
HOMESCHOOL CURRICULUM

REVISED
and
UPDATED



REBECCA RUPP

Home Learning Year by Year

Revised and Updated

How to Design a
Creative and Comprehensive
Homeschool Curriculum



Rebecca Rupp

B \ D \ W \ Y
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About the Author

Introduction

Are you homeschooling your kids? Or thinking about homeschooling your kids? Or are your kids enrolled in school but you'd like to be more involved in their education? Cool! This is the book for you!

Included here are some general thoughts on the process of education, with reference to a lot of recent research, followed by grade-by-grade and subject-by-subject summaries of the average public school requirements, with many suggestions for helpful resources, supplements, and activities. As you read about the average first, fifth, or eleventh grader, you'll probably find that your kid doesn't quite fit the mold—but that's perfectly normal. Kids (and adults), given the complex mush of interests, skills, and personalities that we are, often don't march in mandated lockstep. Flip ahead and back, expand or contract on the curriculum lists as suits your children. After all, you're the one who knows them best.

Randy, my husband, and I first became interested in homeschooling in our early days of parenthood, after reading educator John Holt's books, originally published in the 1960s and 1970s—notably *How Children Learn*, the more ominously titled *How Children Fail*, and finally *Teach Your Own*, which, to a pair of optimistic scientists, sounded like a creative challenge and a wonderful idea. Why not, we told each other, come up with a homemade learning program in which our kids can get individual attention and which we can tweak and tailor to each child's interests and abilities?

At the time, Josh, our oldest, was three and a half; Ethan, our middle son, was two; and Caleb, our youngest, was a baby in a cradle. *This will be a piece of cake*, we thought.

Nowadays approaches to homeschooling are legion, ranging from “school at home” aficionados, who replicate a formal public-school-style program around the kitchen table, to proponents of unstructured “unschooling” (sometimes called “natural” or “child-led” learning), in which parents simply act as facilitators, providing the wherewithal for kids to explore and investigate based on their own eccentric interests. Between these two extremes, there are any number of permutations—often influenced by the homeschool laws of the state, which can vary from noninvasive to highly restrictive.

We homeschooled our three kids from day one through the end of high school—and did so in a range of states since, due to job opportunities, we moved frequently when the boys were of elementary school age. Our best experience was in Missouri, largely a hands-off state; our worst was in Massachusetts, where homeschooling decisions were made by local school districts, some of which clearly were prepared to make our lives miserable. And—regardless of state—homeschooling was hardly the piece of cake that Randy and I had so blithely predicted. It was far more absorbing, time-consuming, and overwhelming than we’d expected. That said, it was also far more terrific. The rewards of watching (and helping) your kids learn are inestimable. We wouldn’t change this experience for anything.

A hurdle for many beginning homeschoolers is self-confidence. We all worry about our children, and we all want to give them the best possible chance at a happy and satisfying future. I hear from a lot of worried parents asking how they can give their kids a quality education when they themselves are lousy at—well, we’ve all got blind spots; you fill in the blank. Trust me: *Don’t worry*. Homeschooling is a learning experience on both sides, and everybody hits a wall sooner or later—usually sooner. You can’t speak Spanish, deal with chemistry or calculus, kick a soccer ball, or play the piano? Stop fretting. There are dozens of alternatives, from online courses to tutors, mentors, community organizations, and more. Nobody does it all.

Actually, chances are your biggest challenges will come from the gazillions of questions asked by your endlessly curious little guys:

What did people use before there were buttons?

If atoms are mostly space, why can't people walk through walls?

How does the TV work?

How deep is the world's deepest hole?

What's inside a battery?

How do you put things in alphabetical order in Chinese?

Inevitably you're going to spend a lot of time as a homeschooler saying, "I haven't the foggiest idea." Don't freak out. There's no way any of us—ever—can answer all our kids' questions. Just realize that those questions are the bedrock of education and that "Let's find out!" is a great way to go. We want our children to maintain their curiosity and to learn how to satisfy it for themselves. We want them to become lifelong learners. Tackle all those questions together and help them on their way.

Go with it. That's our job.

CHAPTER 1

To School or Not to School

Thank goodness I was never sent to school; it would have rubbed off some of the originality.

—BEATRIX POTTER

Today, about two million kids in the United States are homeschooled. Reasons for homeschooling choices vary: In a 2016 survey conducted by the National Center for Education Statistics, 80 percent of parents cited concern about a negative school environment, and 61 percent were dissatisfied with the quality of public school academics. Some had moral or religious issues. Others mentioned the importance of family togetherness and the benefits of nontraditional or small-scale individualized instruction.

Some choose to homeschool from the very beginning. Others make their decisions following unhappy experiences with public or private schools, variously describing emotional, physiological, and intellectual miseries—everything from temper tantrums to tummy aches to chronic academic boredom.

According to the 2018 Phi Delta Kappa (PDK) poll of attitudes toward public schools, 81 percent of participants nationwide give the public schools a grade of C or lower; and in a Gallup poll of 2019, 62 percent of pollees pronounced themselves somewhat or completely dissatisfied with the quality of public education. Communities still support their local

schools, and we all know many teachers who are wonderful and talented educators and dedicated trouper—but there’s no getting around the fact that public education, as practiced in the United States, has serious problems.

Exactly why is a matter of contention. According to educators, reasons for the schools’ struggles include lack of funding; lack of parental involvement and support; gaping socioeconomic divides among students’ families; invasive screen and social media technology; lack of innovation in teacher education; mediocre textbooks; bullying; and the nature of school culture itself, which reinforces conformity, obedience, and the ability to shut up and sit still all day long.

Another potential culprit is increasing school size: educational research indicates that bigger doesn’t always mean better. School consolidation, heavily promoted by school districts attempting to save money, makes for centralized schools catering to hundreds or even thousands of pupils—and these, with escalating discipline problems and declining levels of academic achievement, can resemble nothing so much as boot camp. Small schools may not be able to afford the splashy range of activities available at large ones, but there are real emotional advantages to small neighborhood schools, where civility rules and everybody knows your name.

Academically, our current school system, despite all the effort that professional educators put into it, doesn’t seem to be doing us any favors. According to the National Assessment of Education Progress (NAEP), fewer than 40 percent of graduating high school seniors have adequately mastered reading and math. On the Program for International Student Assessment (PISA), a worldwide exam administered every three years to 15-year-olds in seventy-two different countries by the Organization for Economic Cooperation and Development (OECD), the United States is less than impressive: in 2015, for example, our kids ranked fortieth in math, twenty-fourth in reading, and twenty-fifth in science.

A major part of our problem may be our obsession with those very tests. “Our schools will not improve if we value only what tests measure,” writes educator Diane Ravitch in *The Death and Life of the Great American School System* (Basic Books, 2010). “Not everything that matters can be quantified. What is tested may ultimately be less important than what is

untested, such as a student's ability to seek alternative explanations, to raise questions, to pursue knowledge on his or her own, and to think critically and creatively.”

Another point for the anti-test crowd is the overwhelming success of essentially testless schools, most famously those of Finland. Finnish kids are routinely among the top PISA scorers, but in general no kid in Finland takes a standardized test until the end of their senior year in high school. Says Finnish educator Pasi Sahlberg, “We prepare children to learn how to learn, not how to take a test.”

Formal education in Finland doesn't begin until the age of 7, and while kids spend time in the classroom, they also spend a good chunk of the day outdoors. Children get a lot of individual attention, and each school has a welfare team, whose purpose is to ensure student happiness. Schools are wholly funded by the federal government—which means that the quality of student education isn't dependent on local economies or parental income. School policies are driven by vetted independent research, which means that the Finnish educational system is resistant to the ups and downs of politics—and teachers, viewed as respected professionals, have the freedom to design and implement their own curricula.

So why can't the United States simply do what Finland does? Sahlberg points out that we can, provided we're willing to make fundamental changes to our current system. One of the most sweeping would require social change to establish student equality. Equality is a watchword in Finnish education; rather than the American schools' vast differences in services and performance levels, Finnish schools are pretty much the same across the board, all with equal access to quality instructors and public support. And all Finnish citizens, by law, have access to childcare and healthcare in their communities, and a right to a free education from preschool to university. We could level our playing field too—but we haven't done it yet, and we've got a long way to go. And clearly it's not a priority among politicians: just a tad over 3 percent of the federal budget goes to fund education.

If standardized tests aren't the be-all and end-all of academic achievement, how else to assess the public schools? One approach might be to track students' responses to their learning experiences—which again

paints a sorry picture. Surveys show that the majority of high school students find school tedious and boring—and bored, unmotivated kids don't learn well. There's a price to be paid for this later: While about 65 percent of American high school graduates go on to college, many are unprepared once they get there. One-fifth of students enrolled in four-year colleges and half of community college kids need remedial education. Similarly, about a fifth of students at four-year colleges and a third of community college attendees drop out after just one year—which means that while the United States has one of the highest rates of college entry in the industrialized world, it's far down the list in terms of college completion.

Choosing a mode of education for one's kids is one of the most difficult decisions parents make. Which is best: public school, private school, alternative school, homeschool? Should they go to preschool? Should they try a Montessori or Waldorf school? Which system will enable our kids to grow up healthy, happy, ethical, self-sufficient, tolerant, mannerly, compassionate, and intellectually above average?

Kids succeed in any number of learning environments, and which works best when and for whom is hard to predict. Josh, Ethan, and Caleb, our three sons—now all adults—never went to public school, barring an odd class here and there. All went on to college—two to Bennington College, one to Clarkson University—and two, so far, have gone on to obtain master's degrees, Josh from the New School in New York City and Ethan from Carnegie Mellon University in Pittsburgh. All three, from birth on, were educated at home, a process that was fascinating, exciting, and deeply rewarding—though not always smooth sailing. We all remember the days when I threatened to send them to military boarding school in Oklahoma, and when they threatened to run away from home and live in trees. Some days, believe me, are just like that.

Homeschooling is a learning experience for everyone involved. Randy, my husband, and I figured that at-home learning would resemble our own more or less orderly, workbook-laden progression from alphabet books to English literature, arithmetic facts to algebra. What we got from our kids instead were a lot of strong opinions and passionate enthusiasms for everything from Egyptology to rocket models, submarines, Shakespeare, and ant farms. Nobody liked workbooks. One kid sneered at the

multiplication tables (“Come on, Mom. That’s what calculators are for!”). One balked at geography (except for—don’t ask me why—*islands*). One spent months demanding, as bedtime reading, excerpts from *The Encyclopedia of Fish*. It’s in this eccentric way that kids learn best—but it’s not possible in the one-size-fits-all atmosphere of the public schools.

The school system that we’re living with today came into being with nineteenth-century industrialization, and in many ways it still functions as though its purpose were to produce generations of factory workers. Sir Ken Robinson’s TED Talk “Do Schools Kill Creativity?” is a devastating condemnation of the way our current educational system operates. Kids, who are nothing but imaginative and innovative, Robinson argues, are squashed into molds that don’t fit them, and many become terminally discouraged. Kids enter elementary school interested in practically everything. By middle school, they’re reluctant to ask questions; by high school, they’re resentful and bored. That loss of eagerness, sparkle, and inquisitiveness is the worst thing our public schools do. Every kid loves something. It’s our job to help them find it.

We all want to give our kids the tools to take them where they want to go. The problem is that we have no idea where they’re headed. None of us has the foggiest notion what the future may bring. To prepare our kids for what lies ahead, we need to ensure that their inherent creativity and curiosity survive, that they’re free to discover their passions and pursue them, and that learning is something they’ll always be able to do for themselves.

RESOURCES

Creative Schools: The Grassroots Revolution That’s Transforming Education

Sir Ken Robinson. Penguin Books, 2016.

Rather than our outmoded industrial education system, Robinson argues for a highly personalized approach capable of engaging all students. Also see Robinson’s online 2006 TED Talk, “Do Schools Kill Creativity?”

Cultural Literacy: What Every American Needs to Know

E. D. Hirsch Jr. Vintage Books, 1988.

Hirsch argues that there's a basic body of knowledge all Americans need to know, in order for us to understand each other and to function in modern society. The book lists five thousand essential facts. (See how many you know!)

The End of Education

Neil Postman. Vintage Books, 1996.

The problem with the schools, Postman argues, is that we no longer have a shared national narrative. Instead, we're splintered by consumerism and multiculturalism. By the author of *Teaching as a Subversive Activity* (Delta, 1971).

Frames of Mind: The Theory of Multiple Intelligences

Howard Gardner. Basic Books, 2011.

Gardner proposes seven different types of intelligences (later research proposes nine), which all of us possess in different degrees and which influence how we best learn. Also see Gardner's *The Unschooled Mind: How Children Think and How Schools Should Teach* (Basic Books, 2011).

Free to Learn

Peter Gray. Basic Books, 2015.

Psychologist Gray argues that free play is how kids learn to control their lives, solve problems, and forge relationships with peers. And they need much more of it.

How We Learn

Benedict Carey. Random House, 2014.

Science reporter Carey points out that in the rush to systematize education, we've neglected the ways in which the brain really works. There are real advantages to daydreaming and sleeping late in the morning.

Range

David Epstein. Riverhead Books, 2019.

Subtitled *Why Generalists Triumph in a Specialized World*. Epstein argues—with many great examples—that the way to excel is to learn as many different things as possible. Encourage your kids to experiment, pursue tangents, and have a wide range of experiences.

Savage Inequalities: Children in America's Schools

Jonathan Kozol. Broadway Books, 2012.

Kozol's original 1988 study showed blatant inequalities between rich and poor schools, and the gap has become even wider today.

Substitute: Going to School with a Thousand Kids

Nicholson Baker. Penguin Books, 2017.

Award-winning author Baker spent a year working as a substitute teacher in the Maine public schools, covering every grade from kindergarten through twelfth. An up-close look at the day-to-day conduct of public education.

Teach Like Your Hair's on Fire

Rafe Esquith. Penguin Books, 2007.

Esquith, possibly the most famous fifth-grade teacher in America, shares his innovative approaches to education—among them getting kids pumped on full-text Shakespeare.

Where Good Ideas Come From

Steven Johnson. Riverhead Books, 2011.

What kind of environment sparks flashes of brilliance? Johnson explains the seven key patterns behind innovation.

Why Don't Students Like School?

Daniel Willingham. Jossey-Bass, 2010.

A cognitive scientist answers such questions as “Why is it so hard for students to understand abstract ideas?” and “What's the secret for getting students to think like real scientists, mathematicians, and historians?”

CHAPTER 2

Anything Leads Everywhere

Don't panic.

—DOUGLAS ADAMS

“All authorities get nervous when learning is conducted without a syllabus,” wrote Neil Postman and Charles Weingartner in *Teaching as a Subversive Activity* (1971). “A syllabus not only prescribes what story lines you must follow (the War of 1812 in sixth grade, chromosomes in eleventh, South America in the ninth), it also prescribes the order in which your skills must be learned (spelling on Monday, grammar on Tuesday, vocabulary on Wednesday). This is called the ‘sequential curriculum’ and one has to visit the Ford Motor plant in Detroit in order to understand fully the assumptions on which it is based.”

As anyone who’s ever observed a child knows, however, learning is a messy and unpredictable process, and seldom do any two children head the same way at the same speed at the same time. Let’s say you’re studying volcanoes. One kid will be fascinated by Pompeii: “How long ago was it? Who dug it up? How do ashes kill people?” Another will latch on to geology: “How hot is lava? What makes pumice float? What’s a supervolcano?” And a third will slope off to the living room to read *Journey to the Center of the Earth*.

Don't be afraid of the unexpected. There are innumerable effective approaches to any given subject; just because your kids are heading down a road less traveled by doesn't mean they're not going to get there. While standardized curricula are organized and sequential—and who doesn't like a reassuring list?—learning doesn't necessarily work that way. Interests, learning styles, attention spans, growth rates, developmental progress, and attitudes toward vegetables vary wildly from child to child. Which, of course, is the problem with standardized curricula.

The public school system, which copes with over fifty million school-age children annually, attempts to meet the needs of the many, with the aim of turning out kids who have the intellectual wherewithal to succeed in college and/or at work—and ultimately, hopefully, to help the country compete in the global economy. It's an admirable aim—but on a large scale, it's impossible to tailor education to the idiosyncratic interests and learning styles of over fifty million unique human beings. In large-scale education, kids must adapt willy-nilly to the decreed state and national norms. Unfortunately, it's not working very well.

A major problem with the standard curriculum—which must cause creative and independent-minded teachers to tear their hair—is that often it's boring. Much of what the schools have in mind for our kids is excruciatingly dull, a long gray line of worksheets demanding that they identify past perfect verbs and compound-complex sentences, solve endless long division problems, memorize list after list of spelling words, and regurgitate textbook accounts of the Civil War and the Russian Revolution. Decades of research address the issue of how kids learn best, but none of it seems to budge our educational bureaucracy. A primary advantage of homeschooling and other forms of alternative education is the chance to provide learning opportunities that interest and engage kids. Homeschoolers can design their own programs, assembling resources and using approaches that best suit their own kids' interests.

Say your kid is hooked on marine biology. Read books, fiction and nonfiction, about the oceans and ocean life; play ocean-related games; collect seashells; conduct experiments on water pressure, temperature, and salinity; visit an aquarium. Watch *Finding Nemo*. Adopt a whale.

Or say he/she is interested in ancient Greece. Read Greek myths and (age-appropriate) versions of *The Iliad* and *The Odyssey*; learn the Greek alphabet; experiment with the Pythagorean theorem and Archimedes's famous principle (What *does* happen to the bathwater when you sit down in it? And what does *eureka* mean anyway?); make Greek-style pottery; hold your own version of the Olympic Games.

The bottom line throughout the educational process, though, is that children learn best what interests them. This, in a nutshell, is the problem with standardized curricula. The curriculum says Johnny should be mastering long division; Johnny doesn't give a hoot. Now what?

Given this situation, homeschoolers have a wide range of options. Perhaps an alternative math program may interest him—or math manipulatives in lieu of workbooks, or computer games, or real-world math exercises involving cooking, carpentry, and other hands-on projects. Or just give the kid a calculator.

Or concentrate on something that sparks Johnny's interest—space travel, rock collecting, raising tropical fish—all of which eventually involve math. Our experience in homeschooling has shown time and again that an interest in anything inevitably leads everywhere.

On the other hand, at some point or another everybody runs into the question of sequence. Where to start? How do you ensure that your kids have an adequate grounding in the basics? What *are* the basics? What comes first? What should you tackle next? And—depending on the homeschool laws in your particular state—how do you mesh your homeschool program with the required public school curriculum?

While public school curricula vary somewhat from state to state, all have similarities in that they attempt to present an appropriate developmental sequence of skills. In general, kids learn the letters of the alphabet first, then letter sounds, then the art of blending letter sounds into whole words. Addition and subtraction precede multiplication and division; studies of holidays and family life prepare beginners for broader-based studies of world and American history. Invented spelling precedes conventional spelling and grammar; basic algebra is a prerequisite for chemistry and physics.

Many states require that homeschoolers keep step with the public school curriculum and demand proof that they are indeed doing so. Depending on the state, this can take the form of written assessments (in some cases by an accredited teacher), student portfolios, or the inevitable standardized tests. Colleges, despite avowed interest in unusual students, often require test scores and a battery of high school background courses. In other words, there's considerable pressure by the educational establishment for homeschools to mimic the public schools—which, most homeschoolers agree, misses the point of homeschooling. On the other hand, given the range of resources and opportunities available, it's possible to give your kids the best of both worlds.

The standard curriculum functions best as a reference and a guideline rather than as a set of predetermined assignments. Usually there are equivalents and alternatives to the mandated standards, and parents should adjust and adapt to best meet the needs and interests of their own children. Realize too that public school curricula are designed for school systems dealing with a wide range of children, many with little home support.

When it comes to homeschooling, as Douglas Adams advised in his signature line from *The Hitchhiker's Guide to the Galaxy*, don't panic. Homeschoolers will inevitably find that their first grader isn't standard. He or she may be reading at an advanced level but lagging in such mandated essentials as arithmetic, time-telling, and the competent tying of shoes. Or, alternatively, he or she may have whizzed confidently ahead in math but be struggling with the awful process of stringing letters into words. Or he or she may be most interested in computer programming, bird-watching, or basketball.

Move forward or back in the curriculum for lists of concepts and suggestions. Variation is normal, and our many individual differences are what make the world the interesting place it is. Kids are natural learners, and each will find his or her own best way to learn. Help them do it. And always remember that there are many roads that lead to an educational Rome.

CHAPTER 3

The Three R's, Plus: Some General Principles

First, do no harm.

—UNKNOWN

For adults, the uncomfortable thing about our children's education is that ultimately—in whatever venue it takes place—we're not the star players. Education is something our kids will build for themselves over a lifetime—and our roles, as parents and educators, is to see that they have the wherewithal, confidence, and desire to do it. In education, there's a lot to be said for one of the principal precepts of bioethics: "First, do no harm." Don't make them miserable. If they're jabbing each other with pencils and begging to leave the table, chances are you need a break—or a new approach. Because people who don't want to learn something won't. Period.

On the other hand, learning isn't always easy. This adds to its value; kids, experiencing the satisfaction and sense of accomplishment that come from hard work and overcoming challenges, get hooked. We all do, from the teenager cracking quadratic equations to the toddler figuring out how to button her sweater by herself. Think of the rush you get from successfully dealing with wonky plumbing or a recalcitrant computer. Learning, done

right, is empowering. In other words, struggle and frustration are inevitable—but they're the price you pay for the thrill of the end result.

HELPFUL BOOKS

Brave Irene

William Steig. Square Fish, 2011.

Irene's dressmaker mother is ill, so Irene—in the face of a raging snowstorm—sets out to deliver the duchess's ball gown, battling the wind every step of the way. For ages 4–9.

The Little Engine That Could

Watty Piper. Grosset & Dunlap, 2001.

The classic tale of perseverance and positive thinking, as a little blue train struggles to take a load of toys over a mountain. For ages 3–7.

The Most Magnificent Thing

Ashley Spires. Kids Can Press, 2014.

A little girl sets out with a wagonload of widgets to make the most magnificent thing—but fails, time and again, until she quits in frustration. Finally, with some encouragement from her dog and a lot of tinkering and tweaking, she gets it just right. The moral: Try, try again. For ages 4–8.

Stuck

Oliver Jeffers. Philomel, 2011.

Floyd's kite is stuck in a tree and he's determined to find a way to get it down again. But everything he tries only seems to make the situation worse. (What would you do?) For ages 4–8.

Thank You, Mr. Falker

Patricia Polacco. Philomel, 2012.

Trisha, who is dyslexic, struggles with learning to read, until a perceptive teacher helps her overcome her reading disability. For ages 5–8.

All kids, as they grew older, will go their very different ways. But in order to do so, everybody needs basic tools. For starters, everybody needs to read.

Language Arts

Reading

Even though I was there every step of the way, I have no idea just how our children learned to read—and, given the disagreements in the professional reading literature, I’m not convinced that anybody else knows either. According to one theory, reading proceeds in logical and incremental fashion, from the memorization of letters to the mastering of phonemes, then to the decoding (sounding out) of words, and finally to the stringing of words into sentences and the comprehension of their meaning. This, in a nutshell, is phonics, which—authoritative as it sounds—is by no means the only way that kids learn to read.

Its opposite number in what is sometimes known as the “reading wars” is the whole-language approach, in which reading fluency develops through immersion in real written language, during which kids learn to decipher word meanings using a combination of best-guess logic and memory skills. Phonics proponents point out that such off-the-cuff sight-reading doesn’t provide kids with the tools to decipher unfamiliar words. Whole-language fans argue that theirs is the road to natural fluency.

Josh and Caleb, our oldest and youngest, essentially taught themselves to read by the time they were five or six, apparently from being continually read to and by poring over *Tintin*, *Calvin & Hobbes*, and *Garfield* books. This isn’t unusual, and many researchers point out that if kids grow up in a literate society, surrounded by books and readers, they’ll learn to read.

Education professor Peter Gray, who has written extensively on learning to read without formal instruction, lists seven basic principles of the process:

1. There is no critical period or optimal age for learning to read. For kids in conventional schools, there's tremendous pressure to learn to read on schedule: if your kid misses the crucial window, he or she will fall further and further behind. But when kids are left to develop as it suits them, they may learn to read anywhere between the ages of 4 and 11.
2. Once the time is right, kids can go from not reading to reading fluently quickly—even, according to some accounts, in a matter of weeks.
3. Attempts to push reading before a kid is ready can backfire. Kids can end up stressed, resistant, and resentful, and—rather than loving reading—may begin to loathe the whole idea.
4. Learning to read comes most easily when kids perceive it as a means to a valued end.
5. Like many skills, there's a social component to reading, and shared participation is a plus.
6. Some kids learn to read as they write.

As to this last particular, Ethan, our middle son, was a case in point. He enjoyed our phonics projects and had no difficulty learning letters and letter sounds—but he had a hard time integrating his phonics knowledge with the outrageous irregularities of English spelling. Phonics, he pointed out irritably, never really worked: *G* sometimes sounds like *J*; *C* sometimes sounds like *S*; and words like *through*, *neighbor*, and *night* make no earthly sense whatsoever. On the other hand, a knowledge of phonics did allow him to write, using his own invented (but logical) spelling. Armed with phonics, Ethan kept journals, wrote letters to friends and relations, and composed stories and poems, all well before he could read conventional English in anything but a limited capacity. Without phonics, we would never have seen Ethan's tales of the rocket-building PNGWIN, the evil criminal SKNK, or the enormous SE MONSTR, or known—from his bold notation on the refrigerator-posted family bird list—of his sighting of a CHIKADE.

7. Don't panic. There's no predictable course through which kids learn to read.

From my homeschool journal (Josh is 9; Ethan, 7; Caleb, 5):

Caleb is reading simple books these days. He asks for words all the time—“What does this one say?”—and once he’s told, he never seems to forget. Ethan is still doggedly halting along and will ask for the same word over and over without connecting. He doesn’t seem bothered by Caleb’s burgeoning expertise, however; he’s got his own set of skills. Yesterday he completely dismantled Caleb’s pedal tractor, repaired the chain and steering wheel, and put the whole thing back together again—it now works—and day before yesterday, with a collection of electrical odds and ends, he figured out how to light three lightbulbs at the same time, turning them on and off with a switch triggered by opening the kitchen door.

In other words, learning styles and paces are different from kid to kid. That’s what makes us interesting.

RESOURCES

The Read-Aloud Family: Making Meaningful and Lasting Connection with Your Kids

Sarah Mackenzie. Zondervan, 2018.

The most rewarding and effective learning in our homeschooling experience came from simply reading aloud together, discussing as we went. Mackenzie’s book includes book lists and strategies for readers and listeners of all ages.

The Read-Aloud Handbook

Jim Trelease. Penguin, 2013.

Now a classic, this covers the theory and practice of reading aloud, sustained silent reading, digital learning, TV and literacy, and more. Also included is a list of great read-aloud books.

Reading Magic: Why Reading Aloud to Our Children Will Change Their Lives Forever

Mem Fox. Mariner Books, 2008.

When, where, why, and how to get the most out of reading aloud.

Family Book Journal

All you need for this one is a notebook and some group book talk. For each book that you and your kids have read together, record each person's opinions, comments, favorite or least favorite characters, best or worst happenings, illustrations, and anything else your kids might like to share. Not only a useful reading record, but eventually a wonderful collection of memories.

Literature

Once we know how to read, there are many reasons to keep it up, not least because it makes us better people. Studies show that individuals—even young children—who read fiction are more empathetic and understanding of others than those who don't.

Hundreds of book lists and recommendations can be found online.

RESOURCES

Children's Book-a-Day Almanac

Anita Silvey. Roaring Brook, 2012.

An event of the day plus a detailed description of a related book for every day of the year. See the website at childrensbookalmanac.com.

Five in a Row (FIAR)

fiveinarow.com

Lessons in science, social studies, language arts, art, geography, and applied math are based on selected children's books. FIAR is targeted at ages 4–8, Before FIAR at ages 2–4, and Beyond FIAR at ages 8–12. Above and Beyond FIAR, for middle-grade students, is a series of multidisciplinary lesson plans based on Rachel Field's *Hitty: Her First Hundred Years* (Macmillan, 1969).

Great Books Foundation

www.greatbooks.org

The Great Books Foundation programs are based on a “shared inquiry” approach to reading in which stories and selections are paired with interpretive questions (to which there are more than one answer) to encourage conversation and debate. This sounds stuffier than it is; Great Books reading picks are excellent and thought-provoking, and the associated questions spark lively discussions. Books and reading guides are available for all ages from preschool to adult. See the Junior Great Books for grades K–5, Middle School Great Books for grades 6–8, and High School Great Books (Introduction to Great Books) for grades 9–12.

We Need Diverse Books

diversebooks.org

Founded by a grassroots organization dedicated to promoting literature that reflects the lives of all young people, the website has an extensive list of sites featuring diverse children’s books.

Worlds of Words

wowlit.org

Global reading lists paired to Common Core state standards. Books, both fiction and nonfiction, are categorized by grade level from kindergarten to grade twelve. For each, a list of cross-cultural “global pairs” is provided.

Subscription Book Clubs

Since the Book of the Month Club shipped out its first selection in 1926 (Ernest Hemingway’s *The Sun Also Rises*), subscription book clubs have multiplied, diversified, and come a long way. Many cater specifically to kids of all ages, from birth and up. Selections are often excellent and accompanied by appealing extras (activities, book stickers, prizes)—and it’s always a thrill to get books in the mail. See these:

Bookroo

bookroo.com

Monthly boxes come with two to three books, variously appropriate for ages 0–3, 2–6, or 7–10. For families with kids of multiple ages, there's an option for an alternating subscription, in which younger and older kids get boxes in alternating months.

Kid Curated Books

kidcuratedbooks.com

Subscribers take a questionnaire about their child's reading preferences; kids then receive monthly boxes of four interest-appropriate books. For ages 8–12.

Kids BookCase Club

www.kidsbookcase.club

A range of plans for ages 0–2, 2–4, 5–6, 7–8, and preteen. Each month subscribers get three handpicked books.

Learning Crates

www.learningcrates.com

Each subscription box contains seven to ten items, including books, games, and hands-on activities and experiments, for kids in grades K–6. Subscribers fill out a questionnaire about each child's interests, hobbies, and areas of needed academic improvement.

Literati

literatibooks.com

Four subscription choices, variously for ages 0–3, 3–5, 5–7, and 7–9. Subscribers get five age-appropriate monthly selections to try; those you like, you can purchase for Amazon-competitive prices; those you don't, you pop into the included mailer and send back.

Owl Post Books

www.owlpstbooks.com

Choices include Book of the Month and Imagination Box subscriptions for ages 0–3, 4–7, and 8–11, and a YA Artist and Writer subscription for ages 12 and up.

Reading Bug Box

www.readingbugbox.com

Each monthly box contains three to four books plus assorted educational extras. Categories are Baby (0–30 months), Read to Me (0–4 years), Early Reader (5–8), and Reader (8–13).

Writing

According to the 2017 National Assessment of Educational Progress, writing is clearly a challenge for American students: 75 percent of eighth and twelfth graders don't make the grade. The Common Core state standards, rolled out in 2010, require that students become proficient in three types of essay writing—argumentative, informational, and narrative—but to date such decrees don't seem to have had the desired effect. And, as with reading, there's no consensus as to how to deal with the problem.

Educational research now indicates that kids learn to write in the same way that they learn to speak; that is, spontaneously, and via exposure to an array of print elements, from cereal box labels to road signs, magazines, newspapers, and TV. Kids as young as 2 know the difference between writing and drawing, and will try their hands at both. At 2 or 3, their output still looks pretty much like scribbles, but the idea is there.

Traditionally, writing has been taught via structured worksheet-centered programs, which involve everything from letter tracing to the memorization of spelling words. Much of this, according to Charles Temple and colleagues in *The Beginnings of Writing* (see [this page](#)), is a waste of time. “Many well-meaning parents buy workbooks and have kids sit quietly in a chair and trace letters over and over again,” says one early-literacy specialist, adding, “That's totally uninspiring.” Alternatives might involve a multisensory approach: making letters with finger paint or modeling clay, experimenting with sidewalk chalk, drawing in the sand at the beach, building letters with Lego blocks. Try baking alphabet cookies or going on a letter-spotting walk.

Kids *want* to write, emphasized the late Donald Graves, an expert on the teaching of writing—but, he believed, traditional school programs

discourage this by throwing up walls of rules and regulations in children's paths. Let kids develop their own invented spellings, encourage them to choose their own topics, and give them the opportunity to watch adults struggle with composition, says Graves. This last was particularly easy here: I began writing professionally when our oldest was a baby, and our kids grew up with every head-bashing detail of the writer's life.

Not everyone agrees with Graves's live-and-let-live philosophy, however; a contingent of educators continues to tout a formalized, traditional approach, progressing from sentence to paragraph, with reinforcement of punctuation and grammar rules.

RECOMMENDATIONS

1. Focus on the kids' ideas. Help them communicate their information, and turn writing into an opportunity for kids to teach or tell others about something they know.
2. Write often, preferably daily.
3. Provide feedback and discussion.

RESOURCES

Any Child Can Write

Harvey S. Wiener. Oxford University Press, 2003.

A well-constructed home writing program with many suggestions for projects and activities.

The Beginnings of Writing

Charles A. Temple et al. Pearson, 2012.

A helpful overview of the developmental process of writing, from toddler scribbles to invented spelling and on, with many examples of children's work and suggestions for how to encourage writing.

Writing: Teachers & Children at Work

Donald Graves. Heinemann, 2003.

Graves, known as the father of "processing writing," has many valuable insights on how kids flourish as writers.

Draw Write Now

www.drawyourworld.com/books

The problem with practice is that—despite the obvious eventual rewards—often kids don't like it much. The Draw Write Now writing program is a possible solution, combining topics that appeal to kids with step-by-step drawing and writing exercises.

National Writing Project

www.nwp.org

The National Writing Project (NWP) promotes writing for students from preschool to college. The website has resources on all aspects of writing, including activities and projects for young writers, informational articles and essays, research publications, and a bookstore devoted to writing education.

Zaner-Bloser

www.zaner-bloser.com

Handwriting workbooks and journals for pre-K through grade eight. Zaner-Bloser also sponsors an annual National Handwriting Contest for grades K–8.

WHERE TO GET PUBLISHED...FOR KIDS!

It's always a plus to see your name in print.

The Apprentice Writer

www.apprenticewriter.com

Publishes fiction, memoirs, personal essays, poetry, and photography by high school students.

Ember

emberjournal.org

Publishes fiction, poetry, and creative nonfiction by kids ages 10–18.

Merlyn's Pen

www.merlynspen.org/us

Publishes fiction, essays, and poems by teens.

New Moon Girls

newmoongirls.com

By and for girls ages 8–14. See the website for submission guidelines.

Mark Twain's Mantelpiece and Other Writing Helps

Each night after dinner, author Sam Clemens—better known as Mark Twain—told a story for his three daughters. The rules, invented by the girls, were that every item on the family mantelpiece had to be incorporated into the tale.

Our kids loved the idea, so we began a storytelling game of our own, based on household bric-a-brac and miscellaneous objects lined up on the kitchen table. Later this turned into a writing game, and I've used it in writing workshops with kids of a wide range of ages. Each participant gets an envelope containing a cut-out cardstock mantelpiece and an assortment of individual word cards. Put the mantelpiece on the table; then (no peeking) grab three or four word cards and line them up on the mantelpiece. (Examples: *emerald—bottle—typewriter—ship*.) Use them in order to tell or write a story.

There are many websites that provide lists of writing prompts and story starters for writers of all ages, from beginners to adults. There are also many

commercial writers' journals. For example, *365 Ideas to Write About* (Thomas Media, 2017) gives writers one or two single-word ideas per page; 826 Valencia's *642 Things to Write About: Young Writer's Edition* (Chronicle Books, 2014) provides longer story starters ("Write a story that includes a streetlight, a bear, and a kid with a jar of honey").

Skipping Stones

www.skippingstones.org

Multicultural literary magazine; accepts stories, essays, and poems from kids of all ages and in all languages.

Stone Soup

stonesoup.com

Publishes stories, poems, and art by kids ages 13 and younger. See the website for submission info and ongoing contests.

Teen Ink

www.teenink.com

Publishes articles, stories, poetry, art, and photos by teens; also sponsors numerous contests.

Spelling

My spelling is Wobbly.

—A. A. MILNE

Some educational researchers claim that weekly spelling lists and tests improve students' spelling skills. Others claim that they do not, and that spelling is more effectively taught through writing and reading.

Literacy professor Timothy Shanahan, who argues for a traditional list-and-test approach, points out that spelling is important for the following reasons:

1. Spelling is included in the educational standards.
2. Spelling is related to reading. If students can spell well, they read better.
3. Spelling is related to writing. Students who can spell well are more likely to use a wider vocabulary in their written work.
4. Bad spelling leads to negative social judgments.
5. Spell-check programs aren't infallible.

Of these, I'd argue that (1) is a wretched reason to learn spelling, and (2) and (3) are debatable: reading and writing generally precede accurate spelling, and in fact there's considerable evidence that an obsession with correct spelling inhibits beginning writers. On the other hand, bad spelling undeniably makes for negative social judgments—misspellings on a college essay or job application can boot you right out of the running—and we all know that spell-check programs, unless human-checked, can make us look like idiots.

In an alternative to the traditional approach, spelling is integrated with the student's reading and writing—that is, kids learn to spell *penguin* while reading *Mr. Popper's Penguins* or *rocket* while writing a story about a trip to the moon. None of our kids ever wanted to memorize spelling words and have weekly spelling tests, and all seemed to learn to spell reasonably well through a version of this integrated method. We had ongoing word discussions and kept lists of words that interested them: "What's the longest word in the world?" "Why did colonial people make their s's look like f's?" "How come *armadillo* is spelled with two a's?"

Accommodating Broccoli in the Cemetery—or Why Can't Anybody Spell English?

Vivian Cook. Profile Books, 2005.

A survey of impossible spelling, with examples from literature and assorted difficult spelling tests, which most of us can't pass.

P Is for Pterodactyl

Raj Haldar and Chris Carpenter. Sourcebooks Jabberwocky, 2018. Subtitled *The Worst Alphabet Book Ever*, this is an illustrated collection of some of the most maddening words in English, among them “*A* is for *aisle*,” “*C* is for *czar*,” and “*G* is for *gnocchi*.”

It's worth noting that homeschoolers famously excel at spelling. To date, the youngest person to qualify for the Scripps National Spelling Bee has been a 5-year-old homeschooler—and while just 3 percent of the school-age population are homeschoolers, homeschooled kids make up 10 percent of Bee finalists. Kids are eligible to compete in the National Spelling Bee through the end of eighth grade, and each year the Bee publishes a study list of 450 words, chosen from books selected by the Scripps editorial team for age-appropriate content and rich vocabulary. See the website for the annual list, categorized by grade.

Scripps National Spelling Bee

spellingbee.com

Grammar

All the research says don't teach it—at least not as a separate, isolated subject. One study, for example, divided high school students into three groups and followed their progress for three years. Two groups were given formal instruction in grammar; the third was taught no grammar at all but given more literature and creative writing. At the end of the study, there were no significant differences in writing competency among the groups—but the kids who had been made to study grammar hated English.

Most public school curricula have not yet cottoned on to this, so realize that if your kids aren't circling the nouns and verbs and defining *subject*, *predicate*, and *adverbial clause*, you're bucking the system. Kids do need grammar for a variety of reasons—grammatical errors interfere with clarity,

grammatical errors make you look like an ignoramus, and a knowledge of language structure is helpful in studies of foreign languages—but grammar is best taught through reading and writing. In a sense, it’s like riding a bike. Rather than spending endless amounts of time defining *drive chain*, *frame*, and *sprocket*, you simply climb onto the thing and start pedaling.

That said, the English language has a long and fascinating history. How many of our words come from Native American languages? From the Vikings? From Africa? From ancient Greece? Where did punctuation come from? How old is Old English? How does English keep changing? What are the most beautiful words in English? Why?

Kids should know that English is a creative, ever-evolving, and all-encompassing construct, a phenomenal linguistic hodgepodge with infinite possibilities. It’s a marvelous tool. And while the rules of grammar have their place, they’re also made to be broken.

Wait until your kids hit e.e. cummings and Gertrude Stein.

RESOURCES

Editor in Chief

www.criticalthinking.com/editor-in-chief.html

This series of interactive workbooks, for grades two through twelve, teaches grammar through editing, as kids correct error-laden passages filled with other people’s mistakes. Pair with red pencils.

Learning Language Arts Through Literature

www.commonensepress.com

From Commonsense Press, this series of activity books for grades one through eight teaches grammar through children’s books. Each incorporates reading, spelling, grammar, and handwriting.

Very Silly Sentences

DK Toys & Games

A board game for ages 4–7 in which kids use color-coded puzzle pieces to build silly (or serious) sentences while learning parts of

speech.

Listening and Speaking Skills

To the average person, if you have to go to a funeral, you're better off in the casket than doing the eulogy.

—JERRY SEINFELD

Fear of speaking in public (the official term is *glossophobia*) reportedly afflicts some 74 percent of American adults. It's not clear why public speaking so dramatically freaks us out. One theory is that it's evolutionary: in the days when large predators were a menace, being part of a group was a survival strategy, while standing out on one's own—say, on a stage, behind a podium—meant risking death.

Now, however, the ability to effectively and coherently communicate in public is a major advantage. The impressively articulate students from Florida's Marjory Stoneman Douglas High School—who survived a 2018 school shooting and went on to make a passionate case on the national stage for gun control legislation—came from a school system that, unlike many, supports a prominent middle and high school debate program emphasizing extemporaneous speaking and the ability to effectively and coherently defend a point of view. The school also has an exceptional drama program—what better way to experience public speaking?—and features a broadcast journalism program for students, aired on public-access TV.

Your kids' ability to make their case effectively in public will serve them well for the rest of their lives, in everything from college and job interviews to town meetings. See grade-by-grade resources and suggestions in following sections.

Mathematics

Math for many homeschoolers is the most problematic of the three R's. In our homeschool, Josh loathed it, Caleb tolerated it, and Ethan loved it and went on to major in math in college. Josh dug in his heels after seventh-grade algebra, announcing that if he ever needed more math in the future—the implication being that he certainly wouldn't—he'd learn it then. Otherwise, this stuff was making him miserable, it was a waste of his time, and he was *done*.

In that, he was in line with Andrew Hacker, author of *The Math Myth* (see [this page](#)) and of an attention-getting op-ed piece in *The New York Times* titled “Is Algebra Necessary?” Hacker argues that while arithmetical numeracy is important—everybody, for example, needs to be able to balance a checkbook, understand a budget, and not get hornswoggled by the statistics presented on the nightly news—traditional high school math (algebra, geometry, and calculus) is unnecessary for most. In fact, making higher math mandatory for high school graduation and college admission unfairly sets millions of kids up for failure. And how many of us actually use it? “Did you use the polynomial equation today? When did you last calculate the volume of a sphere?” writes an anti-math sympathizer.

Mathematicians, on the other hand, argue that a thorough grounding in math provides kids with essential critical thinking and analytical skills. Some blame math's unpopularity not on math per se but on the generally awful way in which it is taught. Paul Lockhart, in *A Mathematician's Lament* (see [this page](#)), points out that if music were taught as we currently teach math, kids would spend endless time filling in worksheets on music notation and theory without ever singing, playing an instrument, or listening to music. A meaningful art form would thus be reduced to a mindless and trivial exercise—and most kids, frustrated and bored to tears, would lose all interest in music.

Math, similarly, is meant to be played with and enjoyed. Kids need substantive problems—by which Lockhart doesn't mean workbook exercises (“insipid”) but problems they can sink their teeth into. Do prime numbers keep going on forever? Is infinity a number? Where did pi come from? How many ways can you symmetrically tile a surface?

“But don't third graders need to be able to do arithmetic?” opponents and worried parents commonly ask. “Why?” Lockhart retorts, pointing out

that very few 8-year-olds spontaneously beg to learn long division or to calculate the answer to $427 + 389$. Instead, he suggests, kids in elementary-level math classes should play games. Try chess, Go, backgammon, Battleship, and strategy games. Do puzzles. Solve mysteries using deductive reasoning—which is, at rock bottom, the stuff of mathematical proofs. All these encourage active and creative mathematical thinking, which is far more important than notation and technique.

Lockhart, as you can imagine, has little positive to say about the public school mathematics curriculum, which he pillories as a lot of mindless memorization largely divorced from meaning, curiosity, or the joy of discovery. For those who feel compelled to stick with it despite its limitations, be sure to check out suggested supplements and alternatives in future chapters. As Lockhart says, “We could all be having so much more fun.”

Josh, freed of algebra, played chess and strategy board games. He joined a local gaming group, for which he designed complex Dungeons and Dragons adventures. He learned to play poker. He did logic puzzles. He investigated Möbius strips, topology, the four-color map theorem, the DNA double helix, cryptography, Rube Goldberg machines, Benjamin Franklin’s number squares, and Charles Babbage and Ada Lovelace’s difference engine. He read math-related books (see [this page](#), [this page](#)). He dropped the traditional math curriculum, a decision over which I had cowardly fits. But in the wisdom of hindsight, it’s clear that he didn’t drop math.

RESOURCES

Family Math

Jean Kerr Stenmark et al. Lawrence Hall of Science, 1986.

A collection of over 300 activities for kids and family, with simple manipulatives like pennies, buttons, beans, and string. Included are pages of useful reproducibles, such as game boards, hundred charts, and number lines.

In the same activity-based format, see *Family Math for Young Children* (1997) and *Family Math II* (2003).

The Math Myth: And Other STEM Delusions

Andrew Hacker. The New Press, 2018.

Is algebra necessary? For many, almost certainly not.

A Mathematician's Lament: How School Cheats Us Out of Our Most Fascinating and Imaginative Art Form

Paul Lockhart. Bellevue Literary Press, 2009.

A must-read for those who hope their kids will become creative and invested mathematical thinkers.

MATH PROGRAMS FOR KIDS

CTCMath

www.ctcmath.com

An online curriculum for K–12 presented in the form of short tutorials followed by interactive questions to ensure comprehension.

Eureka Math

greatminds.org/math

A complete curriculum for pre-K through grade twelve, available as free PDF downloads, accompanied by instructional materials and support resources.

Everyday Mathematics

McGraw-Hill

everydaymath.uchicago.edu

Developed by the University of Chicago School Mathematics Project, this series for K–6 reinforces abstract concepts through real-world applications. Included are hands-on activities and problems with drawing and written components.

JUMP Math

www.jumpmath.org

Developed by a Canadian mathematician, JUMP uses small steps and puzzles in a process of “guided discovery,” said to be particularly successful with kids who are intimidated by math. Teaching guides and lesson plans are free from the website; workbooks are available for sale. For K–8.

Life of Fred

Stanley Schmidt. Polka Dot Publishing.

www.lifeoffred.uniquemath.com

Math for grades K–12 through the chatty adventures of a pint-sized math genius named Fred, who solves varied math problems in the course of everyday life.

Math Techbook

Discovery Education

www.discoveryeducation.com/solutions/math-techbook

Digital textbooks for middle and high school: grades six through eight, Algebra I, Geometry, Algebra II, and Integrated Math I, II, and III. Individual units have Discover, Practice, and Apply features, with hands-on investigations, independent work with immediate feedback, and problems with real-world context.

Mindset Mathematics

Jo Boaler et al. Jossey-Bass.

www.youcubed.org/mathematical-mindset-teaching-resources/

A creative series for grades K–8, concentrating on visualization, play, and investigation while reinforcing connections among mathematical concepts. Boaler, a professor of math education at Stanford, and colleagues incorporate new research on brain science into math learning.

Miquon Math

miquonmath.com

Miquon Math is a hands-on curriculum using Cuisenaire rods (page [this page](#)). The program, designed for grades one through

three, consists of six colorful books: Orange and Red (grade one), Blue and Green (grade two), and Yellow and Purple (grade three). All the basics, with investigations, games, and puzzles.

Ready Mathematics

Curriculum Associates

www.curriculumassociates.com

A curriculum for grades K–8 using “Picture It” and “Model It” problem-solving approaches.

Singapore Math

www.singaporemath.com

Attractively illustrated texts and workbooks with varied exercises and activities for pre-K through grade eight.

History and Geography

History and geography in the public schools are often grouped under the broader category of “social studies,” a combination discipline that includes American and world history, geography, civics, economics, sociology, political science, and cultural anthropology.

Traditionally these are taught from textbooks, with frequent quizzes to make sure that kids are absorbing the material; and this lecture-and-test method continues to be the most common way of teaching history today. Progressive educators argue vociferously that this is the worst possible approach. “When it comes to teaching history,” writes educator David Cutler in a 2014 article in *The Atlantic*, “nothing destroys student interest faster and more completely than a heavy reliance on textbooks.”

Rather than emphasizing rote memorization of facts that most won’t retain in the long-term—quick, what can you today, as an adult, tell me about the Congress of Vienna or the Teapot Dome scandal?—history should teach kids to read critically and make effective arguments based on

evidence. Good history courses, rather than teaching from a single book, provide a thought-provoking range of primary and secondary sources, intended to give students a deeper understanding of history as a whole and a sense of history as an active interpretive process. This is known as the inquiry-based approach to history, in which kids try to answer such questions as “Who built the pyramids?” “Who discovered America?” “Did Pocahontas really rescue John Smith?” and “Was Abraham Lincoln a racist?”

Also important, progressive history teachers emphasize, is relevance: connecting history to today. Cutler explains that he introduces studies of the sixteenth-century Spanish conquistadors with a clip from the 1987 film *Wall Street* in which inside trader Gordon Gekko, played by Michael Douglas, delivers a classic monologue on “greed is good”; he also pairs studies of landmark Supreme Court rulings on the supremacy of the federal government with current state debates over abortion and the legitimacy of marijuana laws.

Traditional history classes also often miss out on what’s going on in the world right now. “I find it worrisome,” Cutler writes, “when students can explain the finer points of lesser-known historical events...but then have little clue about major world events happening in the present.” He assigns weekly news articles for students to read and discuss. Try it with your kids at dinnertime.

The Journey

In *The Journey*, a semester-long course created by history professor Eileen Scully of Vermont's Bennington College, students role-play a character taking a specific trip at a certain point in history—say, traveling from London to Cathay during the Middle Ages, or from Boston to San Francisco during the mid-nineteenth century. Participants invent a character with a background and family tree, and

document their journey through letters, maps, and journal entries. This can be endlessly repeated—and is a terrific learning experience, entailing an astounding amount of multidisciplinary research. Adaptable to a wide range of ages.

The common alternative to inquiry-based history is the traditional “heritage” approach, which concentrates on promoting a sense of national identity, patriotism, and civic pride through lessons about the founding fathers, national heroes, national symbols, and the like. The idea here is to socialize kids such that they share common community values—though since agreeing on ideal common values is difficult, this comes with its own set of pros and cons.

History is generally taught chronologically. A survey of American history, for example, generally begins with the arrival of the first prehistoric peoples and continues through early American civilizations, the European explorers and settlers, the colonial period, the Revolutionary War, the Civil War, the events of the twentieth century, and modern times.

History also—in education, as in the real world—repeats itself. Kids generally encounter the same topics several times in the course of traditional primary and secondary programs, learning through picture books and simple projects in the early years, investigating in greater depth using comprehensive texts and primary source materials in later years. One suggestion is that kids study ancient history in grades one, five, and nine; the Middle Ages and the Renaissance in grades two, six, and ten; the seventeenth through nineteenth centuries in grades three, seven, and eleven; and modern history in grades four, eight, and twelve, thus covering world history three times, in four blocks of three years.

In a homeschool environment, approaches, topics, and emphasis will inevitably vary with the interests of the students. The Middle Ages or the American Civil War period, for example, may occupy kids for months, while other time periods may get short shrift. A science-oriented child may

be happier approaching history through science and inventions, a young artist through art or music. Adapt to suit their interests and learning styles.

RESOURCES

Lies My Teacher Told Me: Everything Your American History Textbook Got Wrong

James W. Loewen. Touchstone, 2007.

Loewen surveyed eighteen prominent American history textbooks and found that not only did they make history boring, but they perpetuated historical myths, misinformation, and blind patriotism. An American Book Award winner.

Also by Loewen, see *Teaching What Really Happened: How to Avoid the Tyranny of Textbooks and Get Students Excited About History* (Teachers College Press, 2009).

Opposing Viewpoints Series

Various authors. Greenhaven.

Books in this series cover the pros and cons of a wide range of controversial topics, among these corporate farming, immigration, abortion, race, welfare, and gun control. For ages 13 and up.

Why Won't You Just Tell Us the Answer?

Bruce A. Lesh. Stenhouse Publishers, 2011.

In lieu of traditional methods of history teaching—lecture and memorization—that have turned so many students off in the past, Lesh's book proposes an active investigative and interpretive approach involving critical analysis, and awareness of multiple perspectives and changing attitudes over time.

Social Studies School Service

www.socialstudies.com

A large catalog of social studies resources for K–12, categorized under U.S. history, world history, geography, government and law, economics, and psychology.

Science

The world looks so different after learning science.

—RICHARD P. FEYNMAN

According to the 2015 results from the National Assessment of Educational Progress (NAEP), sometimes called the Nation's Report Card, just 37 percent of America's fourth graders, 32 percent of eighth graders, and 20 percent of twelfth graders are considered proficient in science, as determined by standardized tests. It's a discouraging result, especially given that kids are natural scientists, primed to explore the world around them and figure out how it works. To find that so many don't make the grade in science doesn't make sense. We must be doing something wrong.

Like math, science tends to be taught as a collection of facts, of the sort that can easily be turned into multiple-choice questions on tests. According to a recent NAEP survey, kids in school reported only limited hands-on engagement with science: 58 percent, for example, had never experimented with simple machines, and 62 percent had never worked with living things. Only 17 percent had used a microscope, and just 18 percent reported experimenting with chemicals. Worse, it's not clear that even such hands-on experience as schoolchildren get makes much of a difference. Science, rather than being experienced as an exciting field filled with world-changing possibilities, is coming across as yet another rote exercise.

Most scientists come to science through active, hands-on meddling. They monkey with chemicals in homemade labs in the garden shed; collect rocks and beetles; build catapults, potato cannons, and robots; and rig up shatteringly loud burglar alarms that go off when an unsuspecting parent opens their bedroom door. It's this unpredictable process of exploration and discovery that makes science so appealing.

Not everybody will become a professional scientist—but everybody needs knowledge of the way science works. Do vaccines cause autism?

Does human activity cause climate change? What's killing the bees? Are GMOs dangerous? These are all science questions. Kids—and adults—should be able to verify sources, look at the experimental results, evaluate their validity, and draw defensible conclusions. If you're going by a splashy headline in the *National Enquirer* or a Facebook anecdote, chances are you're not getting reliable scientific information.

There are two major approaches to formal science curricula. One favors a separation of the four major scientific disciplines, in which earth and space science, biology, chemistry, and physics are taught in succeeding years. The other favors an integration, studying all four at once and emphasizing the connections among them. Astronomy, for example, overlaps with physics and chemistry (“What’s the speed of light?” “What are stars made of?”); physics and chemistry overlap with biology (“How do electric eels work?” “What’s stomach acid?”).

Science programs, of course, work best if skewed toward the interests of the students. Say your kid is obsessed with telescopes; the public school curriculum calls for amphibians. What to do? You may end up studying both at once (after all, it's the rare child who doesn't like frogs). You may end up covering amphibians with one quick picture book and a trip to the neighborhood pond and then concentrating on stargazing, building a telescope, assembling a solar system mobile, and mapping the moon. Just realize that this last—all learning being the tightly woven web that it is—brings you back to frogs again. Some cultures claim to see a frog on the face of the full moon.

RESOURCES

The Demon-Haunted World: Science as a Candle in the Dark

Carl Sagan. Ballantine Books, 1997.

A wonderful defense of science and scientific thinking in the face of irrationality and superstition. Included is the essay “No Such Thing as a Dumb Question,” a reflection on the state of science education.

Falling for Science

Sherry Turkle, ed. MIT Press, 2011.

A collection of stories from MIT scientists and engineers about how they were first inspired to pursue their adult careers by childhood toys, from Lego bricks to My Little Pony to a basketful of plastic Easter eggs. A tribute to the importance of childhood fooling around.

The Two Cultures and the Scientific Revolution

C. P. Snow. Martino Fine Books, 2013.

Snow's famous 1959 essay on the great divide between the "two cultures"—the sciences and the arts—and the importance of building bridges to bring them together. Invaluable when your computer-obsessed kid asks, "What's the point of reading Shakespeare?" It's a problem that still hasn't been solved.

Science Fairs

Science fairs have gotten some flak, in part because they have a tendency to turn into competitions among parents rather than kids, and in part because students often opt for canned experiments rather than original research. That said, giving kids a venue for conducting and sharing research projects is a good idea, and local public schools that host science fairs often allow homeschoolers to enter.

More challenging national venues include the Intel International Science and Engineering Fair and the Regeneron Science Talent Search, both for high school students; and the Broadcom MASTERS science and engineering competition for middle school students. For more information, see student.societyforscience.org.

Odyssey of the Mind

www.odysseyofthemind.com

A creative problem-solving contest for kids of all ages. Each year participants have a choice of five challenging problems, plus one primary problem for grades K–2.

Science Buddies

www.sciencebuddies.org

Over a thousand potential science fair projects in physical science, life science, earth and environmental science, behavioral and social science, math and computer science, and engineering, categorized by grade level.

SOURCES FOR SCIENCE EQUIPMENT, KITS, AND SUPPLIES

Looking for lab glassware, dissection specimens, molecular model kits, or programmable robots?

American Science and Surplus

www.sciplus.com

An eclectic and usually inexpensive collection of kits, models, electronic widgets, optical equipment, lab supplies, and more. And the catalog is just plain fun to read.

Carolina Biological Supply Company

www.carolina.com

An impressive collection of products for scientists of all ages and skill levels, including lab equipment, microscopes, living organisms, dissection specimens, and much more in the fields of biotechnology, chemistry, life science, and the physical and earth sciences. Included are science kits for distance learning and suggestions for homeschool science.

ETA Hand2Mind

www.hand2mind.com

Resources and supplies for math, science, and literacy for preschoolers through grade eight.

Home Science Tools

www.homesciencetools.com

Science supplies for preschool through high school in the fields of biology, chemistry, earth science, and physics and engineering.

Some curricula and kits are aimed at a conservative Christian audience.

Lab-Aids

lab-aids.com

Curricula and resources for middle- and high-school-level students in the fields of earth science, physical science, life science, biology, chemistry, environmental science, and agricultural science.

Nasco

www.enasco.com

A large and varied selection for all ages, from math manipulatives and building kits to lab supplies. STEAM resources, for example, include materials for studying virtual reality, circuitry and electricity, coding, engineering, the environmental sciences, robotics, and more.

Scientifics Online

www.scientificsonline.com

Science toys, kits, and instruments for all ages.

Ward's Science

www.wardsci.com

Resources, kits, models, specimens, and supplies for biology, earth science, chemistry, physics, and more.

Citizen Science

Citizen science projects are conducted with the help of public volunteers—that is, ordinary people of all ages. There are many projects in which kids and families can participate, such as the Audubon Christmas Bird Count and Great Backyard Bird Count, which monitor bird species; Annenberg Learner's Journey North, which tracks hummingbirds, butterflies, robins, and more; and the Great Sunflower Project, in which participants plant

sunflowers and monitor bee visits. You might even create your own citizen science project: see www.citsci.org.

National Geographic Citizen Science Projects

www.nationalgeographic.org/idea/citizen-science-projects

Long, annotated lists of possible projects, among these monitoring night-sky brightness, water quality, frogs and toads, birds, and butterflies.

Scientific American Citizen Science

www.scientificamerican.com/citizen-science

Many creative projects for all ages and interests. Enroll your dog in a “Darwin’s Dogs” study, help monitor ocean plastic litter, track turtles and dragonflies, help hunt for asteroids. Continually updated.

Foreign Language

Away with him! Away with him! He speaks Latin.

—WILLIAM SHAKESPEARE

The ideal way to learn a foreign language is to have your parents speak it to you, fluently, from infancy on. Unfortunately, since we were no help there, our kids were doomed to acquire foreign languages the hard way: by deliberate study. In retrospect, we put this off far too long.

Natural language learning is referred to as immersion—that is, beginners simply surround themselves with the language and learn it in context. Kids spending a few months as exchange students in a foreign country learn a second language in this fashion, just like they picked up their first. If that’s not a viable option, second-best is a formal program that provides plenty of exposure to the spoken language. (Nobody ever became conversationally fluent by conjugating verbs in a workbook, which is why I

can read French but can't speak it.) Many programs targeted at small children include song tapes, which are excellent: as kids sing, speak, and listen, they get added memory boosts from melody, rhyme, and rhythm.

You might also look for a tutor: friends, neighbors, or students at local colleges and universities who are fluent in foreign languages may be willing to trade services or teach your kids for a fee.

While foreign language instruction in the public schools traditionally doesn't begin until middle or high school, researchers agree that in foreign language learning, the key is to start young, preferably before the age of 6. On average, children in Europe begin learning foreign languages between the ages of 6 and 9. In Belgium, kids begin at 3, and foreign-language study is compulsory there until the age of 18.

Foreign language teaching basically falls into two camps, one emphasizing communication, conversation, and practical usage; the other a traditional, grammar-based approach in which students learn language rules. Most public school programs are a mix of the two, and professional language consultants say that there's no single method that works best.

HELPFUL HINTS FOR LANGUAGE LEARNERS

1. Read books in your target language. For beginners, many children's picture books are available in a range of languages.
2. Keep a dictionary at hand and record words you don't know in a notebook, either in hard copy or online. Use your notebook frequently for review.
3. Try comparative reading—read bilingual books or read the same book, side by side, in both your native and target language.
4. Try foreign-language comic books.
5. Read along while listening to foreign-language audiotapes.

Then there's the question of which language to learn. Here, Josh initially opted for Latin, Japanese, and Mayan; Ethan for Russian and Sumerian; and Caleb for German, Esperanto, and American Sign Language. It's best, at least at first, to pick just one. But which one?

Spanish is the second-most-common language in the United States and one of the easiest foreign languages for English-speakers to learn. With many native Spanish speakers around, there's a good chance of finding a tutor or friend for practicing conversation. And many popular picture books and chapter books are available in Spanish.

French is the fourth-most-common language in the United States. It's also, according to some, a preferred language for international business, politics, or travel.

Mandarin Chinese is the main dialect spoken in China, home to the world's fastest-growing economy. Language teachers claim that the tonal nature of Chinese, which makes it sound a bit like a song, appeals to young children, as do the pictographic written characters.

Italian is the closest Romance language to Latin, which means—say some—that it confers a vocabulary advantage when taking the SATs. In my opinion, this is a poor reason to learn a language. Aim for reading Dante in the original.

German features many words and word roots that are similar to English, which may make it easier for English-speaking children to absorb. Germany also provides substantial support for students from abroad, so if any of your kids are interested in such programs, German may give them a head start.

American Sign Language (ASL), as well as an essential means of communication for the hearing-impaired, is increasingly seen as a plus for very young preverbal children, who can learn to recognize signs as young as four months old and can begin to sign on their own by eight months. Advantages include enhancing speech development, reducing frustration for those just learning to talk, and promoting child-parent bonding.

Fluent Forever: How to Learn Any Language Fast and Never Forget It

Gabriel Wyner. Harmony Books, 2014.

A game plan for language learning from Gabriel Wyner, who taught himself six languages using simple techniques, free online resources, and practice on the subway.

Teach Your Baby to Sign

Monica Beyer. Crestline Books, 2017.

Background information and simple signs for the littlest kids, illustrated with photographs.

The Arts

When it comes to the arts, the public schools generally concentrate on the visual arts and music—and these often are the first to be cut when educational funds run low. The view that the arts are expendable in times of financial crunch is an enormous mistake. The arts, collectively, not only are important for their role in broadening our understanding of the human condition but also are sources of personal empowerment, joy, and satisfaction. The highly successful Finnish schools have an extensive program devoted to arts and crafts, in which kids learn woodworking, metalworking, weaving, knitting, sewing, and more. Handicrafts, Finnish educators explain, enforce such skills as strategic planning, problem-solving, and math, as well as encouraging independence, patience, perseverance, self-confidence, and pride in one's work.

The current National Core Art Standards, which cover dance, media arts, music, theater, and visual arts, are divided into four major parts: (1) creating; (2) performing, presenting, and producing; (3) responding; and (4) connecting. Boiled down, this means that kids should design and create their own works of art, which might include anything from painting a picture to composing a song to choreographing a ballet; prepare their work for public presentation, which might consist of a theater performance, an art exhibit, or a film showing; analyze the work of others using specific technical criteria; and learn to appreciate the multidisciplinary aspects of the arts and to understand the various arts' social, cultural, and historical contexts.

SOURCES FOR ARTS AND CRAFTS SUPPLIES

Dick Blick

www.dickblick.com

A large selection of quality arts and crafts supplies for painting, drawing, ceramics, sculpture, and printmaking.

Michaels

www.michaels.com

Crafts supplies of all kinds for all ages. The website includes instructions for a wide array of hands-on projects.

Nasco

www.enasco.com

A comprehensive assortment of painting, drawing, and sculpting supplies and crafting materials for everything from beading and candlemaking to jewelry-making, foam crafts, and papercrafts.

S&S Worldwide

www.ssw.com

Arts and crafts kits and educational supplies for kids of all ages. A source, for example, for kaleidoscope kits, decorate-a-kite kits, kid's looms, and much more.

Philosophy and Comparative Religion

I think, therefore I am.

—RENÉ DESCARTES

Philosophy isn't commonly taught in the public schools, and even less commonly at the elementary school level. When it is, it's often touted simply as an academic performance booster: studies show that kids who are exposed to philosophy have better math and literacy skills and perform

better on standardized tests. Frankly, these are feeble goals for a discipline that has absorbed much of the civilized world for millennia.

Philosophy is a means of thinking deeply and creatively about issues of importance. Everybody is interested in life's big questions—and these aren't questions that we ponder just so we can rake in a few extra points on the SAT.

What's a good life? Do people have free will? Which is better, wisdom or intelligence? What is beauty? What is art? Is it ever right to kill? Does God exist? Is the mind the same as the brain? What is real? And just why is the unexamined life not worth living?

Philosophical questions also abound across the curriculum: Are all people created equal? Should we make designer babies? When does life begin? Do animals have rights? Was Macbeth evil? Can a computer think?

From my homeschool journal (Josh is 9; Ethan, 8; Caleb, 6):

We've been reading about George Washington and just hit the famous (but apocryphal) story of Washington and his father's cherry tree, with its attendant moral: "I cannot tell a lie." Caleb was most interested in the mechanics of the evil deed: "How big is a cherry tree? How long does it take to chop one down? Can I have a hatchet?"

Josh and Ethan, however, took off into more complex ethical territory: "Is lying always wrong?" "What if you lie to keep from hurting someone's feelings?" "What about the conductors on the Underground Railroad? They lied to protect escaping slaves." "What about spies in wartime?" "What about Nathan Hale? If he had lied about what he was doing, maybe the British wouldn't have hanged him. Is it wrong to lie to save your life?"

RESOURCES

Big Ideas for Little Kids

Thomas E. Wartenberg. Rowman & Littlefield, 2014.

Subtitled *Teaching Philosophy Through Children's Literature*, Wartenberg's book shows how to generate philosophical discussions through popular children's books. All the major branches of philosophy are covered—ethics, social and political philosophy, philosophy of the mind, environmental philosophy, logic, epistemology, aesthetics, and the philosophy of language—through such works as *The Giving Tree*, *Knuffle Bunny*, and *The Wonderful Wizard of Oz*.

Teaching units for dozens of children's books are available at the accompanying website: www.teachingchildrenphilosophy.org.

Little Big Minds

Marietta McCarty. Tarcher/Perigee, 2006.

Helpful guidelines and resources for teaching philosophy to a range of ages. Chapters variously cover themes of friendship, responsibility, happiness, justice, time, courage, death, prejudice, God, nature, and freedom.

Health and Physical Education

When our kids were young, our physical education program consisted of nothing more than active outdoor play. The boys learned to ride bikes, skate, ski, kayak, and swim. They played catch and Frisbee. They built forts and treehouses. They played croquet, badminton, and horseshoes, flew kites, and tried rock climbing. We took a lot of family hikes.

A worrisome trend these days is how little time kids spend outside, and how little free time they have to explore independently. A particularly depressing 2016 study showed that half of the world's kids now spend less time outdoors than do the inmates of maximum-security prisons. Another found that American kids, on average, spend only half as much time playing outside as their parents did. Two-thirds of today's kids have never been bird-watching. Seven out of ten have never been berry picking.

While modern online culture certainly contributes to this state of affairs, researchers believe that the changing public attitude toward risk is a major factor. Kids no longer walk to the school bus stop alone, much less climb trees or build fires, and public playgrounds—following a barrage of lawsuits—have become bland, ultra-cautious environments that, studies show, kids soon find boring. All this protection may be backfiring.

“Our fear of children being harmed,” writes early-childhood researcher Ellen Sandseter, “may result in more fearful children and increased levels of psychopathology.” In other words, while keeping our children safe is a priority for all parents, we may actually have gone too far. Free outdoor play provides exercise and a boost to the immune system; it also enhances the imagination and promotes social and problem-solving skills. Sometimes we need to back off and leave the kids alone. Let them climb trees and splash in the mud.

Outdoor play is within everyone’s reach. For kids interested in team sports, however, things become more problematic. If anything has led to acrimony between homeschoolers and the public schools, it’s the battle over sports. Homeschoolers, pointing out that they pay school taxes, argue that their kids should be allowed to play interscholastic sports on school teams; public schools counter that sports participation is a privilege that homeschoolers forfeit when they opt out of the public schools.

According to the National Federation of State High School Associations, about thirty states now allow homeschooled students to play on public school sports teams, though policies vary from state to state. In West Virginia, for example, kids need to attend at least half of every school day in order to participate in the athletic program; in many states, homeschoolers must prove that they’re maintaining grade point averages equivalent to those required of public school athletes.

If the public school route doesn’t work for you, alternatives include joining a community team—many towns have recreation associations that are good resources here—or recruiting enough players to field a local homeschool team.

RESOURCES

The Daily Mile

thedailymile.co.uk

In the Daily Mile, introduced as a fitness program in the United Kingdom, kids of all ages and fitness levels simply run or jog every day at their own pace. The aim is to keep it up for fifteen minutes, to enjoy the outdoors, and to do an activity with friends.

Home School Family Fitness

Bruce Whitney. Hatherleigh Press, 2008.

A physical education curriculum for grades K–12 with lesson plans and instructions for playing everything from Capture the Flag to Snow Soccer and No Rules Tennis.

The Ultimate Homeschool Physical Education Game Book

Guy Bailey. Educators Press, 2003.

A large collection of partner and small-group games designed to promote fitness and sports skills for a wide range of ages. Included are diagrams of game setups and glossaries of sports terms.

Free Range Kids

Lenore Skenazy. Jossey-Bass, 2010.

In 2008, Skenazy wrote a column for *The New York Sun* titled “Why I Let My 9-Year-Old Ride the New York Subway Alone.” The column garnered a storm of attention, pro and con, and began what became known as the “free-range parenting” movement. How much independence should kids have? And when?

Last Child in the Woods

Richard Louv. Algonquin Books, 2008.

Why play outdoors? Louv argues that interaction with nature is essential for the physical and emotional health of children and adults. Without it, we're prone to obesity, distraction, and depression. Find out how to save your kids from what Louv has dubbed “nature-deficit disorder.”

Life Skills

Many parents complain that schools don't adequately prepare kids for real life, citing a battery of skills from financial management to resume-writing to car maintenance. While definitions of life skills will vary from place to place and family to family—not everybody needs to know how to clean a horse stall or stack a woodpile—there are some constants.

- All kids should be taught etiquette. Manners matter.
- Kids need to develop the social skills to communicate well with others and to solve problems through negotiation and mutual respect. This takes patience and forbearance—especially when the problem takes place in the grocery store and involves screaming.
- Kids, from an early age, should learn responsibility for household chores. Eventually—face it—everybody has to clean bathrooms, scrub floors, change beds, and wash windows.
- Kids should learn to cook. Not everybody has to be a gourmet chef, but there should be options in the kitchen other than instant ramen noodles.
- Kids should know how to use basic hand tools and perform simple repairs.
- Kids should know how to manage a bank account, pay bills, and stick to a budget. They also need to know how to use a credit card responsibly.
- Kids need to know how to respond in an emergency. Disasters happen, and it's best to be prepared.
- Sooner or later, they'll need to learn to drive, which means responsibility for car maintenance.

All that said, there's no way that we can prepare our kids for all they'll encounter out there in the wide world. The best we can do is to give them

the confidence that whatever they need to learn, they can.

And chances are it's on YouTube.

Computer and Technology Skills

Technology is a term that often makes people twitchy. It's undeniable that kids need to be computer-savvy. On the other hand, too much of a good thing—especially presented too young—isn't necessarily wonderful. Nowadays, on average, kids under 2 spend about two hours a day watching television or using other screen media (computers, tablets, smartphones); school-age kids and tweens spend an average of six hours a day on assorted screens; and teenagers may spend even more.

For the youngest kids, screen time may not be a good idea. The American Academy of Pediatrics recommends no screen time at all for children under 18 months, and suggests a limit of one hour a day for kids up to age 5. For young children, all agree, learning takes place best via face-to-face interactions and active hands-on exploration and play. At the very least, if your little guys are having screen time, be with them to share and comment upon the experience. Research—though still in the early stages—indicates that young children who spend too much time in front of a screen lag behind others in language skills. And too much sitting contributes to childhood obesity.

That said, kids need technology skills. Most agree that by the time kids are 11 or 12, they should have mastered:

1. Touch typing at a rate of 20 words per minute.
2. Basic troubleshooting, as in what to do when your computer goes on the blink.
3. Online protocol. The minimum age for many social media sites is 13. By then, kids should have the scoop on online etiquette, privacy, and personal safety.

4. Basic device operations, including email usage, internet access, bookmarking, use of photos and videos, and so on.
5. Multimedia presentations.
6. How to conduct an internet search and analyze sources for reliability.

A primary defense for the efficacy of child-led learning—one that almost all of us have seen firsthand—is technological. Given access to a computer or other digital device, kids educate themselves in record time as to its uses and possibilities. As parents, we need to make sure that they understand safety and privacy issues, and to give them the tools they need to evaluate information versus disinformation—but realize that in this rapidly moving field, kids are almost certainly going to pick up skills faster than we do.

Engineering

Kids are curious, which means that they're natural engineers—and most love putting things together or (sometimes even better) taking things apart. A number of science projects revolve around just that: giving kids tools (screwdrivers, pliers, and the like) and an assortment of toys or small household appliances to disassemble. (Extra points for getting them back together again.) (Safety glasses and adult supervision advised.)

An avowed goal in the public schools these days is to promote hands-on STEM learning (an acronym for Science, Technology, Engineering, and Math—occasionally expanded to STEAM, with an added A for Art). The emphasis on STEM has an economic basis: over the next decades, the demand for workers with STEM-related skills is expected to steadily rise. STEM programs—which encompass everything from kindergartners building with blocks and playing with marble runs to high school kids fabricating programmable robots—emphasize integrated learning, technical ability, and real-world problem-solving skills.

RESOURCES

Engineering: Go for It

www.egfi-k12.org

From the American Society for Engineering Education (ASEE), background information on all types of engineering, from Aerospace to Ocean, and many activities and lesson plans, categorized by grade.

Engino

www.engino.com

Dozens of creative building, motorized, and robotic kits for a wide range of ages from preschoolers on up.

KiwiCo

www.kiwico.com

A subscription service that delivers monthly hands-on kits (crates) for kids from toddlers to teens. The Tinker Crates, for ages 9–16, provide materials and instructions for an awesome array of STEM projects, including automata, trebuchets, and hydraulic claws. Eureka Crates are engineering and design kits for ages 14 to adult; sample projects include an articulated desk lamp, an electric pencil sharpener, and a ukulele.

Lego

www.lego.com/en-us

Something for everyone, from bricks to spaceships to programmable dragons.

Evaluations, Assessments, and Records

Bureaucratic as this sounds, keeping track of what your kids are learning is important. You'll need records for preparing application forms and transcripts for everything from camps and classes to colleges, and evaluations will let you know how your kids are doing and where or if they

need help. Record-keeping can range from detailed journals to quick daily lists; also, many homeschoolers continually collect materials for end-of-the-year portfolios. For each kid, an annual portfolio may include a log of daily, weekly, or monthly activities; samples of writing and artwork; a reading list; photos documenting science projects and field trips; tickets or brochures from concerts and museum visits; and accounts of extracurricular classes and workshops. Add notes from instructors such as violin teachers or gymnastic coaches.

Many educational programs come with built-in tests and quizzes, though for the most part, assessment-wise, we relied on discussion and homemade games of Trivial Pursuit. In our version, we routinely made stacks of question cards for each subject or topic—What was the Stamp Act? How many legs does a spider have? What’s important about the North Star?—and played with them. (Some tests can be fun.)

IXL

www.ixl.com

Hundreds of interactive quizzes for pre-K–12 in math, language arts, science, and social studies.

Twenty-four states require assessments for homeschooled students. Of these, eight rely on standardized tests (Georgia, Minnesota, North Carolina, North Dakota, Oregon, South Carolina, South Dakota, and Tennessee). Ten allow parents to choose either a standardized test or a portfolio review (Colorado, Florida, Louisiana, Maine, New Hampshire, Ohio, Vermont, Virginia, Washington, and West Virginia). Three mandate standardized tests in some years, but in others there’s an option to substitute a portfolio review (Hawaii, New York, and Pennsylvania). Maryland relies solely on portfolio reviews, and Massachusetts and Rhode Island leave assessment choices up to the local school district.

For those facing standardized tests, there are numerous practice books available, categorized by subject and grade.

Multimedia Learning

Multimedia learning, most sources indicate, is a plus: visual images, graphics, and audio input enhance memory, and the wide range of available choices allows students to find materials and approaches that work best for them. For every subject and age group, there are associated movies, videos, podcasts, apps, online classes and lesson plans, educational television programs, interactive games, and virtual field trips.

ONLINE RESOURCES

BrainPOP

www.brainpop.com

Videos, quizzes, games, and more in a wide range of categories, including science, social studies, English, math, arts and music, health, and engineering and technology. By subscription.

Core Knowledge

www.coreknowledge.org

Many free downloadable lesson units in all subjects for grades K–8.

K12

www.k12.com

Tuition-free online public school courses for K–12; private school courses available for a fee.

Khan Academy

www.khanacademy.org

Excellent free courses in math, science, engineering, computing, history and government, the arts, and economics for all ages, as well as test prep workshops and more.

Outschool

outschool.com

Small live online classes and courses in a wide range of subjects. Categories include the arts, coding and technology, health and wellness, English, life skills, math, music, science and nature, social

studies, and world languages. Study architecture with Minecraft, write Harry Potter fan fiction, and learn Mandarin Chinese.

PBS

www.pbs.org

Excellent programming and a huge video library on a wide range of subjects; many programs have associated lesson plans and supplements. Visit **PBS Learning Media** (www.pbslearningmedia.org) for resources in all subjects for students and teachers.

TED

www.ted.com

Short, powerful talks on a wide range of ideas. Well worth listening to plus great discussion possibilities.

Also see **TED-ED** (ed.ted.com), TED's youth and education initiative, with lessons, talks, and thematic video series, searchable by subject, among these Literature and Language, Philosophy and Religion, Mathematics, Science and Technology, Social Studies, the Arts, and more.

Time4Learning

www.time4learning.com

Online curricula for pre-K through grade twelve. Subjects include math, language arts, science, social studies, and foreign languages.

Wonderopolis

wonderopolis.org

The wonders of learning never cease. A wonder of the day, a searchable database of past wonders, and an opportunity to submit questions.

Also see **Let's Learn All About It!** (rebeccaruppresources.com) for many detailed themed resources lists in all subjects for all ages.

TEACHING WITH THE MOVIES

The Film Club

David Gilmour. Twelve, 2009.

The story of a dad who let his unhappy 15-year-old son drop out of school—provided he watched three parent-picked movies each week.

Talking Pictures

Ronald Madison and Corey Schmidt. Running Press, 2001.

Subtitled *A Parent's Guide to Using Movies to Discuss Ethics, Values, and Everyday Problems with Children*, this covers dozens of movies, with plot summaries, pointers, and lists of discussion questions.

Teach with Movies

www.teachwithmovies.org

Dozens of lesson plans based on movies and TV shows in many genres for K–12. Included for each are background information, discussion questions, and suggested activities.

Is teaching with movies a good idea? Educators agree that it is—it's attention-grabbing—but advise caution and common sense. Movies, after all, aren't made to be teaching tools, and the history and science on the silver screen, though exciting, isn't necessarily accurate. Be prepared to talk. (Also see [this page](#) Should My Kids Watch *Gone With the Wind*?)

National Standards

RESOURCES

National and State Standards

www.educationworld.com/standards

Lists of voluntary national standards in fine arts, language arts, mathematics, physical education and health, science, social

sciences, and technology.

U.S. Department of Education

www.ed.gov

The U.S. Department of Education website has a wealth of information about the state of national education, including the Nation's Report Card, an annual assessment of the academic performance of the nation's fourth, eighth, and twelfth graders.

Next Generation Science Standards

www.nextgenscience.org

The latest in K–12 science standards emphasizes 3-D learning—that is, core ideas in physical science, life science, earth and space science, and engineering design, paired with interconnections among the sciences and hands-on practices.

CHAPTER 4

Preschool

Babies are such a nice way to start people.

—DON HEROLD

Nobody needs a curriculum for preschoolers. For all kids, phenomenal amounts of learning take place in their very early years, and the kids have this one down. The World War II poster KEEP CALM AND CARRY ON is pretty much right on for early parenthood.

What to do with your preschoolers? Cuddle them. Answer their questions. Play games. Read picture books. Let them help bake bread, sort socks, and plant the garden. Make play dough and experiment with finger paint. Sing songs. Feed the birds. Draw with crayons and sidewalk chalk. Play games. Go for walks.

As you do, your kids will acquire an ever-expanding vocabulary and amass an astonishing fund of knowledge. In comfortable everyday fashion, they'll learn to count; absorb the names of shapes and colors; memorize nursery rhymes, the words to "Twinkle, Twinkle, Little Star," and the letters of the alphabet; figure out how to pedal a tricycle and turn a somersault; and—at least in our experience—disassemble the toilet, crib, and clock radio, operate the telephone answering machine, coffee grinder, and computer, write their names (both backward and forward) on the wallpaper,

dig a tunnel under the back fence, and drop the entire contents of the silverware drawer down the heat registers in the floor.

Generally, within limits of safety and parental sanity, preschoolers should be given the freedom to explore. Chances are they'll learn more in an afternoon making mud pies in the sandbox than they will from even the best-designed curriculum. Some of the most effective learning is what kids do for themselves.

Perhaps one of the most important things you can do for your youngest learners is read aloud. New research shows that sharing books has a significant impact on children's cognitive development—and the more interactive the reading process, the better. Count the wheels on Cinderella's pumpkin coach, find the bowl of mush in *Goodnight Moon*, growl with the Three Bears. The American Academy of Pediatrics recommends daily reading aloud to young children, which not only stimulates brain development, but also strengthens parent-child relationships and builds language, literacy, and social-emotional skills.

Most sources agree that by the age of 4 or so, kids should know the alphabet. They should also (more or less) share cooperatively with friends and siblings; get dressed by themselves; recite simple rhymes, songs, and fingerplays; follow one- or two-step directions; and have enough hand-eye coordination to build block towers and string big beads. Most preschoolers can count to ten, know the names of colors and shapes, and can catch and bounce a ball.

It's a cliché, but it's true: kids grow up fast. Cherish those early years while you've got them. Henry David Thoreau could have been speaking to the parents of small children when he touted the beauties of daily living and the importance of taking time to appreciate the marvels taking place around us. Don't worry. Relax and have fun.

RESOURCES

A Child's Work

Vivian Paley. University of Chicago Press, 2005.

Subtitled *The Importance of Fantasy Play*, Paley's book is a compelling defense of unstructured creative play for children.

Einstein Never Used Flash Cards

Roberta Michnick Golinkoff, Kathy Hirsh-Pasek, and Diane Eyer. Rodale Books, 2004.

Why our kids need to play more and memorize less, plus a large selection of age-appropriate games for creative play.

The Enchanted Hour

Meghan Cox Gurdon. HarperCollins, 2019.

Subtitled *The Miraculous Power of Reading Aloud in the Age of Distraction*, Gurdon's book summarizes the latest research on the cognitive benefits of reading aloud and provides practical suggestions and reading recommendations.

The Power of Play

David Elkind. Da Capo Lifelong Books, 2007.

A now-classic defense of natural learning. Child development expert Elkind argues that imaginative, spontaneous play sets the stage for future mental and social development and makes for healthier and happier kids.

Read Aloud 15 MINUTES

www.readaloud.org

The spokesperson for Read Aloud 15 MINUTES is Dr. John Hutton, a researcher at the Cincinnati Children's Reading and Literacy Discovery Center, who recommends that kids be read to for at least fifteen minutes a day, starting at birth. The website includes research results, surveys, and helpful book lists.

What Your Preschooler Needs to Know

E. D. Hirsch Jr. Delta, 2008.

Illustrated poems, songs, stories, short selections on history and science, and a resource bibliography. The book is subtitled *Get Ready for Kindergarten* and is targeted at ages 3–5.

MAGAZINES FOR PRESCHOOLERS

Cub

National Wildlife Foundation; rangerrick.org

Animal stories and activities for kids under four. Six issues per year.

Also from the National Wildlife Foundation, see *Ranger Rick Jr.*, animal stories and photos, activities, crafts, and recipes for ages 4–7.

Babybug

Cricket Media; cricketmedia.com.

Stories, games, and activities for ages 6 months to 3 years. Nine issues per year.

Also from Cricket Media, see *Ladybug*, a magazine of stories, poems, games, and activities for ages 3–6, and *Click*, science and nature activities for ages 3–6.

High Five

Highlights; www.highlights.com

Stories, puzzles, activities, and games for ages 2–6. Twelve issues per year.

National Geographic Little Kids

National Geographic; www.nationalgeographic.com

All about animals for ages 3–6, with photos, stories, games, and collectible animal cards.

BOOKS FOR PRESCHOOLERS

A Is for Angry

Sandra Boynton. Workman, 2016.

An A-to-Z book of personality-laden animals beginning with an Angry Anteater, Bashful Bear, Clean Cat, and Dirty Dog.

Brown Bear, Brown Bear, What Do You See?

Bill Martin Jr. Henry Holt, 2008.

A rhyming book of colors and animals, with collage illustrations by Eric Carle. Sequels include *Polar Bear, Polar Bear, What Do You Hear?* and *Panda Bear, Panda Bear, What Do You See?*

Cars and Trucks and Things That Go

Richard Scarry. Golden Books, 1998.

Crammed with illustrations of busy characters and their creative vehicles, this one—like all Scarry's titles—captivates kids. Since there's so much to see on each page, this one is a great pick for interactive reading.

The Cat in the Hat

Dr. Seuss. Random House, 1957.

The kids are stuck at home with nothing to do—until the hilarious and disastrous Cat in the Hat arrives. There are many other Dr. Seuss titles for preschoolers, among them *The Cat in the Hat Comes Back*, *Green Eggs and Ham*, *Ten Apples Up on Top*, and *Dr. Seuss's ABC*.

Chicka Chicka Boom Boom

Bill Martin Jr. and John Archambault. Beach Lane Books, 2000.

"A told B, and B told C / I'll meet you at the top of the coconut tree." Bright-colored letters race to the top of the tree—will there be enough room for all?

The Eentsy, Weentsy Spider: Fingerplays and Action Rhymes

Joanna Cole. HarperCollins, 1991.

Forty interactive classics, including the waterspout-climbing spider, "I'm a Little Teapot," "The Wheels on the Bus," "This Old Man," and more.

Goodnight Moon

Margaret Wise Brown. HarperCollins, 2007.

A little bunny, tucked in his bed in the great green room, is saying goodnight. A timeless and lovely bedtime book.

Knuffle Bunny

Mo Willems. Hyperion, 2004.

Trixie, a toddler, after a trip to the laundromat with her father, finds that her beloved stuffed bunny has been left behind. Trixie can't talk yet, though it's clear to readers what she means—but her father doesn't understand, and it takes a lot of upset before Knuffle Bunny is safely retrieved. Also see Willems's hysterical *Don't Let the Pigeon Drive the Bus!*

Little Blue Truck

Alice Schertle. Houghton Mifflin Harcourt, 2008.

The indomitable Little Blue Truck gets help from a lot of animal friends when he gets stuck in the mud trying to help the not-so-nice Dump Truck.

Mother Goose

Sylvia Long. Chronicle Books, 1999.

There are many collections of Mother Goose rhymes; Long's—illustrated with gorgeous animal watercolors—maintains the classics while softening some of the more disturbing imagery.

Over the Hills and Far Away: A Treasury of Nursery Rhymes

Elizabeth Hammill, ed. Candlewick, 2015.

A beautiful collection of 150 classic and less-classic nursery rhymes from two dozen countries and cultures, with pictures by seventy-seven different illustrators.

The Snowy Day

Ezra Jack Keats. Puffin, 1976.

In this Caldecott winner, a little boy explores the new snowfall.

The Tale of Peter Rabbit

Beatrix Potter. Warne, 2002.

The classic tale of the misbehaving bunny who runs into trouble in Mr. McGregor's vegetable garden. Just make sure you get an edition with Potter's original illustrations.

The Very Hungry Caterpillar

Eric Carle. Philomel Books, 1981.

The newly hatched and very hungry caterpillar eats his way through an enormous amount of food every day of the week—and ultimately spins a chrysalis and emerges as a gorgeous butterfly.

Where the Wild Things Are

Maurice Sendak. HarperCollins, 1984.

Max, dressed in a wolf suit, has been so naughty that he's sent to bed without his supper—at which point he embarks on a magical voyage to the island where the Wild Things live.

1000 Books Before Kindergarten

1000booksbeforekindergarten.org

The goal: read to your baby or toddler, keeping a record as you go, with the aim of reading a thousand books before your child is old enough to start kindergarten. (Repeats count.) The website has printable reading log sheets and a recommended reading list.

CHAPTER 5

Kindergarten

In my son's kindergarten, they're telling us how to get him into Stanford. By their advice, I'm doing everything wrong, because I'm trying to make him happy rather than putting him through as many piano lessons as possible.

—SEBASTIAN THRUN

Kindergarten, in public school, is the new first grade. A study published in 2016 by researchers at the University of Virginia comparing kindergarten and first grade classrooms between 1998 and 2010 found that kindergarten—once a half-day class featuring naps, sing-alongs, blocks, and a dress-up box—is now a full-day class with a hefty at-the-desk academic component. The pressure on schools to prepare kids for their first round of formal standardized testing in grade three continues to shove academic instruction further down the scholastic ladder, to kindergarten and preschool. It's now generally accepted that kids should enter kindergarten primed with the alphabet and able to hold a pencil, and that by the end of kindergarten they should have acquired basic math skills and learned to read.

This emphasis means that now, for kindergartners, there's less time for independent investigation and imaginative play, which is the crux of early learning experience. What kids really need, research tells us, is a wide range

of varied experiences and resources and the freedom to explore and assimilate as suits them best. Kindergartners may not be developmentally ready for formal academics, which may take an emotional toll, and a 2018 study from Harvard Medical School suggests that the steady rise in ADHD diagnoses over the last two decades may be largely attributable to too much school, too soon.

This doesn't mean that 5-year-olds can't or shouldn't learn to read and add. But it does mean that their time might be better spent doing something else.

Language Arts

Kindergartners are generally considered to be pre-readers. In most public school programs, kindergartners concentrate on a battery of readiness skills, designed to prepare them for the upcoming plunge into more challenging literature. They learn the letters of the alphabet, the sounds of the letters (phonemes), and—using both—begin to translate simple three-letter groups (e.g., *c-a-t*) into spoken words and to read simple stories.

Phonics, Decoding, and Word Recognition

1. Know the upper- and lowercase letters of the alphabet, both in and out of sequence.

There are many terrific alphabet books for young letter-learners, often with multifaceted themes that go far beyond “A is for apple.” See, for example, Mary Elting and Michael Folsom’s *Q Is for Duck* (Houghton Mifflin Harcourt, 2005) (Why? Because ducks *quack*.); Stephen Johnson’s *Alphabet City* (Puffin, 1999), in which readers discover the letters of the alphabet in the city in everything from sawhorses to fire escapes; and Oliver Jeffers’s *Once Upon an Alphabet* (Philomel, 2014), which features a clever short story for each letter.

From my homeschool journal (Josh is 8; Ethan, 7; Caleb, 5):

I've just written a new set of phonics books for Ethan and Caleb. There's a separate booklet for each letter, full of letter-coordinated exercises, books, and projects. In the A books, we began with ants: first read a couple of picture books about ants, then tracked down an anthill, studied the ants under a magnifying glass, and fed cookie crumbs to the ants and watched to see what happened. We then moved on to apples, read books about Johnny Appleseed, and made apple dolls, apple monsters, and dried apple rings.

The ant part of the project was a spectacular success. Ethan now goes out daily to observe "his" ants, and has assembled his own insect-studying kit, complete with magnifying glass, sketchbook, plastic specimen box, and bottle of ant-tempting crumbs.

*Next: the B booklet, which features bees, bats, and beds. We're going to read *The Bed Book* by Sylvia Plath and invent our own incredible beds. And we're going to build boats for the bathtub.*

2. Know letter sounds for all the consonants and short vowels (a, e, i, o, and u).

Given a letter sound, kids should be able to come up with the correct letter (in education-speak, encoding); alternatively, given a letter, kids should know the correct letter sound (decoding).

3. Know that letters are linked together to form words.

Kids should recognize that letters are grouped to form words, and words linked to form sentences. They should also know that—in English—words are decoded from left to right, and that reading proceeds from left to right, and from top to bottom on a page.

Try tracking down some alternatives—say, Japanese, Chinese, or Hebrew picture books—to show kids that this isn't universal.

4. Be able to blend short sequences of phonemes to form words.

Kids should be able to blend *onsets*—beginning consonants—with *rimes* (a vowel plus an ending consonant) to form words ($c + at = cat$) and should be able to extend this process to form rhyming families of words. Having decoded *cat*, for example, they should also be able to come up with *bat*, *hat*, and *mat*.

Kindergartners should also be able to combine isolated phonemes to form short words, blending *p*, *i*, and *g*, for example, to produce a complete *pig*. Once this technique is mastered, kids should be able to read any three-letter CVC (consonant-vowel-consonant) word.

5. Understand syllabication. Kids should be able to count the number of syllables in words and the number of sounds in syllables.

Kids should know that such words as *Pooh* and *Roo* contain only a single syllable, while *Piglet* and *Kanga* contain two and *Christopher* three. To reinforce this concept, kids are encouraged to repeat words while clapping: *Pig* (clap) *let* (clap). Syllabication, in theory, helps kids read unknown words and aids in spelling.

Try playing Hink Pink. A Hink Pink is a pair of one-syllable words that rhyme—for example, *big pig*; a Hinky Pinky is a pair of two-syllable words that rhyme, such as *funny bunny*. This is played as a guessing game. Check online for lists of Hink Pink clues and challenges. (Clue for *funny bunny*: “silly rabbit.”)

6. Know simple VCC, CVCC, and CCVC words.

Once kids are comfortable with a written vocabulary of simple CVC words, add common VCC (vowel-consonant-consonant), CVCC, and CCVC words—such as *ant* (VCC), *milk* (CVCC), and *frog* (CCVC).

One Thousand Things

Anna Kovecses. Wide Eyed Editions, 2015.

A delight of a vocabulary-builder as readers search for Little Mouse on pages of clearly labeled things of all kinds, arranged by theme (“Things in Nature,” “Things Inside Your House”).

7. Recognize their own names in print.

Kids should also be encouraged to identify and recognize words in everyday contexts: the STOP on stop signs, for example.

8. Know age-appropriate sight words.

Sight words are generally defined as those irregular misfits that do not follow the logical rules of phonics and therefore must be memorized. (English is loaded with these.) This category also includes frequently used words that readers, for purposes of speed and fluency, should be able to recognize at a glance. Various compilations of these words are available, listed by grade. Popular examples are the Dolch Word List, which recommends that kindergartners assimilate about fifty simple sight words, including *all, am, but, say, there, and yes*, and the Fry Sight Words List, a thousand-word compilation broken down into groups of one hundred, based on the most common words that appear in books for grades 3–9.

Sight Words

www.sightwords.com

Includes both the Dolch and Fry Sight Word Lists, along with word games and printable sight words flash cards.

From my homeschool journal (Josh is 7; Ethan, 6; Caleb, 4):

Our Bob Books [see below] arrived in the mail today—twelve tiny paperbacks packaged together, just the sort of thing to appeal to Ethan. The books feature a pair of buddies named Sam and Mat. Sam has a triangular head; Mat looks like a doughboy in checkered pants. The activities of Sam and Mat, summed up in very few, very short words (“Sam sat”), aren’t much from an adult point of view, but the illustrations are funny and—best of all—Ethan can read them.

Caleb promptly demanded a set of Bob Books of his own, so we spent the morning writing and illustrating the Bad Bob Books, a series of little stapled pamphlets about Bad Bob, a goggle-eyed sheep who eats everything in sight, including trees, bees, a house, a

pirate ship, and the moon. (Sample sentence: “No, Bob, no!”) Caleb colored all the pictures (Bad Bob is pink), then curled up in a chair and read them all over and over to himself, giggling.

RESOURCES

Bob Books

Bobby Lynn Maslen. Scholastic, 2006.

Set 1 is recommended for beginning readers (there are just four letters in the entire first story), and Set 2 for “advancing beginners.” There’s also a Sight Words set that introduces thirty of the most common kindergarten sight words.

Check out the accompanying apps, *Bob Books Reading Magic* and *Bob Books Reading Magic 2*, available for iOS and Android.

Brand New Readers

Various authors. Candlewick.

Short, funny, brightly illustrated stories targeted at ages 4–7.

School Zone Start-to-Read Books

Various authors. School Zone Publishing.

Short illustrated stories for first-time readers (Level 1) and more advanced beginners (Levels 2 and 3). Many titles, including *Nine Men Chase a Hen*; *Jog, Frog, Jog*; and *Raccoon on the Moon*.

Teach Your Child to Read in 100 Easy Lessons

Siegfried Engelmann, Phyllis Haddox, and Elaine Bruner. Touchstone, 1986.

Popular among homeschoolers, this is an entire reading program in one oversize 395-page book. Lesson one begins with simple phonics (*m* and *s* sounds); by the final lesson, if all goes well, kids are reading at a second-grade level. Instructions for parent or teacher are presented as catechism-like dialogues with adult lines printed in red.

Reading Comprehension

1. Order pictures in proper sequence for telling a story.

For example, first Jack’s mother threw the beans out the window, then the beanstalk grew, and then Jack climbed up the stalk and met the giant. Commercial sets of illustrated story-sequencing cards are available. Free printable sets can also be found online—or it’s fun to make your own.

2. Listen and respond to a variety of age-appropriate texts, including fiction and nonfiction books, myths and legends, fables and folktales, and poetry.

For kindergartners and first graders, the Junior Great Books program ([this page](#)) features a three-volume set of short stories and poems. The accompanying teacher’s edition has lists of discussion-promoting questions.

As a general practice, discuss books with kids during and after reading—a process that both encourages critical thinking and builds vocabulary skills. It also, willy-nilly—depending on what you’re reading—leads to a lot of talk about everything from the nature of war to the fate of endangered species to the ethics of that destructive trespasser Goldilocks.

Often recommended for kindergarten:

Bedtime for Frances

Russell Hoban. HarperFestival, 1995.

It’s bedtime, but Frances—an endearing and creative little badger—is fighting it every step of the way. There are several other titles starring Frances.

Blueberries for Sal

Robert McCloskey. Puffin, 1976.

Sal and her mother have gone blueberry picking at the same time that a mother bear and her cub visit the blueberry patch. There’s a mix-up in kids.

Curious George

H. A. Rey. Houghton Mifflin Harcourt, 1973.

George, a mischievous little monkey, is adopted by the Man with the Yellow Hat. Many sequels, in which George's curiosity leads him from one disaster to the next.

The Day the Crayons Quit

Drew Daywalt. Philomel, 2013.

When Duncan opens his crayon box, he finds a bunch of letters from crayons who are having problems. Black is tired of outlining; Blue has had enough of coloring all those giant bodies of water; Orange and Yellow are feuding over who is the true color of the sun. And very neat Purple thinks Duncan should pay more attention to coloring inside the lines.

Frederick

Leo Lionni. Pantheon, 1967.

Frederick, an imaginative and dreamy little field mouse, doesn't hold up his end when it comes to gathering food for the winter—but when winter comes, it turns out that Frederick's stored-up stories, filled with warmth and color, are just as important.

Frog and Toad Are Friends

Arnold Lobel. HarperCollins, 2003.

Toad is impatient, pessimistic, and grouchy; Frog is his optimistic, upbeat, and supportive best friend. The Frog and Toad stories are clever gems. Also see *Days with Frog and Toad* and *Frog and Toad All Year*.

Little Bear

Else Holmelund Minarik. HarperTrophy, 2003.

Little Bear plays in the snow, makes birthday soup, and flies to the moon. The illustrations, by Maurice Sendak, are lovely. Several sequels.

Mike Mulligan and His Steam Shovel

Virginia Lee Burton. Houghton Mifflin Harcourt, 1977.

Mike Mulligan and his faithful steam shovel, Mary Anne, manage to dig the cellar for Popperville's new town hall in a single day—but they forget to build a ramp to get Mary Anne out of the hole.

Olivia

Ian Falconer. Atheneum, 2004.

Olivia, the world's most charming little pig, is a bundle of energy, good at singing very loud songs, scaring her little brother, and avoiding naps. Many sequels.

The Runaway Bunny

Margaret Wise Brown. HarperCollins, 2017.

A little bunny decides to run away and hide, imagining himself as a flower in a garden, a fish in a stream, or a rock on the mountain—but is reassured that his mother will always find him.

Tikki Tikki Tembo

Arlene Mosel. Square Fish, 2007.

A Chinese folktale explains why firstborn sons no longer have long names—after Tikki tikki tembo-no sa rembo-chari bari ruchi-pip peri pembo falls down a well.

And don't forget read-aloud chapter books. Try Michael Bond's *A Bear Called Paddington*, A. A. Milne's *Winnie-the-Pooh*, L. Frank Baum's *The Wonderful Wizard of Oz*, C. S. Lewis's *The Lion, the Witch, and the Wardrobe*, Ruth Stiles Gannett's *My Father's Dragon*, Roald Dahl's *Fantastic Mr. Fox*, Laura Ingalls Wilder's *Little House in the Big Woods*, Walter R. Brooks's *Freddy the Detective*, and of course Beverly Cleary's *Ramona the Pest*, the story of a trouble-prone kindergartner. Older siblings will love these too.

3. Know the definitions of *title*, *author*, and *illustrator*.

From Pictures to Words: A Book About Making a Book

Janet Stevens. Holiday House, 1995.

Stevens describes how a picture book is made, to an accompaniment of wacky suggestions from helpful animals. Readers learn that stories need a setting and a plot, and see how illustrators use storyboards.

How a Book Is Made

Aliki. HarperCollins, 1988.

Clever cartoon cats show readers all the many people who participate in the making of a book.

Writing

Along with their early reading skills, kindergartners also learn how to write—or, rather, how to print, a penmanship technique formally known as “manuscript handwriting.” According to most public school curricula, kindergartners are expected to master writing the alphabet and to begin writing assorted simple words. Kindergartners generally write on paper with a wide horizontal ruling, with a red baseline and broken midline for extra guidance in the formation of letters. There are many sources for free printable handwriting paper online.

1. Know proper methods of holding and positioning writing materials.

Right-handed kids should slant their paper to the left; left-handed kids should slant it to the right.

Beginning writers often have better luck using oversize pencils, which are easier to hang on to, or using an attached pencil grip, a rubber holder that fits over the barrel of a standard-sized pencil and is shaped to encourage proper finger-gripping position.

2. Be able to print all the letters of the alphabet, both upper- and lowercase.

Kids vary considerably in the rate of fine motor development and coordination, so expect variation on this one.

3. Be able to write simple words, messages, descriptions, and stories, using basic knowledge of phonics and invented spelling.

Even the public schools admit that the emphasis in early writing projects should be on creativity and personal expression rather than the picky niceties of grammar.

Games for Writing

Peggy Kaye. Farrar, Straus & Giroux, 1995.

Creative games and projects for ages 5–9.

Don't Forget to Write: 50 Enthralling and Effective Writing Lessons

826 National. Jossey-Bass, 2011.

A mix of questions, opportunities for drawing, and story starters encourage kids to invent tragic tales, stories for pets, a space exploration adventure, a fractured fairy tale, and more. Targeted at ages 5–12.

Teaching the Youngest Writers

Marcia S. Freeman. Maupin House, 2013.

A guide for the primary grades, with teaching and project suggestions.

Listening and Speaking Skills

1. Follow simple oral one- and two-step directions.

How to Teach a Slug to Read

Susan Pearson. Two Lions, 2011.

A delightful and funny account of the rules for learning to read. For ages 4–8.

How to Wash a Woolly Mammoth

Michelle Robinson. Henry Holt, 2014.

Step-by-step picture-book instructions for washing your very own woolly mammoth. (First, fill the bathtub.)

2. Retell familiar stories.

Innovative nineteenth-century educator Charlotte Mason advocated “narration” for kids of all ages in all subjects of the academic curriculum as a means of enhancing listening and organizational skills, and boosting vocabulary, self-confidence, and self-expression. Mason recommended that parents or teachers spend ten minutes reading a passage or story aloud, after which kids are asked to repeat in their own words what they’ve just heard.

3. Invent and tell fantasy stories or recount stories about real-life happenings.

For our kids, we made storytelling boxes filled with index cards: one box was devoted to imaginative storytelling, the other to reminiscence and real-life recall. Players, in turn, would choose a card from a box and tell a story. Sample cards from the imagination box read “You’ve just built a time machine” or “You’ve found a dragon’s egg.” Sample cards from the real-life box encouraged the kids to tell stories from the past about a holiday, a pet, a vacation trip, a big storm, a birthday present, or a scary night.

We also amassed a Storytelling Envelope, which contained a collection of pictures—everything from dragons and gargoyles to sheep, caves, blimps, and butterflies—to be used as story starters.

OTHER STORYTELLING RESOURCES

- Puppets. These are available from toy and game stores—or you can make your own from anything from felt and paper bags to pictures taped to craft sticks. (See [this page](#).)
- Think-ets. Who can resist tiny little trinkets? These collections are sold in themed bags or boxes and include everything from a miniature pig and bear to a tiny compass, arrowhead, crown, star,

and gold nugget. Pick one or more and tell a story. From toy stores or see www.thinkets.com.

And to Think That I Saw It on Mulberry Street

Dr. Seuss. Random House, 1989.

A tour-de-force of inventive storytelling. Marco, on his way home from school, sees a horse and wagon—and eventually concocts a fantastic story featuring zebras, reindeer, elephants, and chariots.

One Day, The End

Rebecca Kai Dotlich. Boyds Mills Press, 2015.

For every story, there is a beginning and an end—but what happens in between makes all the difference. “One day I went to school. I came home. The end.” The narrator tells very short stories—but the illustrations show that there’s a lot more to every tale.

4. Memorize and recite short poems and rhymes.

If you’re teaching kids of a range of ages, try a family Culture Hour, of the sort described by author/humorist Jean Kerr in her essay “The Poet and the Peasants,” which appears in *Penny Candy*, a collection of her *New Yorker* pieces about family life in the 1950s and 1960s.

“We have made mistakes with our children, which will undoubtedly become clearer as they get old enough to write their own books,” Kerr wrote. “But here I would like to be serious for a few minutes about the one thing we did that was right. We taught them not to be afraid of poetry.” On Sunday evenings, Kerr and her husband collected their five boys—ages 2 to 14—and had each recite a memorized poem, then listen to a piece of classical music. It was at first a hilariously uphill battle, but ultimately it became a family favorite.

1. Buy some inexpensive poetry anthologies. (A good source for these is the local library book sale.) Or Google appropriate poems. See, for example, the Poetry Foundation at www.poetryfoundation.org or PoemHunter at www.poemhunter.com.

2. Choose a poem for each kid, taking into account his/her age and ability.
3. Work with each kid on his/her poem. Have the kids read or recite the poem slowly at first, eventually working up to proper speed. Ask a few questions to make sure the kids understand their poem.
4. Perform! Fun as a group activity, with friends.

The Poetry Friday Anthology

Sylvia Vardell and Janet Wong. Pomelo, 2012.

Sets of thirty-six poems for each grade level, K–5, with associated activities.

The Random House Book of Poetry for Children

Jack Prelutsky, ed. Random House, 1983.

A collection of 572 poems, with great illustrations by Arnold Lobel.

Study Skills

Teaching study skills to preschoolers and kindergartners generally means introducing kids to the public library. Kids should know the basics of library etiquette—that is, how to check out and return books, how to locate books on the shelves, and how to treat books respectfully.

Memory games, fun for a range of ages, are said to improve concentration and attention to detail. Generally these consist of a pack of illustrated cards, laid facedown in a grid pattern. Players turn over two at a time, trying to find matching pairs; if the cards don't match, they get flipped over again. Available from toy and game stores, as well as free versions online.

Or try the Kim Game—from Rudyard Kipling's novel *Kim*, in which the title character is training to be a spy. This involves putting fifteen or so different small objects—toys, stones, chess pieces, utensils, dice—on a tray or cookie sheet, allowing kids to look at it for one minute, then covering it with a cloth. Kids then write down (or say) as many of the objects as they can remember.

Simon

How's your memory for sequences? Simon (Hasbro) is an electronic memory game in which players push big colored buttons to repeat sequences of colored flashing lights. The longer the sequence, the harder it gets. From toy and game stores; free versions are available online. For players of all ages.

Mathematics

The name of the game in early mathematics studies is manipulatives—that is, any collection of concrete objects that can be used to physically represent mathematical concepts. Manipulatives include such countable doohickeys as beans, buttons, blocks, craft sticks, and teeny plastic pigs; base ten blocks and tiles; snap-together linking cubes; measuring tools and containers; pattern blocks; geometric solids; fraction circles; and other hands-on mathematical puzzles. Kids should be encouraged to play, investigate, and experiment with these.

Cuisenaire rods

These colored number rods were invented by Belgian teacher Georges Cuisenaire in the 1950s and have been popular ever since. The rods come in ten different color-coded sizes, from units (white) to tens (orange), and can be used for any number of math investigations and experiments. Available in wood or plastic from educational supply companies.

What about virtual manipulatives? Search online and you'll find a range of (free) math manipulatives, usually categorized by grade level, that kids can maneuver with a tap, click, or swipe of a finger. Preliminary research indicates that these are as effective as physical manipulatives, and often they have the advantage of instant feedback (you know right off if you've goofed), which reportedly enhances learning rate.

Remember, though, that math concepts are everywhere—and are often best learned through games, puzzles, brainteasers, and everyday activities. Build birdhouses, bake cookies, and play checkers.

It's Okay to Count on Your Fingers!

While schools often discourage kids from counting on their fingers, brain research indicates that it's a plus. In fact, the better your finger perception, the better your mathematical development. Researchers recommend that kids be given activities and exercises that improve finger discrimination—for example, putting colored dots on kids' fingernails and having them match their fingers to colored dots on piano keys or using the appropriately colored finger to trace matching colored lines in mazes.

RESOURCES

Bedtime Math

Laura Overdeck. Felwel & Friends.

bedtimemath.org

Fun fact-crammed problems are centered on everything from jalapeño peppers and squirting ketchup bottles to roller coaster rides, crayons, marshmallows, and ladders to the moon. For each, there are questions targeted at wee ones, little kids, and big kids. A great family program that emphasizes how math is a part of everyday life.

Donald in Mathmagic Land

Disney, 1959.

A thirty-minute animation starring Donald Duck on the wonders of math in daily life.

Family Math for Young Children

Jean Kerr Stenmark and Grace Davila Coates. Lawrence Hall of Science, 1997.

A large collection of games and hands-on activities for beginning mathematicians.

Math Is Categorical Series

Brian P. Cleary. First Avenue Editions.

A bright, funny collection targeted at ages 5–8. Various titles cover all the basics, among them *The Mission of Addition*, *The Action of Subtraction*, and *Windows, Rings, and Grapes—A Look at Different Shapes*.

MathStart Series

Stuart J. Murphy. HarperCollins.

The MathStart Level 1 series is a collection of catchy picture books on math concepts for ages 4–7. Many titles, including *The Big Bug Parade*, *Just Enough Carrots*, *A Pair of Socks*, *3 Little Firefighters*, and *Circus Shapes*.

Patterns and Classification

1. Be able to group objects into sets.

Kids should understand that a set is a group of elements with common properties (of size, shape, color, and so on) and should be able to identify elements in sets that don't belong ("One of these things is not like the others..."). Check out online sorting games.

Set

www.setgame.com

An award-winning card game for ages 5 and up in which players are challenged to identify three-card sets based on such features as shape, shading, number, and color. It can be played by several players of widely varying ages, all at the same time—and older players don't necessarily have advantages over younger.

2. Identify and continue simple repeating patterns.

Given the sequence red-black-blue-black-green, for example, kids should be able to figure out what comes next. Check out pattern games online for free printable pattern cards and virtual pattern-making games. Many picture books cover patterns and pattern-making. For example, see Trudy Harris's *Pattern Bugs* (Lerner, 2001) and Brian P. Cleary's *A-B-A-B-A A Book of Pattern Play* (Lerner, 2012).

Numbers and Number Theory

1. Be able to count from 1 to 31.

Kids should also be able to count backward from 10 to 1; by twos to 10; and by fives to 50. There are dozens of innovative counting books, many of which integrate math with other disciplines across the curriculum. For example, see Stella Blackstone's geographical *My Granny Went to Market* (Barefoot Books, 2006), in which Granny circles the globe collecting everything from one flying Turkish carpet to ten Peruvian llamas.

Count Your Chickens

Peaceable Kingdom

An award-winning cooperative board game for ages 3–6 in which players count spaces to collect baby chicks and return them to their coop. Comes with forty chicks and one mother hen.

Candyland

Hasbro

Famed as a first board game for kids since the 1940s, this is now available in several versions. Kids learn counting, colors, and how to follow simple directions while racing to the Candy Castle.

2. Understand one-to-one correspondence.

That is, kids should be able to compare groups of concrete objects or symbols, variously determining whether one group is equal to, greater than, or less than another. They should be able to count the number of items in a set (to 10) and write the corresponding numeral.

3. Identify ordinal positions from first to fifth.

In mathematical language, ordinal numbers indicate position in sequence (first, second, third, etc.), while cardinal numbers indicate amount or quantity (one, two, three, etc.). Check out ordinal numbers games online.

4. Given a number, be able to identify one more and one less.

Try introducing kids to simple number lines, which are excellent exercises in visual mathematics. These are easy to make: just draw a ten-inch line on a sheet of paper, mark it off in inch lengths, and label it from 0 to 10. Reproducible number lines can also be found in *Family Math for Young Children* ([this page](#)).

Line Jumper

www.funbrain.com/games/line-jumper

The Funbrain website, a collection of clever educational games categorized by grade level, includes Line Jumper, a number-line game playable at five different levels, from easy to superbrain. The easy number line runs from 0 to 10, medium from 0 to 20.

5. Understand the concept of one-half.

This is easy to introduce in the context of daily life.

Give Me Half!

Stuart J. Murphy; HarperCollins, 1996.

Simple fractions plus a lesson in sharing as a brother and sister bicker over sharing lunch.

From my homeschool journal (Josh is 8; Ethan, 6; Caleb, 4):

Today the kids and I shared a pair of giant chocolate chip cookies, each of which I broke in half. Josh ate his; Ethan broke his half in half again. Ethan: “How many times can you break something in half? If you break it in half enough times, do you get down to an atom of a cookie?”

We then tried a paper-folding experiment to see how many times a piece of paper can be folded in half. The best we managed was five, though the boys tried large paper, small paper, origami paper, and (Caleb, inspirationally) toilet paper.

Operations

1. Know the meaning of the plus (+) and minus (-) signs.

2. Be able to add and subtract numbers from 1 to 10.

Kids should experiment with simple addition and subtraction problems using manipulatives.

3. Invent and solve simple story problems.

Encourage kids to write (and illustrate) their own. Josh at age 5: “There were six enormous dragons. A wizard with a wand turned two of the dragons into beetles. How many dragons were left?”

4. Make and interpret simple graphs.

These are exercises in data collection, classification, and organization. Data should be obtained as much as possible from real-life situations. For

example: What kind of pets do your friends have? How many have cats? Dogs? Goldfish? Which is the most popular pet? Take polls of least favorite foods, favorite ice cream flavors, or birthday months. See Stuart J. Murphy's *The Best Vacation Ever* (HarperCollins, 1997). Also see graphing resources, [this page](#).

Money and Measurement

1. Identify pennies, nickels, dimes, quarters, and dollar bills; recognize dollar and cent signs.

A useful resource here, suitable for any number of invented buying, selling, and counting games, is a set of play money (plastic coins and paper bills), available from most toy and game stores.

2. Experiment with measurements of length, weight, and volume.

Kids should be able to compare measures of length, weight, and volume using a variety of measuring instruments including rulers, scales, and measuring cups and containers. They should investigate length, weight, and volume using both standard and nonstandard measures. Nonstandard measures involve such comparisons as, "How many craft sticks does it take to reach all the way across the kitchen table?" or "How many beans weigh the same as one pencil?" Be inventive; this can be fun. Try having everyone guess first.

Kids should also be able to use a standard ruler to measure lengths in inches.

A useful tool for measurement comparisons is a student balance. The Educational Insights Number Balance, for example, is a T-shaped scale with a numbered balance bar on which kids hang plastic weights to see which number combinations balance. Pan balances, on the other hand, are good for weight comparisons of disparate objects (small blocks, pennies, chocolate chips).

For comparisons of volume—and a nice science/music tie-in—experiment with musical glasses. You'll need five or more drinking glasses, water, and a chopstick or pencil. Set the glasses in a row and fill with different amounts of water. Tap the glasses with the pencil and see what each sounds like.

See Brian P. Cleary's *How Long or How Wide?* (First Avenue, 2009) and David A. Adler's *How Tall, How Short, How Faraway?* (Holiday House, 1999).

From my homeschool journal (Josh is 8; Ethan, 7; Caleb, 5):

Today we read a book called Barrels to the Moon—a recent find at the library book sale—which is about townspeople attempting to reach the moon via a huge tower of stacked barrels. This immediately led to questions: “How far away is the moon?” “How many barrels would it take to reach the moon?” “How many barrels can you stack up before they fall over?” “If you could drive a car to the moon, how long would it take?” “What if you had a light-speed car?” We ended up making, measuring, and toppling giant experimental towers.

3. Know what a thermometer is and what it measures. Be able to make simple temperature comparisons (hotter than, colder than).

Try charting daily temperatures. We posted a piece of graph paper next to the kitchen door—within sight of the porch thermometer—and recorded the temperature at (approximately) the same time every morning.

4. Compare the lengths of time it takes to complete various activities.

Popular here: How long can you hold your breath? How long can you stand on one foot? How long can you stare without blinking? How long can you stand on your head?

5. Tell time to the hour.

An excellent resource is a clock with movable hands, such as the classic bright yellow Judy Clock that has been helping kids learn to tell time since 1952. Equally helpful is a good-sized kitchen clock, the kind with hands.

Or make a paper plate clock: all you need are a paper plate, a pair of construction paper hands, and a brad paper fastener.

A Second, a Minute, a Week with Days in It

Brian P. Cleary. Millbrook Press, 2015.

A clever rhyming introduction to seconds (the length of a hiccup), minutes, hours, days, and weeks.

6. Know the days of the week in order. Recognize the names of the months of the year. Kids should also understand the meaning of the terms *yesterday, tomorrow, morning, afternoon, and night.*

Try making your own homemade calendars. Printable templates are available online. (Leave plenty of space for kids' illustrations.)

One Lighthouse, One Moon

Anita Lobel. Greenwillow, 2002.

Days of the week, months of the year, the four seasons, colors, and counting, all in one charmingly illustrated picture book.

Geometry

1. Identify right and left hands. Be able to use terms of position and orientation such as *closed and open, over and under, in front and in back, above and below, and so on.*

Most of this simply comes up in the course of daily life as you put on shoes and mittens or try to find the teddy bear, the car keys, the toddler, or the cat.

2. Recognize and identify the basic two-dimensional (plane) geometric figures: square, rectangle, triangle, and circle.

Kids should be able to identify basic shapes in common objects and to compare sizes of basic plane figures. Try identifying shapes around the house. Go on a geometric treasure hunt to find circles, triangles, rectangles, and squares. Play with pattern blocks, magnetic shapes, or Colorforms—bright-colored vinyl geometric shapes that can be stuck to (and peeled from) a laminated background board to make patterns and pictures.

The Greedy Triangle

Marilyn Burns. Scholastic, 2008.

The dissatisfied triangle visits a local shapeshifter to add another angle to his shape and—poof!—he's a quadrilateral. But that's not enough for the triangle, and soon he adds more and more angles, morphing into a pentagon, a hexagon, and more. Have the kids copy the triangle's changing shapes on geoboards (pegged plastic or wooden boards on which kids can build geometric shapes with stretched rubber bands) or model them with toothpicks and marshmallows. A great introduction to polygons.

I Spy Shapes in Art

Lucy Micklethwait; Greenwillow Books, 2004.

Find squares, circles, triangles, and more in works by artists such as Kandinsky, Matisse, O'Keeffe, Warhol, and Magritte.

History and Geography

A synthesis of various history curricula suggests several themes for kindergarten-level social studies. These include a brief overview of early American history; a survey of family life around the world, with exposure to a range of different cultures; and a basic introduction to maps and world geography. Use a variety of print materials (fiction and nonfiction books,

myths and legends, poetry, and biographies); hands-on projects and activities; art and music; and field trips.

BIOGRAPHIES FOR BEGINNERS

Celebrate the birthdays of famous people with books and activities.

Ordinary People Change the World

Brad Meltzer. Dial.

Many well-done short titles in which a kid-friendly text, narrated in the first person, alternates with cartoon bubbles. Among these: *I Am George Washington*, *I Am Abraham Lincoln*, *I Am Harriet Tubman*, *I Am Albert Einstein*, and *I Am Neil Armstrong*.

Picture Book Biography Series

David A. Adler. Holiday House.

Short picture-book biographies of many famous Americans, including Ben Franklin, Paul Revere, Thomas Jefferson, George Washington, Harriet Tubman, Sojourner Truth, Sitting Bull, and more.

Childhood of Famous Americans

Various authors. Aladdin.

These short chapter biographies are lightly fictionalized accounts of the childhoods of dozens of famous Americans.

National Geographic Readers

Various authors. National Geographic Children's Books.

Colorfully designed, high-interest biographies incorporating photos, sidebars, and quizzes, each featuring one of a long list of notable people, among them George Washington, Frederick Douglass, Thomas Edison, Helen Keller, and Martin Luther King Jr.

American History

1. Study and compare family life, past and present.

Read about families now and long ago, discussing changing customs and lifestyles.

Accompanying books might include such family tales as Laura Ingalls Wilder's *Little House in the Big Woods* (HarperCollins, 1971), Robert Lawson's *They Were Strong and Good* (Viking, 2006), Cynthia Rylant's *When I Was Young in the Mountains* (Puffin, 1993), Patricia MacLachlan's *Three Names* (HarperCollins, 1991), Sharon Bell Mathis's *The Hundred Penny Box* (Puffin, 2006), and Paul Fleischman's *The Matchbox Diary* (Candlewick, 2016).

Balderdash!

Michelle Markel. Chronicle Books, 2017.

Be glad you didn't live in the early 1700s—because there were no books for kids. That is, until John Newbery came along.

If You Lived 100 Years Ago

Ann McGovern. Scholastic, 1999.

Where did people take baths? Would you have electricity? How old did children have to be to work? Who went to school? Find out what life was like in New York City in the 1890s via this interactive question-and-answer book.

Then and Now Series

Robin Nelson. Lerner, 2003.

A simple text paired with great photos contrasting present and past. Titles include *Home Then and Now*, *School Then and Now*, *Transportation Then and Now*, *Toys and Games Then and Now*, and *Communication Then and Now*.

2. Before the Europeans arrived: Native Americans.

Cover a range of Native American cultures from various regions of North America. Locate tribal regions on the map.

More Than Moccasins: A Kid's Activity Guide to Traditional North American Indian Life

Laurie Carlson. Chicago Review Press, 1994.

Background information, a pronunciation guide to tribal names, and many hands-on projects, including making model teepees, clay pots, a headdress, and a sand painting; cooking corn and pumpkin stew; and learning the Cherokee alphabet.

The Very First Americans

Cara Ashrose. Grosset & Dunlap, 1993.

A picture-book survey of early Native American life, from the tribes of the Pacific Northwest to the eastern woodlands.

NATIVE AMERICAN LEGENDS

The Girl Who Loved Wild Horses

Paul Goble. Aladdin, 1993.

Goble has written many picture-book versions of Native American legends, among them *The Gift of the Sacred Dog* (Aladdin, 1984), *Buffalo Woman* (Aladdin, 1997), and *Dream Wolf* (Aladdin, 1997).

How the Stars Fell into the Sky

Jerrie Oughton. Houghton Mifflin Harcourt, 1996.

A retelling of a Navajo legend in which First Woman attempts to write the laws of the world in the stars, only to be thwarted by impatient Coyote.

The Legend of the Indian Paintbrush

Tomie dePaola. Putnam & Grosset, 1996.

Also by dePaola, see *The Legend of the Bluebonnet* (Puffin, 1996).

Rainbow Crow

Nancy Van Laan. Dragonfly, 1991.

This Lenape tale tells how the crow lost his sweet voice and brilliant feathers by bringing the gift of fire to Earth.

Raven: A Trickster Tale from the Pacific Northwest

Gerald McDermott. Houghton Mifflin Harcourt, 2001.

Also by McDermott, see *Arrow to the Sun: A Pueblo Indian Tale* (Puffin, 1977) and *Coyote: A Trickster Tale from the American Southwest* (HMH, 1999).

The Rough-Face Girl

Rafe Martin. Puffin, 1998.

A Cinderella story from Algonquin folklore.

They Dance in the Sky

Jean Guard Monroe. Houghton Mifflin Harcourt, 2007.

A collection of star myths from a variety of Native American cultures. Pair this one with stargazing.

Thirteen Moons on Turtle's Back

Joseph Bruchac. Puffin, 1997.

In Native American legend, the thirteen scales on a turtle's back reflect the thirteen moons of the year. A short illustrated poem describes each, among them the Moon of Popping Trees, Baby Bear Moon, and Moose-Calling Moon.

Also by Bruchac, see *The First Strawberries* (Puffin, 1998), *How the Chipmunk Got His Stripes* (Puffin, 2003), and *Turtle's Race with Beaver* (Puffin, 2005).

3. Early European exploration and settlement of North America.

Topics to cover include the voyage of Columbus in 1492, the arrival of the Pilgrims in 1620, the celebration of Columbus Day and present-day alternatives, the first Thanksgiving, the impact of the arrival of Europeans on the Native Americans, and life in colonial days.

Colonial Kids: An Activity Guide to Life in the New World

Laurie Carlson. Chicago Review Press, 1997.

A timeline, maps, background information, and hands-on activities, among them making a model sailing ship, a rag rug, and a bandbox; dipping candles; churning butter; baking a batch of cornbread; and making buttons.

Follow the Dream

Peter Sis. Knopf, 1991.

A beautifully illustrated account of Columbus's discovery of the New World.

Ox-Cart Man

Donald Hall. Puffin, 1983.

In October, a New England farmer packs his oxcart with all the things he and his family have made or harvested during the past year and heads to town to trade.

Squanto, Friend of the Pilgrims

Clyde Robert Bulla. Scholastic, 1990.

A fictionalized short chapter biography of the remarkable Wampanoag named Squanto.

The Story of the Pilgrims

Katharine Ross. Random House, 1995.

From the *Mayflower's* dangerous voyage across the Atlantic to the establishment of the Plymouth colony and the first Thanksgiving feast.

4. An overview of the Revolutionary War.

Topics to cover include the significance of the Fourth of July and the stories of important events and people of the Revolutionary War period, such as the Battle of Lexington and Concord, Valley Forge, and the Battle of Yorktown; and Paul Revere, Betsy Ross, Ethan Allen, Benjamin Franklin, George Washington, and Thomas Jefferson. Introduce the idea that in history there are often different sides to every story.

The Fourth of July Story

Alice Dalgliesh. Aladdin, 1995.

A story-style history of the American Revolution. Also see Dalgliesh's *The Thanksgiving Story* (Aladdin, 1985).

George Washington's Breakfast

Jean Fritz. Puffin, 1998.

Young George Washington Allen is determined to know what his namesake ate for breakfast—and discovers a great deal about Washington's life along the way. Try cooking up your own Washingtonian breakfast.

Katie's Trunk

Ann Turner. Aladdin, 1997.

Katie's family is Loyalist; when the rebel soldiers invade, Katie ends up hiding under the clothes in her mother's wedding trunk. A different perspective on the Revolutionary War.

Sam the Minuteman

Nathaniel Benchley. HarperCollins, 1987.

Sam's family lives on a farm in Lexington, Massachusetts, and he and his father rush to the village green when they learn that the British are on the way. Pair this one with Benchley's *George the Drummer Boy*, in which George—a drummer boy for the British—sees the battle from the other side.

5. An overview of the presidency.

What does the president do? How is he/she chosen? How is he/she different from a king or queen?

The House That George Built

Suzanne Slade. Charlesbridge, 2015.

How the White House came to be.

If I Ran for President

Catherine Stier. Albert Whitman, 2007.

Running for president is not easy. You'd have to decide what you want to do to solve the nation's problems, choose a running mate, and prepare to debate your opponents.

Also see Stier's *If I Were President* (1999), a simple introduction to the office and duties of the president.

See Mike Venezia's Getting to Know the U.S. Presidents series ([this page](#)).

6. Slavery, the Underground Railroad, and a survey of the Civil War.

The Civil War

Peter Benoit. Scholastic, 2011.

One of the True Books series; all the basics in short illustrated chapters.

Follow the Drinking Gourd

Jeanette Winter. Dragonfly, 1992.

The story of the song that guided escaping slaves north to freedom. Pair this one with Joseph Stanley's *The Big Dipper* (Powerkids Press, 2015) and some outdoor stargazing; also check out recordings of the folk song "Follow the Drinking Gourd" on YouTube.

Henry's Freedom Box

Ellen Levine. Scholastic, 2007.

The true story of Henry Brown, a slave who mailed himself to freedom in a wooden crate.

If You Lived When There Was Slavery in America

Anne Kamma. Scholastic, 2004.

Written in question-and-answer format, which makes for a great interactive read: "Why weren't slaves allowed to read and write?" "Was it dangerous to run away?"

Sweet Clara and the Freedom Quilt

Deborah Hopkinson. Knopf, 1995.

When Clara, a slave, learns of the Underground Railroad, she fashions a map in a quilt to help her fellow slaves find the way north to freedom.

Also see Bettye Stroud's *The Patchwork Path* (Candlewick, 2007).

Unspoken

Henry Cole. Scholastic, 2012.

In this lovely wordless story, illustrated with pencil sketches, a young girl finds a runaway slave hiding in the family barn.

7. Moving west and pioneer life.

Apples to Oregon

Deborah Hopkinson. Aladdin, 2008.

Loosely based on a true story, the tale of how a pioneer family brought fruit trees to Oregon.

Dakota Dugout

Ann Turner. Aladdin, 1989.

A story of life in a sod house on the prairie.

Dandelion

Eve Bunting. Houghton Mifflin Harcourt, 2001.

The story of Zoe and her family, traveling by covered wagon to the Nebraska Territory.

If You Traveled West in a Covered Wagon

Ellen Levine. Scholastic, 1992.

What would your family bring in your covered wagon? How far would you travel in a day? How would you build a fire without wood? An interactive read.

Little House in the Big Woods

Laura Ingalls Wilder. HarperCollins, 1971.

The first in the Little House series, in which 4-year-old Laura and family are living in a cabin in the Big Woods of Wisconsin.

The Quilt Story

Tony Johnston. Puffin, 1996.

A handmade quilt comforts a little girl long ago on a move west.

8. Recognize such national symbols as the flag, the Liberty Bell, the bald eagle, and the Statue of Liberty.

Should the bald eagle be our national bird? (Ben Franklin had his doubts.)

True Books: American History

Elaine Landau; Scholastic, 2008.

Among the titles in this series are *The Bald Eagle*, *The American Flag*, *The Statue of Liberty*, and *The National Anthem*.

The Eagles Are Back

Jean Craighead George. Dial, 2013.

Our national bird was once dangerously near extinction.

Her Right Foot

Dave Eggers. Chronicle Books, 2017.

A clever and creative picture-book history of the Statue of Liberty.

9. Be familiar with traditional American folktales, stories, and songs.

Kids should know the stories of American tall-tale figures such as Paul Bunyan, Pecos Bill, John Henry, and Br'er Rabbit—and of historical individuals whose life stories have become legendary, such as Davy Crockett, Annie Oakley, and Johnny Appleseed. There are many excellent picture-book versions of these stories, such as *Johnny Appleseed* by Reeve Lindbergh (Little, Brown, 1993); *John Henry* by Julius Lester (Puffin, 1999); and Steven Kellogg's *Paul Bunyan* (2004), *Pecos Bill* (1992), *Mike*

Fink (1998), and *Sally Ann Thunder Ann Whirlwind Crockett* (1995) (HarperCollins).

American Folksongs for Children

Mike and Peggy Seeger. Rounder, 1997.

One hundred favorites on two audio CDs, among them “Jimmy Crack Corn,” “Froggie Went a-Courtin’,” “She’ll Be Coming Round the Mountain,” and “This Old Man.”

American Tall Tales

Mary Pope Osborne. Knopf, 1991.

The stories of Davy Crockett, Sally Ann Thunder Ann Whirlwind, Johnny Appleseed, John Henry, Paul Bunyan, and more, illustrated with woodblock prints.

10. Know about the many different professions that enable a community to function.

Kids should know about the workings of the fire and police stations, the post office, the bank, the newspaper office, the public transportation system, the telephone company, and so on.

Richard Scarry’s *Busy Town* books (Golden Books), which feature a busy animal-populated community complete with school, farm, library, supermarket, post office, fire station, and hospital, plus workers of all kinds, are a good resource here. This is also a great opportunity for local field trips.

World History

Learn about families and family life in different times and places around the world.

Kids should be introduced to different ways of life in different places through a variety of materials, including fiction and nonfiction books, hands-on projects and activities, art, and music. World history studies should be correlated to geography.

Children Just Like Me

DK, 2016.

The lives and cultures of children from thirty-six different countries are highlighted through maps and color photos. Other books in the series include *Children Just Like Me: Celebrations* (DK, 1997); *A School Like Mine* (DK, 2016); *Food Like Mine* (DK, 2017), which includes multicultural recipes; and *Our Favorite Stories* (Jamila Gavin; DK, 1997).

Everybody Cooks Rice

Norah Dooley. Carolrhoda, 1992.

Carrie is sent out to find her younger brother at dinnertime, and discovers the many ways in which the residents of her multicultural neighborhood cook rice.

In the same format, see Dooley's *Everybody Bakes Bread* (1995), *Everybody Brings Noodles* (2005), and *Everybody Serves Soup* (2004).

Kids Celebrate! Activities for Special Days Around the Year

Maria Bonfanti Esche. Chicago Review Press, 1998.

Celebrate one hundred special days with creative projects. Take a Hansel-and-Gretel walk for Jakob Grimm's birthday, make paper lanterns for the Chinese New Year, and construct a groundhog puppet for Groundhog Day.

People

Peter Spier. Doubleday, 1980.

Crammed with tiny detailed paintings, this creative picture book introduces kids to the vast diversity (and similarity) of people around the world.

Geography

Kindergartners should be encouraged to use maps and globes frequently, to play geography games, and to associate activities in other academic disciplines with geography. When reading multicultural legends, for example, try finding the location of the countries of origin on the map; or connect geographic locations to storybook characters, animals, or historical events.

A useful resource for the early elementary years is a world map, posted in some readily accessible location. Ours, a book-sale find, spent many years tacked to the dining room wall. Over time we accumulated a pack of index cards to accompany our map, each with a “Find it on the map!” challenge that turned into a popular game. Examples: Where would you go to visit the pyramids? What country has a famous Great Wall? Where did Paddington Bear come from? Where did Rikki-Tikki-Tavi live? Where would you go to visit Ferdinand the Bull? Where would you go to see kangaroos?

1. Be familiar with the use of maps and globes.

Kids should understand what maps and globes represent. They should be able to locate the United States and their own home state on a map and a globe, as well as the Atlantic and Pacific Oceans and the North and South Poles.

As the Crow Flies

Gail Hartman. Aladdin, 1993.

What do maps look like to an eagle, a rabbit, a horse, and a sea gull?

Follow That Map!

Scot Ritchie. Kids Can Press, 2009.

An introduction to mapping skills as Sally and friends travel from neighborhood to park to around the world in search of a lost cat and dog.

Me on the Map

Joan Sweeney. Dragonfly Books, 1998.

A step-by-step introduction to maps, as a little girl shows off a crayon-sketched map of her room, then maps of her neighborhood, state, country, and world.

My Map Book

Sara Fanelli. HarperCollins, 2001.

Wonderful illustrations of creative maps, including a Map of My Family, a Map of My Day, a Treasure Map, a Map of My Dog, and a Map of My Heart. Your kids are bound to want to create similar imaginative maps of their own.

2. Draw simple maps of known areas, such as kids' bedrooms, the rooms in their house, and their yards or neighborhoods.

Try treasure and scavenger hunt games—all of which can involve simple maps. Invent your own tea-dyed pirate treasure maps. (Pair with pirate books.)

The Once Upon a Time Map Book

B. G. Hennessy. Candlewick, 2010.

Six detailed pictorial maps of famous fantasy lands, including Neverland, Wonderland, the Land of Oz, and the Giant's kingdom on top of Jack's beanstalk.

3. Know names and locations of the seven continents of the world.

Kids should be able to locate Asia, Europe, Africa, North and South America, Australia, and Antarctica on the world map and globe. Learn about major geographical features, people, monuments, wildlife, and representative myths and legends of each.

How to Make an Apple Pie and See the World

Marjorie Priceman. Dragonfly, 1996.

A trip around the world gathering the ingredients for an apple pie.

In the same format, see *How to Make a Cherry Pie and See the USA* (2013).

The True Books: Geography

Children's Press, 2009.

This series includes a short photo-illustrated book on each continent: *Asia* (Gary Drevitch), *Europe* (Sandra Newman), *Africa* (Mel Friedman), *North America* (Libby Koponen), *South America* (Libby Koponen), *Antarctica* (Mel Friedman), and *Australia and Oceania* (Mel Friedman).

In the News

Time for Kids is a weekly news-and-information magazine for kids, published in four different editions (K–1, 2, 3–4, and 5–6). Visit the website at www.timeforkids.com for sample articles and subscription information.

Science

Science studies should involve direct observation and hands-on explorations and investigations. Kids are naturals at this, and any walk in the woods or visit to the zoo is bound to generate dozens of science questions (“How long can frogs hold their breath?” “Why do leaves change color?” “What do giraffes eat?”). From the beginning, kids should understand that science is a process—an active and effective means of answering questions—rather than a to-be-memorized body of facts.

There’s no specific scientific discipline essential for young children. Rather, it’s best to introduce kids to a wide range of interesting possibilities and then, if somebody lights on a particular topic—“Ooh! Spiders!”—expand upon that.

There are many excellent science books and science activity books for this age group. Try a mix of fiction and nonfiction books, poems,

biographies, and multidisciplinary projects. Mesh science with history, language arts, and math.

Much of our boys' earliest science education involved toys. Almost anything can be used to introduce young children to basic physical science principles—marbles, magnets, mirrors, Erector sets, soap bubbles, balloons—and science supply companies ([this page](#)) usually sell a wide assortment of science-based toys.

In our early science experiments, the kids variously threw rainbows on the wall with a prism, burned their names in blocks of wood by focusing the sun's rays through a magnifying glass, painted pictures with a swinging pendulum, built and flew kites, raced marbles down inclined planes, made gruesomely colored batches of slime, and rigged up a series of devices that allowed them to drop eggs out of a second-story bedroom window and hit the ground without breaking. (There were also devices in which the eggs were smashed to smithereens; good scientists, however, learn as much from mistakes as from successes.)

We stargazed; went on nature hikes; visited museums and science centers; went to the zoo and the botanical garden; raised butterflies and ants; collected and pressed flowers, weeds, and leaves; and played with building sets. We built catapults, baking soda volcanoes, and balloon cars. We fired rockets.

See below for topics commonly covered in kindergarten-level public school science curricula. Just remember that there are always more options and alternatives.

Let's-Read-and-Find-Out Science Series

Various authors. HarperCollins.

Dozens of well-done picture-book titles on a wide range of topics, variously covering the physical, life, and earth/space sciences, for ages 4–9.

The Magic School Bus Series

Joanna Cole. Scholastic.

The irrepressible Ms. Frizzle and class explore the sciences on board the Magic School Bus. Many varied titles, including *The*

Magic School Bus Inside the Human Body, The Magic School Bus Lost in the Solar System, and The Magic School Bus on the Ocean Floor.

Start to Finish Series

Various authors. Lerner.

Learn where everyday items come from. Sample titles include *From Tree to Paper, From Cotton to T-Shirt, and From Flower to Honey.*

Physical Science

1. Know the three states of matter (solid, liquid, gas) and be able to order objects according to physical characteristics such as length, weight, volume, and temperature.

Kids should be able to classify objects by a range of basic physical properties. Which are light and which are heavy? Which float and which sink? And—at our house—which items are most exciting when zapped in the microwave? (Use caution.)

How come helium balloons—get a couple—float up to the ceiling while those you blow up on your own just bounce around the floor? Which falls faster: a hammer or a feather? Which would fall faster on the moon?

Dropping things in the bath or other tub is an easy and endlessly appealing way to observe floating and sinking. Be sure to include a wide range of objects of various sizes, shapes, and densities.

Things That Float and Things That Don't

David A. Adler. Holiday House, 2014.

What floats and what doesn't? An apple? A penny? A ball of foil? What if you turn your ball of foil into a boat?

What Is a Solid?

Jennifer Boothroyd. Lerner, 2007.

Simple explanations and experiments, illustrated with photographs. By the same author, also see *What Is a Liquid?* and *What Is a Gas?*

What Is the World Made Of? All About Solids, Liquids, and Gases

Kathleen Weidner Zoehfeld. HarperCollins, 2015.

Clear explanations and simple experiments.

Who Sank the Boat?

Pamela Allen. Puffin, 1996.

A cow, a donkey, a sheep, a pig, and a tiny little mouse decide to go for a row on the bay. Who sank the boat?

2. Kids should be introduced to the idea that physical properties can be measured and should conduct simple experiments using nonstandard measures.

Search for “sorting and classifying” activities online and you’ll find a wealth of suggestions, including—should you want them—printable worksheets.

How Big Is a Foot?

Rolf Myller. Yearling, 1991.

The king wants to give the queen a bed for her birthday—but how big should the bed be? And how to measure it?

Inch by Inch

Leo Lionni. HarperCollins, 1995.

The little green inchworm measures a robin’s tail, a flamingo’s neck, a toucan’s beak, a heron’s leg, and a whole hummingbird—but runs into trouble when he’s asked to measure the nightingale’s song.

Measuring Penny

Loreen Leedy. Square Fish, 2000.

Lisa's school assignment is to measure something in several different ways—so she decides to measure her dog, Penny. A fun project if you've got a cooperative pet.

3. Investigate forces and motion.

Kids should know that forces acting on objects—pushing or pulling—make things move. Experiment with pushing and pulling with magnets. (What's attracted by magnets? What isn't?) Magnets in many shapes and sizes, including the popular bar and horseshoe, are available from science and educational supply companies. Also check out Woolly Willy, an inexpensive toy dating to 1955, in which kids use a magnetic rod to coax iron filings to add hair, beard, and mustache to a cartoon face.

Forces Make Things Move

Kimberly Bradley. HarperCollins, 2005.

A simple overview of force and motion in the Let's-Read-and-Find-Out Science series.

Give It a Push! Give It a Pull!

Jennifer Boothroyd. Lerner, 2010.

This photo-illustrated picture book covers forces, including gravity and magnetism, as well as direction, speed, and friction. Included are suggestions for further reading.

What Makes a Magnet?

Franklyn M. Branley. HarperCollins, 2016.

How do magnets work—and how can the whole planet be a magnet? Clear, cleverly illustrated explanations, along with instructions for making your own magnet.

Try making a "Go Fish" game with a magnet tied to a string and a box filled with objects to "catch." Can you pick up a paper clip, a nail, a button, a Lego block, a washer?

Check out commercial magnetic building sets.

4. Experiment with light and shadow.

Kids should make predictions and perform simple experiments to discover what causes shadows, and should attempt to identify different objects by the shapes of their shadows. Try making shadow puppets, hand-shadow pictures, and silhouettes. And—should you get a chance to view an eclipse—this is a great time to learn about the causes and effects of a truly gigantic shadow.

Bedtime Shadow Books

Various authors. Peter Pauper Press.

Shine a flashlight through the pages to throw shadow pictures on the walls. Many themed titles, including *Whoo's There?*, *Up Up and Away*, *The Deep Blue Sea*, and *Nighttime Fairies*. And what kid doesn't like to play with a flashlight?

The Black Rabbit

Philippa Leathers. Candlewick, 2016.

Rabbit has a problem: no matter where he goes, a giant black rabbit is chasing him. He finally loses the black rabbit in the woods—only to encounter a wolf.

Fun with Hand Shadows

Frank Jacobs and Henry Bursill. Dover, 1996.

Adapted from nineteenth-century children's books, this pairs silly rhymes with two dozen hand-shadow animals.

The poem "My Shadow" by Robert Louis Stevenson can be found online at the Poetry Foundation website (www.poetryfoundation.org) or in Stevenson's *A Child's Garden of Verses*.

Life Science

One possibility for home-style life science is to encourage kids to keep a nature journal. At kindergarten age, this might include simple maps of field

trips, labeled drawings, weather records, photos, and perhaps short, simple accounts of experiments and observations. For outdoor and nature-journaling activities, see Kim Andrew's *Exploring Nature Activity Books for Kids* (Rockridge Press, 2019) for ages 5–12, and *Backpack Explorer: On the Nature Trail* (Storey Publishing, 2018) for ages 4–8.

1. Discuss differences between living and nonliving things.

Kids should know that living things grow and reproduce, and require food, water, and air. Things can be classified as living or nonliving; living things can be classified as plants or animals. This sounds simple, but the distinction between living and nonliving is a complex question. Caleb: “Is a seed alive?” Ethan: “What about an apple?”

Living Things and Nonliving Things

Kevin Kurtz. Arbordale, 2017.

A Compare and Contrast book, illustrated with great color photographs.

What's Alive?

Kathleen Weidner Zoehfeld. HarperCollins, 1995.

Is a doll alive? Or a tricycle? What about a tree? How can you tell?

2. Beginning botany: introduction to plants.

Topics to cover include what plants need to grow, the basic parts of a plant (seeds, roots, stems, leaves, flowers, fruit), the process of photosynthesis, and the differences between deciduous and evergreen plants. Kids should observe and discuss different kinds of plants and participate in hands-on plant projects.

If your family plants a garden, you've got a head start here.

Don't Throw It, Grow It!

Deborah Peterson. Storey Publishing, 2008.

Includes instructions for growing sixty-eight windowsill plants from kitchen scraps. Fun for all ages.

The Amazing Life Cycle of Plants

Kay Barnham. Barron's, 2018.

Great collage-style illustrations trace the journey from seed to plant and back to seed again. By the same author, see *The Amazing Life Cycle of Butterflies*.

The Curious Garden

Peter Brown. Little, Brown, 2009.

Once there was a city with no gardens or greenery...until a little boy discovers a patch of flowers growing near the railroad track. It's clear they need a gardener, and so he becomes one, with wonderful results.

From Seed to Plant

Gail Gibbons. Holiday House, 1991.

An account of how plants grow, with attractively labeled diagrams and instructions for a seed-to-plant project.

Also by Gibbons, see *The Vegetables We Eat* (2008) and *The Fruits We Eat* (2016).

The Reason for a Flower: A Book About Flowers, Pollen, and Seeds

Ruth Heller. Puffin, 1999.

A gorgeously illustrated account of the life cycle of flowers through a brief rhyming text.

Redwoods

Jason Chin. Square Fish, 2015.

A little boy finds a mysterious book about redwoods on the subway, and travels back in time to the early days of the trees, emerging at his subway stop into a redwood forest.

Up in the Garden and Down in the Dirt

Kate Messner. Chronicle Books, 2017.

All about the lush life of the garden, both above and below the ground.

In the same format, also see *Over and Under the Pond* (2017) and *Over and Under the Snow* (2014).

3. Beginning zoology: introduction to animals.

Topics to cover include animal coverings (fur, feathers, scales, and skin), animal movement, and animal diets (plants, animals, or both). Kids should know what kind of animals live in various habitats, and the differences between nocturnal and diurnal animals. This might also be a good time to talk about the many kinds of pets and the responsibilities of being a pet owner, and the differences between farm animals and wild animals.

Check out games about animals, such as *Find My Piglet: Animal Memory Game* (Laurence King Publishing), a matching game in which players pair adult animals with their babies. Or play the *Animal Alphabet Game*, in which one player begins with an animal name starting with *A*, the next player comes up with a name starting with *B*, and so on. See how many times you can make it through the alphabet.

Many books in the *Let's-Read-and-Find-Out Science* series (HarperCollins) are about life science topics—for example, *Ant Cities* (Arthur Dorros, 1988), *From Tadpole to Frog* (Wendy Pfeffer, 2015), *What Lives in a Shell?* (Kathleen Weidner Zoehfeld, 2015), and *Where Do Chicks Come From?* (Amy E. Sklansky, 2005).

Song of the Wild: A First Book of Animals

Nicola Davies. Candlewick, 2017.

A wonderful compendium of animals, variously categorized under “Big and Small,” “Colors and Shapes,” “Animal Homes,” “Animal Babies,” and “Animals in Action,” and more. Each featured animal is accompanied by a short poem.

Zoobooks

www.zoobooks.com

The Zoobooks magazines are a National Wildlife Federation Ranger Rick publication, available for a range of ages: *Zoobies*

(ages birth to 3), *Zootles* (ages 3–6), *Zoobooks* (ages 6–12), and (for dinosaur lovers) *Zoodinos* (ages 5 and up). Each issue features a different animal, with interesting information, diagrams, and photos. See the website for subscription information and sample issues.

4. The human body: know the five senses and basic body systems.

Topics to cover include functions of basic body parts (skeleton, muscles, digestive system, heart, brain), and the definitions and biological basis of the five senses (sight, hearing, touch, taste, and smell).

Titles in the Let's-Read-and-Find-Out Science Series (HarperCollins) include *A Drop of Blood* (Paul Showers, 2004), *Hear Your Heart* (Paul Showers, 2000), *My Five Senses* (Ailiki, 2015), *The Skeleton Inside You* (Philip Balestrino, 2016), *What Happens to a Hamburger?* (Paul Showers, 2001), and *Why I Sneeze, Shiver, Hiccup, and Yawn* (Melvin Berger, 2000).

Bones: Skeletons and How They Work

Steve Jenkins. Scholastic, 2010.

Human bones compared to those of other animals, many with life-size illustrations.

Good supplements here are an inexpensive stethoscope—our kids used theirs to listen to the hearts of their parents, each other, the cats, and the dog; and human body puzzles, of which there are numerous versions.

Earth/Space Science

1. Know the basic composition of the earth.

Kids should know that the earth is a (pretty much) spherical planet made of rock, and should be familiar with oceans, lakes, mountains, hills, valleys, plains, and islands.

Earth: My First 4.54 Billion Years

Stacy McAnulty. Henry Holt, 2017.

A picture-book history of the Earth, told from the point of view of the planet itself.

Grand Canyon

Jason Chin. Roaring Brook, 2017.

The ecology, geology, and paleontology of the Grand Canyon, illustrated with great paintings and diagrams.

How to Dig a Hole to the Other Side of the World

Faith McNulty. HarperCollins, 1990.

“Find a soft place,” this book begins. “Take a shovel and start to dig a hole.” If you dig your hole in Africa, you might find diamonds; in other places, gold, silver, coal, or dinosaur bones. A fascinating account of a little kid’s eight-thousand-mile journey through the earth.

Also see Mac Barnett’s delightful, but very different, *Sam and Dave Dig a Hole* (Candlewick, 2014), with illustrations by Jon Klassen.

The Magic School Bus Inside the Earth

Joanna Cole. Scholastic, 1989.

Ms. Frizzle’s class is studying rocks, so off they go aboard the Magic School Bus for a field trip to the center of the earth.

Thunder Underground

Jane Yolen. Wordsong, 2017.

A collection of illustrated poems about the world underground, from animal burrows and fossils to caves and tectonic plates.

Antipodes Map

www.antipodesmap.com

Find out just where you’d come out if you dug a hole to the other side of the world.

2. Know the basic features of the sun and moon, be able to identify prominent constellations, and know key events in space exploration.

Many Let's-Read-and-Find-Out Science books (HarperCollins) cover astronomy for young readers, among them Franklyn M. Branley's *The Sun: Our Nearest Star* (2002), *The Sky Is Full of Stars* (1983), *What the Moon Is Like* (2000), *The Moon Seems to Change* (2015), *The Big Dipper* (1991), and *What Makes Day and Night* (2015). Judy Donnelly's *Moonwalk: The First Trip to the Moon* (Random House, 1989) is a short chapter book for beginners on the Apollo 11 moon landing, and in Joanna Cole's *The Magic School Bus Lost in the Solar System* (Scholastic, 1992), the bus turns into a spaceship and rockets into space. Supplement studies with picture-book myths and legends about the sun, moon, stars, and constellations.

Names to know in space exploration might include Edwin Hubble, Robert Goddard, Wernher von Braun, Laika, Yuri Gagarin, Neil Armstrong, Buzz Aldrin, Michael Collins, Sally Ride, and Mae Jemison.

A Full Moon Is Rising

Marilyn Singer. Lee & Low, 2014.

A collection of illustrated poems about full moon celebrations, beliefs, and customs around the world.

Here We Are: Notes for Living on Planet Earth

Oliver Jeffers. Philomel Books, 2017.

A brilliant and awe-inspiring introduction to the planet and its (and our) place in the universe.

If You Decide to Go to the Moon

Faith McNulty. Scholastic, 2005.

What to pack, how to get there, what to expect on the moon—and how to get back home again.

3. Know the names and features of the four seasons.

Topics to cover include changes in plants and animals through the seasons, and the different ways in which animals cope with winter (hibernation, migration, color changes, and food storage). Try making your own illustrated summer, fall, winter, and spring booklets or collage-style season posters.

Around the Year

Tasha Tudor. Aladdin, 2004.

With Tudor's charming old-fashioned illustrations, this is a month-by-month tour of the year with a cozy rhyming text ("January brings us coasting / Taffy pulls and apple roasting").

Firefly July

Paul B. Janeczko. Candlewick, 2018.

A collection of very short poems categorized by season of the year, with gorgeous illustrations by Melissa Stewart.

Red Sings from Treetops: A Year in Colors

Joyce Sidman. Houghton Mifflin Harcourt, 2009.

Poems that celebrate colors through the seasons, beginning with spring when red "sings from treetops," green "peeks from buds," and yellow "slips goldfinches their spring jackets."

The Seasons of Arnold's Apple Tree

Gail Gibbons. Houghton Mifflin Harcourt, 1988.

Arnold picks apple blossoms in the spring, builds a tree house in summer, makes apple pie and cider in the fall, and hangs treats for the birds in winter.

Snow Rabbit, Spring Rabbit: A Book of Changing Seasons

Il Sung Na. Knopf, 2011.

What do animals do when the season changes?

Sunshine Makes the Seasons

Franklyn M. Branley. HarperCollins, 2016.

From the Let's-Read-and-Find-Out Science series, a clear explanation of what causes seasons, plus a useful demo you can do for yourself using an orange and a pencil.

In the same series, also see *Why Do Leaves Change Color?* (Betsy Maestro, 2015) and *Animals in Winter* (Henrietta Bancroft, 1996).

The Year at Maple Hill Farm

Alice and Martin Provensen. Aladdin, 2001.

A charmingly illustrated account of the lives of the Maple Hill Farm animals, month by month around the year.

4. Be familiar with different types of weather, and understand the concept of temperature and the use of thermometers.

Kids should make observations and keep simple weather records. Add to your nature journal—or try making personal weather journals. Illustrate with drawings, stickers, or photos. A tie-in to math: graph the weather month by month. How many sunny or rainy days did you have?

Weather titles from the Let's-Read-and-Find-Out Science series (HarperCollins) include *Clouds* (Anne Rockwell, 2008), *Feel the Wind* (Arthur Dorros, 2000), *Flash, Crash, Rumble, and Roll* (Franklyn M. Branley, 1999), *Hurricane Watch* (Melissa Stewart, 2015), *Snow Is Falling* (Franklyn M. Branley, 2000), *Tornado Alert* (Giulio Maestro, 1990), *What Makes a Blizzard?* (Kathleen Weidner Zoehfeld, 2018), and *What Will the Weather Be?* (Lynda DeWitt, 2015). Also see Mark Cassino's *The Story of Snow* (Chronicle Books, 2017), an exploration of the science of snow, with instructions for catching and observing snowflakes.

OUT-OF-THE-ORDINARY WEATHER

Bartholomew and the Oobleck

Dr. Seuss. Random House, 1949.

King Derwin of Didd is sick of the standard weather, so he asks the royal magicians to make him something new. The result is a disastrous green goo.

Cloudy with a Chance of Meatballs

Joel Barrett. Atheneum, 1982.

In the town of Chewandswallow, food falls from the sky three times a day. There are snows of mashed potatoes and rains of juice and soup—but problems arise when the weather turns bad.

Also see the 2009 movie of the same name (PG).

Hide and Seek Fog

Alvin Tresselt. HarperCollins, 1988.

Three days of fog in a New England coastal town, with wonderful and appropriately foggy illustrations. Also by Tresselt, see *White Snow Bright Snow*, winner of the Caldecott Medal.

Katy and the Big Snow

Virginia Lee Burton. Houghton Mifflin Harcourt, 1974.

Katy, an indomitable little snowplow, saves the city of Geopolis in the wake of a blizzard.

We Hate Rain!

James Stevenson. Greenwillow, 1988.

When Mary Ann and Louie complain about rain, their grandpa tells them the story of the massive rain that fell when he and his brother Wainey were young, filling their Victorian house to the rooftop and forcing them to swim through the living room. It's out of print, but well worth tracking down, because Grandpa and his outrageous stories are delightful.

The Wind Blew

Pat Hutchins. Aladdin, 1993.

The wind blew and carried everything away with it: umbrellas, balloons, kites, scarves, the mailman's mail, and the wig from the judge's head.

Foreign Language

Heather Amery's **First Thousand Words** books (Usborne Publishing) are useful vocabulary builders for beginners, available in fifteen languages, among them French, German, Italian, Hebrew, Russian, Spanish, Arabic, and Chinese. These are all colorful, fun-to-explore picture dictionaries. Kids learn the names of animals, vehicles, household items, tools, toys, and more from image-crammed pages of scenes at home, at the park, at school, on the farm, in the yard, and at the seaside. Each book includes a pronunciation guide for all one thousand words. A Quicklinks internet connection allows readers to hear each word read by a native speaker.

Muzzy BBC

www.muzzybbc.com

A video immersion program for toddlers and up, featuring animated characters, among them the oversized blue Muzzy. Languages offered are Spanish, French, Chinese, Italian, German, Korean, and English. Introduces kids to about six hundred vocabulary words. Available by online subscription or on DVD.

Dino Lingo

dinolingo.com

Lessons in over forty different languages, from Albanian to Welsh, for preschoolers and up. Packaged sets include DVDs of animations starring a cartoon dinosaur, posters, flashcards, and coloring books. The online version includes interactive games.

PetraLingua

www.petralingua.com

Courses in English, Spanish, Chinese, French, German, and Russian for ages 3–10. Each course includes about twenty video lessons, with accompanying songs, activities, interactive exercises, and a talking dictionary. Online subscription.

Mango

mangolanguages.com

Many public libraries have Mango subscriptions; check with yours. Suitable for ages 6 and up, the Mango programs—available in sixty different languages—focus on conversational skills. You'll need headphones.

Little Pim

www.littlepim.com

Programs available in French, Chinese, English, German, Italian, Japanese, Arabic, Russian, Portuguese, Korean, and Hebrew for kids through age 6. A mix of short animations (featuring Little Pim, a lovable panda) and video clips use a repetitive immersion method to introduce topics like greetings, colors, and numbers. Prices vary depending on program choices and supplements.

The Arts

Visual Art

Art should be a multifaceted experience, incorporating hands-on projects, art theory, art appreciation, and art history. Try a range of print materials, including fiction and nonfiction books and biographies of well-known artists. Kids should also be acquainted with the art of different cultures and time periods. Try meshing art with history and geography, and with field trips to museums, art galleries, art exhibitions, and artists' studios.

KidArtLit

www.kidartlit.com

Each month subscribers get a book, materials for an art project based on the book, an instructional guide, and bonus gifts. Various memberships available, including sibling kits for multiple children. For ages 3–8.

From my homeschool journal (Josh is 7; Ethan, 6; Caleb, 4):

We visited an artist's workshop today. The artist, a neighbor, does book illustrations. She showed the boys her tools and samples of her work, explained what she does and how, and let them experiment with some of her pens and inks. The boys admired her drawings and peppered her with questions. Back home, they all sat around the porch table and started personal artist's sketchbooks. Ethan drew submarines, Caleb drew magical people, and Josh drew giraffes. They also wrote and illustrated a joint thank-you note for the visit.

1. Be able to name and describe colors, shapes, and lines, and to identify these in works of art. Kids should also be familiar with the concepts of texture and pattern.

2. Observe and discuss famous works of art by a variety of artists from a range of historical periods.

Art and Max

David Wiesner. Clarion, 2010.

The story of a pair of lizards, serious Art, an artist, and happy-go-lucky Max, who hopes to become one. When Max lacks ideas, Art replies, "Well...you could paint me"—and Max, literally, does. There follows a chaotic romp through art media and styles that ends, eventually, with Max painting a portrait and Art throwing paint at a cactus. A nice lead-in for discussions of the nature of art. (What is art, anyway?)

Getting to Know the World's Greatest Artists

Mike Venezia. Children's Press.

A series of humorous short biographies, one per artist, with reproductions of the artist's works, timelines, photos, cartoon asides, and kid-friendly text. Many titles.

I Spy an Alphabet in Art

Lucy Micklethwait. Greenwillow, 1996.

The alphabet in twenty-six famous paintings, from the apple in Magritte's *Son of Man* to the zigzags in de Geest's *Portrait of a Child*.

Art History Lessons for Kids

kinderart.com

Creative hands-on lessons centering on the work of a particular artist, categorized by age group.

Deep Space Sparkle

www.deepspacesparkle.com

Art lesson plans and teaching resources for K–6, categorized by grade, subject, and technique. Various subject categories include birds, animals, nature, art and literature, architecture, and the masters.

A great resource here is a box of art postcards, available for purchase in sets by theme or artist—or just grab a few favorites off the rack whenever you visit an art museum. Once you've got a collection in hand, there are any number of ways to use it: from sorting, classifying, and comparing to discussing and admiring (or not). Ask questions. “What do you see?” “Why do you think the artist did that?”

Child-Size Masterpieces

Aline D. Wolf. Parent Child Press, 2010.

An eight-book series in which kids use the included collections of postcard-sized art reproductions for activities from matching and sorting to learning the names of famous artists and paintings.

3. Experiment with a range of art techniques and media.

Try drawing, painting, and sculpture; and experiment with fiber arts, collages, printmaking, mosaics, pottery, and mobiles. The sky's the limit.

Take photos of your kids' work. This is not only a wonderful record for you but also useful should you need to submit an end-of-the-year portfolio.

Music

At all age levels, a music program should combine active participation (both vocal and instrumental) with music theory, music appreciation, and music history. Kids should use a range of print materials, including fiction and nonfiction books about music, musical legends and folktales, and biographies of famous composers. They should be acquainted with the work of classical composers, as well as a range of modern musical styles and the music of different cultures.

Getting to Know the World's Greatest Composers

Mike Venezia. Children's Press.

Each book in the series features a short kid-friendly text with period reproductions, photos, and clever cartoon illustrations. Many titles, covering every composer from Bach and Beethoven to Aaron Copland and Duke Ellington.

1. Be familiar with such basic elements of music as rhythm, melody, and harmony.

Kids should respond to a steady beat in musical pieces—practice clapping in rhythm—and should participate in a variety of group and solo singing activities.

Wee Sing

weesing.com

Many songbook and CD collections for ages 3–7. Titles include *Wee Sing Silly Songs*, *Wee Sing Around the World*, and *Wee Sing in the Car*.

Raffi

www.raffinews.com

CDs, videos, books, and more by popular children's musician Raffi. Favorites include "Baby Beluga," "The Wheels on the Bus," "Five Little Ducks," and "Down by the Bay."

2. Listen to a range of different musical selections, both classical and multicultural.

Always popular for young beginners is Sergei Prokofiev's *Peter and the Wolf*, an enchanting musical tale in which each character is represented by a different orchestral instrument. (Our kids' favorite: Peter's grandfather, a bassoon.) Other recommended classical pieces for young listeners include Rimsky-Korsakov's *Flight of the Bumblebee*, Rossini's *William Tell Overture*, Tchaikovsky's *Nutcracker Suite*, and Saint-Saens's *Carnival of the Animals*.

Fantasia

Disney, 1940.

This now-classic film consists of eight different sequences in which classical music is paired with cartoon animations—perhaps most famously Paul Dukas's *The Sorcerer's Apprentice*, in which an overconfident Mickey Mouse in wizard's garb gets into a lot of trouble; and Mussorgsky's *Night on Bald Mountain*, which is excitingly creepy. Some love this; others complain that previously loved musical pieces are now marred forever by images of dancing hippos. Rated G.

3. Recognize instruments by sight and sound.

Kids at the kindergarten level should be able to recognize and name the guitar, violin, piano, trumpet, flute, and drum.

88 Instruments

Chris Martin. Knopf, 2016.

A little boy plans to learn an instrument—but which one?

The Philharmonic Gets Dressed

Karla Kuskin. HarperCollins, 1982.

A delightful look at the inside workings of an orchestra.

Zin! Zin! A Violin

Lloyd Moss. Aladdin, 2000.

First a trombone plays all alone, soon to be joined by a trumpet, a French horn, and eventually an entire orchestra. A delightful introduction to musical groups.

Drama

Our kids' earliest formal participation in drama was a puppet show of "Jack and the Beanstalk" at a local library, in which Josh acted as the narrator, Caleb played a cow, and Ethan played the beanstalk.

Kids generally love imaginative play and will continually invent characters, plots, and entire worlds on their own. Research indicates that their forays into make-believe have cognitive, social, and emotional benefits.

Try providing a dress-up box. Make blanket forts and build cardboard castles. Plant/build a fairy house, gnome fort, village, or garden. Enact stories with puppets—which can be made from anything from socks to paper bags to pictures pasted on craft sticks.

Puppet Play

Diana Schoenbrun. Andrews McMeel, 2011.

Twenty puppet projects made from recycled mittens, socks, towels, and more. (That lone unmatched mitten? It's an opportunity!)

Sock Puppet Theater

Christopher L. Harbo. Capstone, 2017.

Each book in the series includes instructions for making the puppets and props, and a starter script for performers. Titles

include *Little Red Riding Hood*, *The Three Little Pigs*, *Goldilocks and the Three Bears*, and *The Three Billy Goats Gruff*.

Philosophy and Comparative Religion

Introduce kids to life's big questions through picture books. Philosophy professor Thomas Wartenberg's website (www.teachingchildren-philosophy.org) has a long, alphabetized list of books, each with accompanying philosophical discussion questions. In Ruth Krauss's *The Carrot Seed*, for example, a little boy continues to water his carrot seed even when told that his carrot will never grow—and in the end is rewarded with a perfectly enormous carrot. Questions include “How do you know when it's right to stand your ground?” “Did the boy actually know that the carrot would come up?” “What is the difference between believing something and knowing something?”

Kids should also be introduced to the range of world religions.

A Faith Like Mine

Laura Butler. DK, 2005.

Covers religions around the world with maps and color photographs.

My Religion, Your Religion

Lisa Bullard. Millbrook Press, 2015.

A simple picture-book introduction to four major world religions: Judaism, Christianity, Buddhism, and Islam.

Health and Physical Education

1. Know the importance of exercise, cleanliness, good nutrition, and sleep.

This generally comes with the territory of normal parenting. For some supportive resources, see the Berenstain Bears series by Jan and Stan Berenstain (Random House), in which Brother and Sister Bear variously learn about visiting the doctor and dentist, avoiding junk food, telling the truth, resisting peer pressure, and more.

Around the World in a Bathtub

Wade Bradford. Charlesbridge, 2017.

Add geography to bath time with this picture-book account of baths around the world, from a Turkish bathhouse to a Yup'ik sweat lodge, a Japanese ofuro, and a dunk in the Ganges River.

BOOKS ON HEALTHY EATING

Good Enough to Eat

Lizzy Rockwell. HarperCollins, 2009.

A guide to a healthy diet for kids, covering the basic nutrients and their functions, the digestive system, and calories, with a few kid-friendly recipes.

Gregory the Terrible Eater

Mitchell Sharmat. Scholastic, 2009.

Gregory, a little goat, shuns old shoes, tin cans, and tires in favor of vegetables, fruits, eggs, and fish. His horrified parents take him to the doctor.

I Will Never Not Ever Eat a Tomato

Lauren Child. Candlewick, 2003.

Big brother Charlie convinces his picky little sister Lola to eat by reinventing carrots as orange twiglets from Jupiter, mashed potatoes as cloud fluff from Mount Fuji, and fish sticks as Ocean Nibbles. Also see Charlie and Lola in Child's *I Am Not Sleepy and I Will Not Go to Bed* (2005).

2. Participate in age-appropriate athletic activities.

Kids should exhibit such basic locomotor movements as running, hopping, jumping, and skipping—usually no problem for the average 5- or 6-year-old—as well as such non-locomotor movements as bending and straightening, curling, stretching, and twisting. They should also be able to throw, catch, and kick a ball.

3. Learn to swim.

According to the Centers for Disease Control and Prevention (CDC), a major risk factor for children is not knowing how to swim. Kids can safely take swimming lessons as early as the age of 1, and it's well worth it—a 2009 study found an 88 percent drop in drowning risk among preschoolers who had had swimming lessons.

Life Skills

Kindergartners should manage basic hygiene without assistance—brushing teeth, washing hands—and should participate in such household chores as setting and clearing the table, picking up after themselves, and feeding pets. They should also be able to choose their own clothes and dress themselves, though be prepared for creative choices.

Kindergartners should also demonstrate polite table behavior—don't chew with your mouth open, put your napkin in your lap, don't poke your brother with your fork—and should know the meaning and usage of *please*, *thank you*, *excuse me*, and *I'm sorry*.

Dear Miss Perfect

Sandra Dutton. Houghton Mifflin Harcourt, 2007.

A tongue-in-cheek guide to manners through the problems of young animals, all described in letters. "Dear Miss Perfect," fourth grader Emily Possum writes. "My problem is that I like to hang upside down. Mama lets me do it at home. That's how I'm most

comfortable and the way I learn.” But Emily’s teacher says no. How to cope?

Do Unto Otters

Laurie Keller. Square Fish, 2009.

Mr. Rabbit’s new neighbors are otters, and he has no idea how to treat them. What if they don’t get along? Helpful Owl suggests he follow the Golden Rule: treat the otters like he’d like them to treat him.

How Do Dinosaurs Say Good Night?

Jane Yolen. Blue Sky, 2000.

Dinosaurs model proper going-to-bed behavior.

There are many well-behaved dinosaur sequels, among them *How Do Dinosaurs Play with Their Friends?*, *How Do Dinosaurs Eat Their Food?*, and *How Do Dinosaurs Clean Their Room?*

Manners

Aliki. Greenwillow, 2007.

Good (and bad) manners explained through clever panel cartoons and speech bubbles, with some side comments from a trio of little birds.

No, David!

David Shannon. Blue Sky, 1998.

An object lesson in what not to do, as David goes from bad to worse.

Time to Say “Please”

Mo Willems. Disney-Hyperion, 2005.

A gang of mice—armed with colorful word bubbles—deal with the basics of *please*, *thank you*, *excuse me*, and *I’m sorry*.

What Do You Say, Dear?

Sesyle Joslin. HarperCollins, 1986.

Zany hypothetical situations illustrating common rules of etiquette, to each of which is appended the question “What do you say, dear?” What to say if you inadvertently bump into a crocodile? Or if you’re introduced to a baby elephant?

“**Rules**,” Karla Kuskin’s wonderful etiquette poem, appears in *The Random House Book of Poetry for Children* (Random House, 1983). (“Do not jump on ancient uncles / Do not yell at average mice / Do not wear a broom to breakfast / Do not ask a snake’s advice.”)

For safety’s sake, kids at this age should know their full name, address, and phone number, and how to make an emergency call.

Computer and Technology Skills

Chances are kids will be far ahead on this one, but these are the public school recommendations.

- 1. Know the parts of the computer (keyboard, monitor, mouse).**
- 2. Log in and log out of the computer.**
- 3. Use the computer mouse correctly.**
- 4. Open and close programs correctly.**
- 5. Locate letters and numbers on the keyboard and be able to type first name, the alphabet, numbers, and simple words.**

6. Practice safe online behavior.

While this last will become more of an issue as kids get older, it's never too early to instill the necessity for only visiting appropriate online sites and never revealing passwords or personal information.

7. Introduction to coding.

Bee-Bot

www.bee-bot.us

This is an easy-to-operate black-and-yellow-striped bee-shaped robot that uses directional keys to enter some forty different commands, variously sending Bee-Bot backward, forward, right, and left.

ScratchJr

www.scratchjr.org

Available as a free app. ScratchJr allows kids ages 5–7 to program their own interactive stories and games, solve problems, and design projects.

Tynker

www.tynker.com

Coding through games for ages 7 and up.

Apps and games for teaching coding, variously for ages 4–7, 7–13, and 13+.

CHAPTER 6

Grade One

At about ten o'clock on an evening late in February the entire pattern of our collective lives was violently altered. My husband and I, sitting in the kind of companionable stupor that sets in when all children are in bed and presumably asleep, were startled at hearing a sudden astonished "Oh!" from Sally's room. As we half rose, looking at one another, her voice lifted in the greatest, most jubilant shout I have ever heard: "I can READ! I can READ!"

—SHIRLEY JACKSON

Language Arts

Reading

The hurdle for average first graders, who by now presumably have phonics under their belts, is developing the ability to decode rapidly and fluently, translating letters into words and sentences. This comes earlier for some

than for others. Some kids read at four; some at eight or ten. Some are natural sight-readers, as was Shirley Jackson's Sally (see quote above). Jackson explained that Sally, a kindergartner, had continued to retrace words on her own in their current bedtime reading book, *Ozma of Oz*, until suddenly the words on the page fell together and became readable. Two of our children learned to read in just this fashion; Ethan, our middle kid—a late reader—used phonics.

Do you need a packaged reading program for your first grader? Probably not. While many commercial reading programs are attractive and reportedly effective, most are pricey for what you get. Common components are early readers and workbooks, flash cards, and simple phonics games. Generally, however, you can assemble a comparable program of your own—with a greater chance of suiting your child's personal learning style and interests—for far less money. In fact, with a library card, a pack of index cards, and a little ingenuity, you can devise one for practically nothing.

There's also a wealth of online exercises, games, quizzes, and activities for beginning readers. Many require a subscription fee, but some are free—such as Reading Bear (www.readingbear.org), where kids can learn letter sounds, blends, plurals, single- and multi-syllable words, and more through photo-illustrated interactive quizzes.

Phonics, Decoding, and Word Recognition

This sounds boring, and it often is. The standard school fallback here is worksheets, often the only choice for harried teachers juggling a class of twenty-five active kids. Homeschoolers have friendlier options, and much of this can be taught in the course of shared family reading.

1. Review and reinforce phonemes.

Kids should know the sounds of all the consonants and both long and short vowels. They should also know the common digraphs—double-letter combinations that represent single sounds, such as *th*, *ch*, *sh*, *qu*, and *wh*—and common consonant blends, such as *bl*, *br*, *sp*, *st*, *sw*, *dr*, and *tr*.

They should be familiar enough with these to substitute initial consonant sounds to create rhyming word families.

2. Expand upon the ability to decode one-syllable words.

Kids should be able to sound out one-syllable words, converting individual letters to phonemes and blending these into recognizable words. This essential skill—decoding—is (say some) a primary means by which beginning readers decipher unfamiliar written words.

3. Identify root words and common inflectional endings: *s*, *es*, *ed*, *er*, *est*, and *ing*.

Kids should be able to read not only the word *look*, for example, but *looks*, *looked*, and *looking*.

Big, Bigger, Biggest

Harriet Ziefert. Blue Apple Books, 2016.

Unfold flaps to find the biggest, the shortest, the fastest, the farthest, and more.

4. Know age-appropriate sight words.

For first graders, suggested sight words (see [this page](#)) include *after*, *every*, *know*, *once*, *some*, *thank*, *walk*, and *when*.

This doesn't mean, of course, that you have to limit yourself to the recommended lists. According to my journal, Josh at this age wanted to spell *elegant* and *archaeopteryx*, and Ethan demanded *zeppelin*, *bazooka*, and *giant squid*.

One of the best ways to build vocabulary, of course, is through reading—and who doesn't love the occasional big word?

Big Words, Small Stories: The Missing Donut

Judith Henderson. Kids Can Press, 2018.

The adventures of Cris, his cat Crat, and some unexpected big words, among them *purloined*, *smithereens*, *bamboozled*, and *galoshes*.

5. Identify and use contractions.

Kids should be able to recognize and use such contractions as *aren't*, *wasn't*, *isn't*, and *I'm*, and to convert them to their alternative longer forms (*are not*, *was not*, and so on).

I'm and Won't, They're and Don't: What's a Contraction?

Brian P. Cleary. Millbrook Press, 2012.

Cleary's funny, cartoon-illustrated grammar picture books deliver all the basic information in a thoroughly enjoyable way.

Reading Comprehension

1. Read and understand grade-level-appropriate material.

By the end of first grade, kids should be able to read aloud reasonably fluently, in a manner that approximates natural speech. (Remember, this is a public school guideline; kids develop reading skills at different rates.)

How to help your early reader pick grade-level-appropriate books? Some reading specialists recommend the **five-finger rule**—have the kid turn to page two of a chosen book, read it, and hold up one finger for each word he/she isn't sure of or doesn't know. If there are five or more unknown words, it might be best to choose an easier book.

2. Answer who, what, when, where, and why questions—the “five W’s”—about reading material.

Kids should be able to give accurate oral accounts of works that they have read themselves or heard read aloud. Such narrations reinforce memory and enhance analytical thinking and attention.

See the Junior Great Books program ([this page](#)) for kindergartners and first graders. Also recommended for first graders is the Great Books Classic Read-Aloud Pegasus series (selections include “The Pied Piper,” “Hansel and Gretel,” and Isaac Bashevis Singer’s “Zlateh the Goat”) and the Sun series (selections include “The Black Hen’s Egg,” a French folktale, “Rumpelstiltskin,” and “The King of the Frogs”), along with thought-provoking discussion questions.

3. Know the literary terms *plot, setting, character, and hero/heroine*, and identify all in books and stories.

4. Enjoy a wide range of literature, including fiction and nonfiction books, multicultural folktales and legends, fairy tales, fables, and poems.

The Classic Treasury of Aesop’s Fables

Running Press, 2007.

Twenty beautifully illustrated classics, including “The Tortoise and the Hare,” “The Ant and the Grasshopper,” and “The Goose Who Laid the Golden Eggs.”

Fables

Arnold Lobel. HarperCollins, 1983.

Twenty humorous illustrated fables, among them “The Crocodile in the Bedroom,” “The Bad Kangaroo,” and “The Mouse at the Seashore.” (Make up some of your own.)

A First Book of Fairy Tales

Mary Hoffman. DK, 2006.

Fourteen classics, among them “Cinderella,” “Jack and the Beanstalk,” “Sleeping Beauty,” and “The Frog Prince.”

There are many other excellent fairy tale collections, among them *The Barefoot Book of Fairy Tales* (Malachy Doyle; Barefoot Books, 2005),

The Random House Book of Fairy Tales (Amy Ehrlich; Random House, 1985), and the *Usborne Illustrated Grimm's Fairy Tales* (Ruth Brocklehurst and Gillian Doherty; Usborne, 2010); this last is a gentle interpretation of the often-grim originals.

Very Short Fairy Tales to Read Together

Mary Ann Hoberman. Little, Brown, 2012.

One of the You Read to Me, I'll Read to You series, this is a collection of new takes on eight favorites, written for two voices. Alternate lines are color-coded for ease of shared reading. Fun and adorable.

In the same series, see *Very Short Fables to Read Together* (2013) and *Very Short Tall Tales to Read Together* (2014).

There are also dozens of picture-book versions of individual fairy tales, not all traditional. For the latter, see some of these:

Interrupting Chicken

David Ezra Stein. Candlewick, 2016.

Papa is trying to read a bedtime story to his daughter, a little red chicken, but she can't help interrupting when the action gets tense ("Don't go in! She's a witch!").

No Bears

Meg McKinlay. Candlewick, 2012.

Ella is in charge of this hilarious fairy tale book, and she's determined that it will contain no bears.

The Princess and the Pea

Lauren Child. Disney-Hyperion, 2006.

A wonderful retelling, printed in creative fonts and illustrated with color photographs of a 3-D dollhouse world.

Rapunzel

Rachel Isadora. G. P. Putnam's Sons, 2008.

Illustrated with brilliant collages, Isadora's fairy tales are multicultural takes on the classics. In *Rapunzel*, for example, Rapunzel sports gorgeous beaded dreadlocks and the prince rides a zebra.

Also see Isadora's lush African versions of *The Twelve Dancing Princesses*, *The Princess and the Pea*, *Hansel and Gretel*, and *The Fisherman and His Wife*.

The True Story of the Three Little Pigs

Jon Scieszka. Puffin, 1996.

As told from the misunderstood wolf's point of view. He just wanted to borrow a cup of sugar to make a birthday cake for his dear old granny.

Who Pushed Humpty Dumpty? And Other Notorious Nursery Tale Mysteries

David Levinthal. Schwartz & Wade, 2012.

Forensics comes to fairy tales in the form of Binky, a detective toad, who deals with a break-in at the Bears' house, a dead witch at a gingerbread cottage, and the criminal who pushed Humpty Dumpty.

Sharing books is perhaps one of the most important activities for kids in this age group. The experience of reading aloud together gives young listeners a chance to imagine, visualize, empathize, accumulate factual information, and ask questions. When our kids were of elementary school age, the backbone of our homeschooling program was just such shared reading and discussion.

The shared reading experience can also be expanded upon with book-related projects and activities. Encourage kids to make thematic bookmarks for favorite books. Plant beans to accompany *Jack and the Beanstalk*, or bake blueberry muffins with *Blueberries for Sal*. Many suggestions for hands-on activities to accompany popular picture books can be found online.

5. Define and use a book's table of contents.

Writing

First graders print. Writing paper generally recommended for first graders has a broken line marking the midpoint, such that kids have some guidance as to where to put the middle crosspieces of capital letters *E*, *F*, and *H*, and help in sizing lowercase letters.

1. Print all upper- and lowercase letters legibly, using proper spacing.

Kids should participate in regular penmanship practice. They should write in the correct direction—that is, left to right, and top to bottom—and should hold pencils or pens correctly.

2. Write words and sentences, using proper spacing, capitalization, and punctuation.

An important point here is that kids should write for a reason. Instead of rote practice in a vacuum, writing should be the cool thing you do when you've invented a story about alien grasshoppers or you want to tell Grandma about your trip to the zoo. First graders should experiment with a wide range of writing activities, such as keeping a journal, letter and story writing, nature observations, autobiographical narratives, and poems. Kids should know that sentences begin with capital letters and end with punctuation marks (period, question mark, or exclamation point). They should also know that proper names begin with capital letters, that the pronoun *I* is capitalized, and that the plural form of a regular noun is (usually) made by adding an *s* to the end of the word.

On the other hand—and most importantly—the emphasis in first-grade writing should be on expression and creativity rather than on form and mechanics.

Punctuation Takes a Vacation

Robin Pulver. Holiday House, 2004.

A wacky picture-book account of what happens when the punctuation marks head off for Take-a-Break Lake.

Similar titles by Pulver include *Nouns and Verbs Have a Field Day* (2007) and *The Case of the Incapacitated Capitals* (2013).

3. Identify nouns, verbs, and adjectives.

Good sources here include Ruth Heller's gorgeously illustrated picture-book grammar series (Puffin). Titles include *Merry-Go-Round: A Book About Nouns*, *Kites Sail High: A Book About Verbs*, and *Many Luscious Lollipops: A Book About Adjectives*. Also see Brian P. Cleary's Words Are CATegorical series (Carolrhoda): many titles, including *A Mink, a Fink, a Skating Rink: What Is a Noun?*; *To Root, to Toot, to Parachute: What Is a Verb?*; and *Hairy, Scary, Ordinary: What Is an Adjective?*

4. Spell simple three- and four-letter words from dictation using phonics skills. Know spelling of first-grade-level sight words.

Don't panic if your first grader uses *dge* for *doggie* and *skwrl* for *squirrel*. Not only does this show comfortable self-confidence on the part of the writer, but it's a natural part of the process of learning how to spell.

As kids progress through the maddening intricacies of the English language, they first enter the *semiphonetic* stage of spelling development, in which they have just begun to grasp letter-sound correspondence. Writing at this stage may turn out sentences that only a parent can translate, often using single letters to represent words, such as *n* for *and* or *in*. Next comes the *phonetic* stage, in which kids have solidified their grasp of phonics and thus spell logically, according to letter sound. Their writing thus includes such perfectly sensible spellings as *enuf* for *enough*. They're in good company: this is the approach Ben Franklin touted in his (sadly failed) eighteenth-century attempt to standardize and simplify English spelling.

Kids next enter the *transitional* stage, in which their writing shows an increasing understanding of the structure of words, and finally they reach

the *correct* stage, by which time they can cope competently with prefixes and suffixes, silent letters, and irregularly spelled words (of which English has many).

None of our kids used a spelling program or formally studied spelling. Instead, they learned by doing: reading, writing, playing word games such as Scrabble, Boggle, and Bananagrams, and doing crossword puzzles.

There are many commercial spelling programs available, which generally consist of a series of graded workbooks with word lists, fill-in-the-blank exercises, and writing prompts. There are also many free spelling placement tests and spelling lists for all grade levels available online.

5. Identify synonyms, antonyms, and homonyms.

Synonyms are words that have the same meaning, as in *fast* and *rapid*; antonyms are words with opposite meanings, as in *fast* and *slow*; and homonyms are words that sound the same but have different spellings and meanings, as in *blue* and *blew*.

Many picture books deal with these concepts, among them Brian P. Cleary's *Pitch and Throw, Grasp and Know: What's a Synonym?* (First Avenue Editions, 2007) and *How Much Can a Bare Bear Bear? What Are Homonyms and Homophones?* (Millbrook, 2007); Gene Barretta's *Dear Deer: A Book of Homophones* (Square Fish, 2010); and Fred Gwynne's delightful *The King Who Rained* and *Chocolate Moose for Dinner* (Aladdin, 1988).

Also see:

Double Take! A New Look at Opposites

Susan Hood. Candlewick, 2017.

Yes/no, on/off, and asleep/awake are pretty obvious, right? But there are complications—who knows what's big unless there's also small? A thought-provoking read.

The Opposite

Tom MacRae. Peachtree, 2006.

Nate wakes up to find the Opposite in his bedroom, a pointy-nosed creature sneakily dressed in pajamas that match the wallpaper. “‘Dad!’ cried Nate. ‘There’s an Opposite on the ceiling!’...But then the Opposite happened and it wasn’t there anymore.” Nate has a lot of troubles until finally, cleverly, he learns to deal with the tricky Opposite.

Listening and Speaking Skills

First graders should be able to listen and respond appropriately to spoken information and instructions, and should be able to communicate information orally in an organized and appropriate fashion.

Sometimes these—especially the need to listen—can be tough for excited little kids.

My Mouth Is a Volcano!

Julia Cook. National Center for Youth Issues, 2006.

Louis just can’t help himself: when he has an important thought, he simply has to blurt it out! Helpful hints for learning not to interrupt.

1. Listen to, restate, and follow two-step directions.

2. Retell a story in proper sequence.

3. Participate in short dramatizations, charades, pantomimes, and plays.

Reenact favorite stories, create puppet shows, or participate in dramatic “let’s pretend”-style games. All of these activities enhance expression, promote comprehension and sequencing abilities, and develop imagination.

Reader’s Theater is an interactive activity in which kids read and then, with minimal props or stage sets, reenact a story. There are many free Reader’s Theater scripts available online, adaptable to any number of actors—or you can create your own. Put on your own performances of “The

Three Little Pigs,” “Goldilocks and the Three Bears,” or “Little Red Riding Hood.”

4. Memorize and recite short poems and rhymes.

Fun for this age group is practically anything by Shel Silverstein. See *Where the Sidewalk Ends* (HarperCollins, 2014) and *A Light in the Attic* (2009).

Forget-Me-Nots: Poems to Learn by Heart

Mary Ann Hoberman. Little, Brown, 2012.

Over 120 illustrated selections from many different poets, among them Robert Frost, Nikki Giovanni, Emily Dickinson, and Carl Sandburg.

Study Skills

A major aim of a good education is to ensure that learners become increasingly self-sufficient. The acquisition of study skills shouldn't be an empty exercise centered on the completion of arbitrary homework. This is important: these are the tools that kids will use to pursue a lifetime of independent learning. They'll need to know how to follow directions, how to conduct research, how to keep usable records, where to find help, and where to look things up.

1. Know the uses of a dictionary, encyclopedia, and card catalog.

There are many illustrated beginners' dictionaries targeted at kids in this age group; kids might also try making their own scrapbook-style dictionaries, adding and illustrating new words as they acquire them. Many different dictionaries and encyclopedias, and most library card catalogs, are available online. Explore.

2. Be able to put words in alphabetical order according to first letter.

Try alphabetizing the family book shelves or recipe collection. Use index cards to make a personal family card catalog.

Mathematics

It's recommended that first graders practice math daily and be encouraged to relate their academic experience to math in daily life: the bathroom scale, the kitchen measuring cups, the thermometer on the back porch, the speedometer on the family car.

What's important when it comes to first-grade math? As they explore the mathematical world around them, kids should be encouraged to understand that there are many ways of approaching and solving mathematical problems and puzzles. They can use hands-on experiments, pictures and diagrams, representative objects, and estimation skills (aka best guesses). Or they may come up with a creative method all their own.

As nervous adults, it's also important for us to remember that kids hone mathematical thinking through any number of activities that don't necessarily look like conventional math. Puzzles, board and card games, building with blocks or Lego bricks, beading, and origami, for example, all enforce math concepts.

Also see Miquon Math and other resources ([this page](#)).

Number Theory

1. Recognize and write the numbers 0 to 100.

A classic aid for learning about numbers and number relationships is the hundred chart. This is a 10×10 grid—a total of 100 squares—labeled with the numbers 1 to 100 in horizontal rows. Thus the first row of the chart

consists of ten squares numbered 1–10, the second row with 11–20, and so on.

Play with it. What do you do on the chart to add 1 to a number? To subtract 1? To add 5? To add 10?

There are many sources online for free printable hundred charts, both numbered and blank.

100 Bugs!

Kate Narita. Farrar, Straus and Giroux, 2018.

Ten different ways to count to 10, using ten different kinds of bugs.

100 Snowmen

Jen Arena. Two Lions, 2013.

Readers count and add to 100 as they watch snowmen stargaze, have snowball fights, go sledding, and play hide-and-seek.

The Night Before the 100th Day of School

Natasha Wing. Grosset & Dunlap, 2005.

It's now a tradition to celebrate the hundredth day of school—often by challenging kids to accumulate or make a hundred of... something. In this parody of “The Night Before Christmas,” the redheaded narrator realizes he needs his collection by tomorrow. And he hasn't even started.

Research “the 100th day of school” online for dozens, if not hundreds, of 100-related activities for kids of all ages. For example, make a 100-Cheerio necklace or a 100-paperclip chain; name 100 animals or 100 countries; find out what life was like 100 years ago.

2. Count to 100 by twos, fives, and tens.

In my experience, a surefire way of teaching kids how to count backward from 100 is to teach them the words to “99 Bottles of Beer on the Wall.” Unfortunately, while this may be a plus for mathematical education, it will drive you bonkers on car trips.

One Hundred Hungry Ants

Elinor J. Pinczes. Houghton Mifflin Harcourt, 1999.

One hundred hungry ants are moving in on a picnic but find that marching in single file is too slow. They divide into two rows of fifty, then four rows of twenty, and so on—only to find that by the time they finally arrive, the picnic is gone.

Sheep Won't Sleep

Judy Cox. Holiday House, 2017.

Clarissa, who can't get to sleep, is trying to count sheep—when ten sheep barge into her bedroom, insisting that she's not trying hard enough. After counting alpacas by twos, llamas by fives, and yaks by tens, she ends up with a hundred bright-colored woolly animals.

3. Use tallies for counting.

Four lines + a diagonal cross = a group of five. To find your total, you'll need to count by fives. Try it with birds at the bird feeder, passing cars, kids at the playground, and board or sports game scores.

Tally O'Malley

Stuart J. Murphy. HarperCollins, 2004.

On a long, dull trip to the beach, the three O'Malley kids amuse themselves by playing tally games. One of the MathStart series.

4. Identify ordinal positions from first through twelfth.

The traditional carol “The Twelve Days of Christmas” is an exercise in ordinal positions through twelfth. Check out the many alternative song versions, which include—for example—eight hares a-running and eleven badgers baiting.

10 Little Rubber Ducks

Eric Carle. HarperCollins, 2005.

The ten little ducks fall overboard in a storm and end up drifting off in different directions. Connect to geography.

Ten Little Caterpillars

Bill Martin Jr. Beach Lane Books, 2011.

A rhyming account of ordinal numbers with ten busy caterpillars, beautifully illustrated by Lois Ehlert.

5. Compare and order numbers 0 to 100 using the terms *greater than*, *less than*, and *equal to*.

6. Understand place values for ones, tens, and hundreds.

An understanding of place value is essential in mathematical operations involving regrouping—that is, carrying in addition and borrowing in subtraction. One way of developing this skill is through simple tile-trading games. A home-style version requires a pair of dice and a set of base ten blocks, which are available from educational supply companies, both in plastic and in cardboard.

Base ten blocks include single units, strips of ten, and squares of one hundred. On each turn, kids roll the dice to win a certain number of units, which can eventually be traded in for strips of ten and squares of one hundred. The first to reach an agreed-upon amount wins. Can also be played backward, subtraction-style.

7. Identify halves, thirds, and fourths.

Reinforce fraction concepts in everyday life—a practice that can be as simple as cutting breakfast toast or lunchtime sandwiches into halves and quarters.

Edward Eager’s chapter book *Half Magic* (Houghton Mifflin Harcourt, 2016) is a delightful exercise in fractions, in which four siblings stumble upon a magic coin that grants just half of every wish.

8. Make and interpret simple picture and bar graphs.

Kids should participate in sorting and classification exercises, then use charts or graphs to present their data. How, for example, to sort a collection

of small objects such as a mix of pasta, beans, buttons, and pebbles? A bag of multicolored jelly beans? And now that you've done that, how to share the results?

Kids should also experiment with collecting data from real-life situations and organizing the results on charts and graphs. Have kids collect data on a trip to the park or the shopping mall. How many people are wearing hats? What kind of trees grow in your neighborhood? How many of each?

The Great Graph Contest

Loreen Leedy. Holiday House, 2006.

Gonk the toad, with the help of friends Beezy and Chester, investigates bar graphs, Venn diagrams, and pie graphs with examples of mud, rocks, cookies, hatching eggs, and flowered bathing suits.

Also see Stuart J. Murphy's *Lemonade for Sale* (HarperCollins, 1997) and *Less Than Zero* (HarperCollins, 2003).

Operations

1. Experiment with the addition and subtraction of whole numbers through 20 using manipulatives and number lines.

Number lines are available from most educational supply companies and can be downloaded for free from many online sites, or you can make your own. For a longer-lasting number line, laminate it.

Also see Family Math ([this page](#)).

2. Know the definitions of *sum* and *difference* and the names and use of the plus (+) and minus (–) signs.

3. Know basic addition facts through $10 + 10$ and corresponding basic subtraction facts.

A major attainment of first grade—and a skill that will be reviewed and reinforced in second grade—is the acquisition of basic addition and subtraction facts. A number of games and materials are available for helping beginners. Many, readily identified by kids as math practice, aren't particularly exciting, such as the ubiquitous flash cards. Double-nine dominos and card and dice games, however, often have somewhat more appeal. A ready knowledge of addition and subtraction facts is a great help as kids move into more complex arithmetic.

4. Understand the commutative property of addition—that is, numbers can be added in any order.

In plain terms, which are all you need, this means that $3 + 2$ is exactly the same as $2 + 3$.

5. Successfully solve simple equations and word problems.

A sample first-grade word problem might read “Katie had twelve cookies. She gave two of them to her friend Sam. How many cookies does Katie have left?”

Encourage your kids to invent their own word problems. Ours routinely found the standard first-grade fare feeble stuff, preferring to add and subtract with submarines, space aliens, plummeting asteroids, and extremely mean and hungry sharks.

Money and Measurement

1. Recognize pennies, nickels, dimes, and quarters.

2. Determine the value of a given set of coins up to a dollar.

First graders should understand that different combinations of coins can equal the same amount of money—two dimes, for example, is the same as

four nickels or twenty pennies. Kids should also be able to recognize dollar and cent signs, and use decimals in writing money amounts.

“Smart” by Shel Silverstein

Found in *Where the Sidewalk Ends* (HarperCollins, 2014), this tongue-in-cheek poem begins “My dad gave me one dollar bill / 'Cause I'm his smartest son / And I swapped it for two shiny quarters / 'Cause two is more than one.”

Alexander Who Used to Be Rich Last Sunday

Judith Viorst. Atheneum, 1987.

Alexander's grandparents give him a dollar—he's rich! What follows is a series of disastrous decisions in money management.

A favorite when our kids were of early elementary age was a homemade buying and selling game in which, for small kid-friendly amounts of cash, the kids could buy or sell imaginative items drawn (and priced) on index cards. Each boy started out with a predetermined amount of money and bought those items he most wanted and could afford, making change as he made his purchases. Most purchases were great deals: players could buy a leopard, a rocket ship, a robot, or the moon, all for under fifty cents.

3. Use calendars to identify days, weeks, and months.

4. Tell time to the hour and half hour on a standard clock. Understand the difference between A.M. and P.M.

5. Be familiar with the uses of common measuring instruments, such as a scale (weight), ruler (length), and thermometer (temperature).

Never underestimate the appeal of a cool gadget. We got each of our kids an inexpensive retractable tape measure, which led to a flurry of measuring everything from the refrigerator to the cat.

6. Compare and order objects by length, weight, and volume using both standard and nonstandard measures.

Standard measures involve determining quantities using formal systems of measurement, such as the English and metric systems. Nonstandard measures involve more eclectic comparisons, such as “How many paper clips does it take to equal the length of the kitchen table?” (Guess first!)

Is a Blue Whale the Biggest Thing There Is?

Robert E. Wells. Albert Whitman & Company, 1993.

A clever exploration of size and proportion, starting with the blue whale—which isn't the biggest thing there is by a long shot.

Also by Wells, see *What's Smaller Than a Pygmy Shrew?* (1995).

Geometry

Recommended materials for beginning geometry studies include pattern blocks (wooden, magnetic, or online versions), pattern-forming games, Colorforms, tangrams, and geoboards.

1. Identify and draw common two-dimensional shapes: circle, triangle, rectangle, and square.

See Mac Barnett's *Triangle* (Candlewick, 2017), *Square* (2018), and *Circle* (2019), with illustrations by Jon Klassen. A brilliant and witty picture book geometry trilogy.

2. Identify figures that have lines of symmetry.

Symmetrical figures can be folded down the middle—that is, along their lines of symmetry—to form a pair of mirror images. Valentine hearts, gingerbread men, and equilateral triangles are symmetrical.

Seeing Symmetry

Loreen Leedy. Holiday House, 2013.

A clever picture book with many symmetrical examples of everything from butterflies to teddy bears, with assorted hands-on activities.

3. Correctly use position words to describe location: *right, left, above, below, inside, outside, in front, in back, over, under, and so on.*

History and Geography

While there are no hard-and-fast rules for teaching your kids history, there are some helpful hints.

1. Interest, enthusiasm, and curiosity are more important than names, dates, and facts.
2. Multiple approaches and sources are always better than a single textbook.
3. History, many educational researchers now agree, is best conveyed through stories. Being made to recite the dates and causes of the Punic Wars is much less effective than hearing the story of Hannibal and his elephants.
4. Don't underestimate your kids. A long-standing dogma has been that young children relate best only to their immediate environments—hence the theory of “expanding horizons,” in which social studies programs move from family to neighborhood to town, and only later to state, country, and world. Kids, however, generally love the strange, the exciting, and the exotic. If yours become convinced that things that happened long ago and far away are fascinating, that's success.
5. History is complex, multifaceted, and crammed with contradictions. Kids should be aware that historical events can have many interpretations, depending on point of view.

History curricula vary. Some combine American and world history in each successive year, such that kids get a taste of both; others present these separately, at separate grade levels—say, world history in grades one and two, American history in grades three and four. There’s no wrong approach.

It’s common for topics introduced in earlier grades to be revisited in greater depth and detail in later grades. Adjust and adapt, according to your kids’ interests and skill levels.

For keeping history in chronological perspective, a useful tool is a timeline. These are easy to make on your own, or check online for free templates and ideas. (See timeline games, [this page](#).)

Tiki-Toki

www.tiki-toki.com

Online timeline-maker software.

The Big History Timeline Wallbook

Christopher Lloyd. What on Earth, 2017.

Developed in association with the American Museum of Natural History, this six-foot fold-out illustrated timeline covers the history of the universe from the Big Bang to the present day.

There’s an accompanying *Big History Timeline Stickerbook* (2017), with which kids can assemble their own impressive timeline.

American History

For early readers, the Random House Step into Reading series (www.stepintoreading.com) has a large selection of short historically themed books, among them *George Washington and the General’s Dog* (Frank Murphy, 2002), *Thomas Jefferson’s Feast* (Frank Murphy, 2003), *Ben Franklin and the Magic Squares* (Frank Murphy, 2001), *Lewis and Clark: A Prairie Dog for the President* (Shirley Raye Redmond, 2003), *Listen Up! Alexander Graham Bell’s Talking Machine* (Monica Kulling, 2007), and more. These are available in five levels, from Level 1 (Ready to

Read for preschool and kindergarten) to Level 5 (chapter books for grades two to four).

Similarly, the HarperCollins I Can Read series (www.icanread.com) has many beginning-reader historical selections, among them *The Drinking Gourd* (F. N. Monjo, 1983), *The Long Way Westward* (Joan Sandin, 1992), *Buffalo Bill and the Pony Express* (Eleanor Coerr, 1996), *Wagon Wheels* (Barbara Brenner, 1984), *Dust for Dinner* (Ann Turner, 1997), *First Flight: The Story of Tom Tate and the Wright Brothers* (George Shea, 2003), and more. The I Can Read books are available at four different levels, from short simple stories (Level 1) to short chapter books (Level 4).

1. An introduction to Native American culture.

Kids should know about the arrival of the first people in North America—how did they get here? How did they live? Other topics to cover include traditional lifestyles of representative Native American tribes (homes, food, clothing, occupations), religion, legends, and Native American life today.

Explore the Ice Age! With 25 Great Projects

Cindy Blobaum. Nomad Press, 2017.

Includes a timeline, vocabulary words, kid-friendly information, and hands-on projects. Readers also find out where the popular movie *Ice Age* (2002) got it wrong.

Explore Native American Cultures! With 25 Great Projects

Anita Yasuda. Nomad Press, 2013.

Introduces the six major Native American cultural regions, with reader-friendly background information, “Words to Know” boxes, and many activities, including making a salt-dough relief map, a picture calendar, a shell rattle, and a bear claw necklace.

If You Lived with the Iroquois

Ellen Levine. Scholastic, 1999.

“What was a longhouse?” “What kinds of foods would you eat?”
“How would you wear your hair?” “What was wampum?” The

interactive question-and-answer format works well with a range of ages.

In the same format also see *If You Lived with the Cherokee* (Peter Roop, 1998), *If You Lived with the Indians of the Northwest Coast* (Anne Kamma, 2002), and *If You Lived with the Sioux Indians* (Ann McGovern, 1992).

A Kid's Guide to Native American History

Yvonne Wakim Dennis. Chicago Review Press, 2009.

An introduction to the diversity of Native American cultures, with many hands-on projects, recipes, and traditional games.

North American Indian

David Murdoch. DK, 2005.

One of the Eyewitness series, illustrated with great color photos. Each double-page spread covers a different aspect of Native American life and culture.

You Wouldn't Want to Be a Mammoth Hunter!

John Malam. Franklin Watts, 2004.

It's cold! And the animals are mean! Real information, cleverly presented.

2. Early European exploration and settlement of North America.

Topics to cover are the early European explorers, including Prince Henry the Navigator, Bartolomeu Dias, Vasco da Gama, Christopher Columbus, Ferdinand Magellan, and Hernán Cortés and the Spanish conquistadors; the establishment of colonies in the New World, including Jamestown and Plymouth; life in the colonial period; and the impact of the Europeans on the Native Americans.

The Discovery of the Americas

Betsy Maestro. HarperCollins, 1992.

From the crossing of the Bering land bridge to the age of Columbus, with maps and impressive watercolor-and-pencil illustrations.

This is the first in Maestro's American Story series; other titles are *Exploration and Conquest: The Americas After Columbus 1500–1620* (1997); *The New Americans: Colonial Times 1620–1689* (2004); and *Struggle for a Continent: The French and Indian Wars 1689–1763* (2000).

Encounter

Jane Yolen. Houghton Mifflin Harcourt, 1996.

When Columbus first lands on San Salvador in 1492, a young Taino boy tries to warn his people about the strangers.

Explore Colonial America!

Verna Fisher. Nomad Press, 2009.

Various chapters cover colonial homes, food, clothing and wigs, schools and games, Native Americans, famous people, and the Revolutionary War. Included are “Words to Know” boxes and many activities, including making a soap boat, a candle, and a model log cabin.

If You Sailed on the Mayflower in 1620

Ann McGovern. Scholastic, 1991.

All about the Pilgrims' journey, written in a conversational interactive question-and-answer format that generates participation and discussion.

Sarah Morton's Day: A Day in the Life of a Pilgrim Girl

Kate Waters. Scholastic, 2008.

Illustrated with photographs from the Plimoth Plantation living history museum in Massachusetts (www.plimoth.org), this may be the closest we get to a glimpse of American life in the early seventeenth century.

In the same format, see *Samuel Eaton's Day: A Day in the Life of a Pilgrim Boy* (Scholastic, 1996) and *Tapenum's Day: A Wampanoag Indian Boy in Pilgrim Times* (Scholastic, 1996).

Where Do You Think You're Going, Christopher Columbus?

Jean Fritz. Puffin, 1997.

An excellent biography of Columbus, filled with details and human interest.

Who's That Stepping on Plymouth Rock?

Jean Fritz. Puffin, 1998.

The Pilgrims almost certainly didn't step on it—but even so, Plymouth Rock has had an exciting life.

3. Revolutionary War.

Topics to cover include the causes of the war and key Revolutionary War figures and events, including King George III, the Boston Tea Party, the Boston Massacre, Thomas Jefferson and the Declaration of Independence, the Battle of Lexington and Concord, Valley Forge, the Battle of Saratoga and the French intervention, and the Battle of Yorktown. Names to know include George Washington, John Hancock, Benjamin Franklin, Paul Revere, Patrick Henry, John and Abigail Adams, Benedict Arnold, Ethan Allen, the Marquis de Lafayette, Nathan Hale, John Paul Jones, Sir Thomas Gage, Sir William Howe, John Burgoyne, and Lord Cornwallis.

See Jean Fritz's acclaimed short Revolutionary War histories for ages 7–10, each packed with human interest, humor, and historical information. Titles include *Can't You Make Them Behave, King George?*, *And Then What Happened, Paul Revere?*, *Why Don't You Get a Horse, Sam Adams?*, *Where Was Patrick Henry on the 29th of May?*, *Will You Sign Here, John Hancock?*, and *What's the Big Idea, Ben Franklin?* (Puffin).

Also see Cheryl Harness's well-done biographies (National Geographic), among them *The Revolutionary John Adams* (2006),

George Washington (2006), *Thomas Jefferson* (2007), and *The Remarkable Benjamin Franklin* (2008).

Ben and Me

Robert Lawson. Little, Brown, 1998.

The life of Benjamin Franklin in a short chapter book, as told by his highly articulate mouse, Amos.

Also see Lawson's *Mr. Revere and I* (1988), the story of Paul Revere as told by his horse.

George vs. George: The American Revolution as Seen from Both Sides

Rosalyn Schanzer. National Geographic, 2007.

Was King George III a royal brute? Was George Washington a scurrilous traitor? A good discussion book. Recommended for ages 9–12, but a good read-aloud for younger kids.

If You Lived at the Time of the American Revolution

Kay Moore. Scholastic, 1998.

Told in chatty question-and-answer format: “What started the Revolution?” “Did everyone in the colonies take sides?” “What if your family supported the Loyalists?”

John, Paul, George & Ben

Lane Smith. Disney-Hyperion, 2006.

The stories of John Hancock, Paul Revere, George Washington, Ben Franklin, and Thomas Jefferson and the parts they played in the American Revolution, told with humorous twists. A “Taking Liberties” list at the back differentiates between the true and the false.

Paul Revere's Ride

Henry Wadsworth Longfellow. Puffin, 1996.

A picture-book version of Longfellow's famous poem.

4. The new American nation.

Topics to cover include the reason for laws, the rocky history of the writing of the Constitution, the Preamble and the Bill of Rights, and the definition of an amendment.

Resources include Elizabeth Levy's *If You Were There When We Signed the Constitution* (Scholastic, 1992) and Jean Fritz's *Shh, We're Writing the Constitution* (Puffin, 1997).

Aaron and Alexander

Dan Brown. Roaring Brook, 2015.

Aaron Burr and Alexander Hamilton were in many ways alike—but their differences led to the most famous duel in American history.

Thomas Jefferson Builds a Library

Barb Rosenstock. Calkins Creek, 2013.

The picture-book story of how Thomas Jefferson's passion for books led to the Library of Congress.

Also see Peggy Thomas's *Thomas Jefferson Grows a Nation* (Calkins Creek, 2015) and *Farmer George Plants a Nation* (2013), the stories of how Jefferson and Washington and their passion for plants had an impact on the new United States.

We the People

Peter Spier. Doubleday, 2014.

The Preamble to the Constitution, illustrated with wonderful little detailed paintings. The first phrase, "We the People of the United States," is paired with many pictures of America's varied peoples: a city scene, a neighborhood, a farmer on a tractor, a family at home, an artist, a schoolroom, a chef, miners and truck drivers, and many more.

Worst of Friends

Suzanne Tripp Jurmain. Dutton, 2011.

The story of the feud between John Adams and Thomas Jefferson, who eventually became the leaders of two opposing political

parties—but who still, at heart, remained friends.

5. An overview of the American presidency.

Getting to Know the U.S. Presidents Series

Mike Venezia. Children's Press.

One kid-friendly picture book per president. Each short biography in this series is an appealing mix of photos, historical reproductions, and clever cartoon illustrations.

Kid Presidents: True Tales of Childhood from America's Presidents

David Stabler. Quirk Books, 2014.

From Ulysses S. Grant riding a circus pony to Dwight Eisenhower battling a barnyard goose.

One of a series by the same author; also see *Kid Scientists*, *Kid Authors*, *Kid Artists*, and *Kid Athletes*.

President Taft Is Stuck in the Bath

Mac Barnett. Candlewick, 2016.

If there's anything your kids will remember from presidential history, it's likely to be that President Taft got stuck in the bathtub ("Blast!" said Taft. "This could be bad.").

Also see Susan Katz's *The President's Stuck in the Bathtub* (Clarion, 2012), a poem for every president from George Washington to Barack Obama.

Presidential Pets: The Weird, Wacky, Little, Big, Scary, Strange Animals That Have Lived in the White House

Julia Moberg. Charlesbridge, 2016.

Catchy poems, fascinating facts, and cartoon illustrations make this a fun read. Readers learn that Thomas Jefferson had a pair of grizzly bear cubs and that John Quincy Adams had an alligator (it lived in the East Room bathroom).

So You Want to Be President?

Judith St. George. *Philomel*, 2004.

A creative overview of presidents and the presidency, including good and bad aspects of the office, and a collective portrait of the presidents (in labeled T-shirts). Readers learn how many were named James (so far, six), how many had pets, how many played musical instruments, and how many never went to college (nine).

6. Recognize and know the significance of national symbols.

Kids should recognize and know the significance of the American flag, the Pledge of Allegiance, the national anthem, the Statue of Liberty, and the White House.

7. Know the meaning of democracy and the purpose and function of the three branches of the American government, and understand the concept of checks and balances.

Is a democracy the best way to run a town? A country?

From Children's Press, the True Books: American History series (2008) is a collection of well-designed short books on American historical documents and government. Titles include: *The Declaration of Independence*, *The Constitution of the United States*, *The Bill of Rights*, *The Congress of the United States*, *The Presidency*, and *The Supreme Court*.

How to Build Your Own Country

Valerie Wyatt. Kids Can Press, 2009.

What would you do? A great group or individual project, suitable for a range of ages, in which kids invent their own countries, complete with flags, stamps, money, a government, laws, and more.

World History

Suggested for first-grade world history is an introductory foray into ancient history, correlating material to maps and timelines. Use a wide range of resources, including fiction and nonfiction books, coloring and paper crafts books, and video and audio materials. Do hands-on projects and activities and, where possible, take relevant field trips.

1. Survey prehistory to the beginnings of civilization.

Some topics to cover include the origins of early humans, Stone Age cultures and hunter-gatherer lifestyles, the beginning of agriculture, the birth of civilization, and the rise of cities.

Try making your own cave paintings. You'll need very large cardboard boxes (caves), markers, flashlights, and some pictures of prehistoric cave paintings. You might even make your own paints—we ground up dried red clay and pulverized charcoal—and try fabricating paintbrushes from twigs and pine needles.

The First Dog

Jan Brett. Houghton Mifflin Harcourt, 1992.

In this picture book, set in the Pleistocene, Kip, a young cave boy, shares his roasted woolly rhino bones with Paleowolf, who becomes the first dog.

The First Drawing

Mordicai Gerstein. Little, Brown, 2013.

The story of an imaginative Stone Age boy who sees animals in clouds and stones and eventually picks up a burnt stick and begins drawing pictures on the cave walls. An Author's Note provides information on the Chauvet Cave and the discovery there of the footprint of an 8-year-old boy.

How to Live Like a Stone Age Hunter

Anita Ganeri. Hungry Tomato, 2015.

Cartoon-illustrated, double-page spreads provide background information and show readers how to hunt, camp, compose cave art, start a fire, and make an ax.

The Secret Cave: Discovering Lascaux

Emily Arnold McCully. Farrar, Straus and Giroux, 2010.

The picture-book story of the four French kids who came across the fabulous Lascaux cave, filled with 17,000-year-old prehistoric paintings.

The Stone Age: Hunters, Gatherers, and Woolly Mammoths

Marcia Williams. Walker Books, 2017.

Williams's delightful comic-book style makes for an irresistible introduction to the Stone Age as the people of Clan Woolly hunt, discover fire, make stone tools, and tame wolves.

This Orq (He Cave Boy)

David Elliott. Boyds Mills, 2014.

The first of a series about Orq, an irrepressible cave boy.

Toby and the Ice Giants

Joe Lillington. Flying Eye Books, 2015.

Toby, a curious bison, learns about the animal inhabitants of the Ice Age.

Movie: *Ice Age* (2002) is the fun, but unlikely, animated story of a sabertooth tiger (Diego), a sloth (Sid), and a woolly mammoth (Manny) attempting to return a lost human baby to his tribe. Rated PG for mild peril. Several sequels.

2. Mesopotamia.

Topics to cover include the Fertile Crescent, the Tigris and Euphrates Rivers, cuneiform writing, ziggurats, the city of Ur and its excavation by archaeologist Leonard Woolley, and the story of Gilgamesh.

Try making clay cuneiform tablets or Mesopotamian treasure boxes. Check out the Royal Game of Ur, a 5,000-year-old board game using pyramidal dice. (A version is available from Amazon; you can also play online.)

Gilgamesh the King

Ludmila Zeman. Tundra Books, 1998.

A picture-book version of the ancient Mesopotamian epic of Gilgamesh. Sequels are *The Revenge of Ishtar* and *The Last Quest of Gilgamesh*.

Mesopotamia

Philip Steele. DK, 2007.

One of the Eyewitness series, this covers the Sumerian, Assyrian, and Babylonian civilizations, with wonderful pictures, maps, and a timeline.

In the same series, see *Ancient Civilizations* (Joseph Fullman; DK, 2013), *Ancient Egypt* (George Hart; DK, 2014), *Ancient Greece* (Anne Pearson; DK, 2014), and *Ancient Rome* (Simon James; DK, 2015).

3. Survey ancient Egypt.

Topics to cover include the Nile River, pyramids, pharaohs, mummies, Egyptian gods and goddesses, the Sphinx, the Rosetta Stone, hieroglyphic writing, and such key figures as Ramses II, Hatshepsut, Tutankhamen, and Cleopatra.

Read ancient Egyptian legends; design personal cartouches; visit an art museum and check out the ancient Egyptian artifacts. Try mummifying an apple—or, if you're up for it, a grocery-store chicken. Experiment with hieroglyphic writing and play a game of Senet.

Ancient Egypt: Tales of Gods and Pharaohs

Marcia Williams. Candlewick, 2013.

In cleverly illustrated cartoon panels, Williams recounts the Egyptian creation myth and nine other tales, including “Seth the Evil One,” “Horus the Avenger,” “Prince Thutmose and the Sphinx,” and “Cleopatra, Last Pharaoh of Egypt.”

The Egyptian Cinderella

Shirley Climo. HarperCollins, 1992.

In this version, a slave girl loses one of her sandals to a falcon. It ends up in the hands of the pharaoh.

Explore Ancient Egypt!

Carmella Van Vleet. Nomad, 2006.

Short, creatively illustrated chapters include “Egyptian Homes,” “Beer, Bread & Bartering,” “Amulets, Clothes & Makeup,” “King Tut & Other Cool Kings,” and “Mummies and Pyramids.” Included are twenty-five projects and activities, among them making a scarab necklace, a hieroglyph tablet, and an edible pyramid.

Mummies Made in Egypt

Aliki. HarperCollins, 1985.

A picture-book account of Egyptian after-death beliefs and the long and tricky process of making a mummy.

Seeker of Knowledge: The Man Who Deciphered Egyptian Hieroglyphs

James Rumford. Houghton Mifflin Harcourt, 2003.

The picture-book story of Jean-François Champollion, the man who solved the puzzle of ancient Egyptian script.

Temple Cat

Andrew Clements. Houghton Mifflin Harcourt, 2001.

In ancient Egypt, cats were worshipped—but this particular temple cat wants less pampering and more freedom.

4. Survey ancient Greece.

Topics to cover include the geography of Greece and its surroundings, the city-states of Athens and Sparta, the origins of democracy, Greek gods and goddesses, the Olympic Games, the Persian and Peloponnesian Wars, and such famous historical persons as Pericles, Socrates, Plato, Aristotle, and Alexander the Great.

Read Greek myths and children’s versions of Homer’s *Iliad* and *Odyssey*. There are many picture-book versions of individual Greek myths.

Popular here: we made Greek-style black-figure pots using small clay flowerpots and black Sharpies, then put the pots in paper lunch bags, broke them with a hammer, and—as modern archaeologists—glued them back together.

Classical Kids: An Activity Guide to Life in Ancient Greece and Rome

Laurie Carlson. Chicago Review Press, 1998.

Timelines, maps, kid-friendly background information, and many hands-on activities, among them making a theater mask, a mosaic, a catapult, and a helmet.

D'Aulaires' Book of Greek Myths

Ingri and Edgar Parin d'Aulaire. Delacorte, 1992.

A gorgeously illustrated collection covering all the gods of the Greek pantheon and their stories, as well as the minor gods and numerous half-god descendants of Zeus.

Echo Echo: Reverso Poems About Greek Myths

Marilyn Singer. Dial, 2016.

An illustrated collection that can be read forward or backward, which presents a whole new point of view. Included are the stories of Pandora, Ariadne, Perseus, King Midas, and more.

Explore Ancient Greece!

Carmella Van Vleet. Nomad, 2008.

Short cartoon-illustrated chapters cover ancient Greek daily life, school, science, theater, the Olympic games, the origins of democracy, wars, and Greek myths. Included are a map, a timeline, and twenty-five hands-on projects.

In the same twenty-five-project format, also see *Explore Greek Myths!* (Anita Yasuda; Nomad, 2016).

Heroes in Training

Joan Holub. Aladdin, 2012.

In this series the Greek gods, as kids, are up against Cronus and his band of Titans. Funny and exciting, for readers who aren't quite

ready for Percy Jackson.

The Iliad and the Odyssey

Marcia Williams. Walker Books, 2006.

A delightfully illustrated comic-strip-style presentation for younger readers.

Also see Williams's *Greek Myths* (Candlewick, 2011).

King Midas: The Golden Touch

Demi. Margaret K. McElderry, 2002.

There are many picture-book versions of this story of the foolish king who wished that everything he touched be turned to gold—but this one has great ancient-Greek-style illustrations.

The Librarian Who Measured the Earth

Kathryn Lasky. Little, Brown, 1994.

A picture-book biography of Eratosthenes, the Greek librarian who managed to calculate the circumference of the earth using a clever technique involving the sun and shadows.

5. Survey ancient Rome.

Topics to cover include the geography of the Roman Empire and the Mediterranean region, the legend of Romulus and Remus, the Roman Republic, Julius Caesar, the Roman Empire, the Latin language, Roman numerals, Roman religion and mythology, and daily life in Roman times.

Try building a model of Pompeii, then erupting a baking-soda-and-vinegar Vesuvius.

See the **Amazing Child Montessori Roman Arch** kit, with which kids use Roman engineering principles to construct an arch. It's a thrill when it stands up.

Explore Ancient Rome!

Carmella Van Vleet. Nomad Press, 2008.

Maps, background information, vocabulary words, clever cartoon illustrations, and twenty-five creative activities, among them making an amphora, an aqueduct, and a Roman tunic.

The Romans: Gods, Emperors, and Dormice

Marcia Williams. Candlewick, 2013.

A tour of ancient Rome, from gods and goddesses to Romulus, Remus, and the wolf; the Roman Republic; the Roman Empire; gladiators; emperors; and the death of Julius Caesar—as presented by Dormeo, a berry-nibbling gladiator dormouse.

Geography

Little Passports, targeted at ages 6–10, is a subscription program in which kids receive a monthly creative packet of information about a new country, with souvenirs, maps, and hands-on activities. Available in World Edition, USA Edition, or Early Explorers Edition (for ages 3–5). For more information, see www.littlepassports.com.

Similarly, KiwiCo’s (www.kiwico.com) **Atlas Crate** (for ages 6–11) is a monthly subscription program in which each new crate is filled with projects, activities, and an informational adventure book covering a different culture or geographical region.

In the News

See *Time for Kids* ([this page](#)).

Science

Science is an active and investigative discipline. Kids should participate in direct observations, explorations, and hands-on experimentation.

And always remember that there's a lot that scientists don't yet know, which is what makes science the exciting field that it is.

Charlotte the Scientist Is Squished

Camille Andros. Clarion, 2017.

Charlotte—a rabbit—is a serious scientist and dedicated follower of the scientific method. But her family is so enormous that there's no room for her to work on her experiments! A fun introduction to the scientific method as Charlotte struggles to use science to solve her problem.

Mesmerized: How Ben Franklin Solved a Mystery That Baffled All of France

Mara Rockliff. Candlewick, 2017.

Dr. Mesmer has convinced all of Paris that he is the master of a mysterious and magical force that flows from the stars into his magic wand—until Ben Franklin, armed with the scientific method, reveals him as a trickster. A fascinating (and gorgeous) book.

Physical Science

1. Understand the basic premise of atomic theory: that is, that all things are made up of very small particles called atoms, which in turn are made up of protons, neutrons, and electrons.

What Are Atoms?

Lisa Trumbauer. Children's Press, 2005.

One of the Rookie Read About Science series for ages 6–7. Other titles include *What Is Matter?* (Don L. Curry, 2005) and *Solids, Liquids, and Gases* (Ginger Garrett, 2005).

What's Smaller Than a Pygmy Shrew?

Robert Wells. Albert Whitman, 1995.

A picture-book introduction to the tiny, from the three-inch-long pygmy shrew to subatomic particles.

2. Know the three states of matter and their characteristics.

Kids should know that matter has weight and takes up space. They should be able to define and differentiate among solids, liquids, and gases, and understand that states of matter can change with heating and cooling.

3. Investigate electricity.

Try experimenting with static electricity and assembling simple electrical circuits. (One of our favorites: exploding a balloon with electricity.) See Ron Marson's *Electricity*, below.

Squishy Circuits

These kits use conductive and insulating play dough to light up LEDs, activate buzzers, and spin motors.

Snap Circuits Electronic Discovery Kits

With these easy snap-together components, kids can build electric circuits and operate working models of various devices, such as a flashing light and howling siren.

Electricity: With Bulbs, Batteries, Foil, Clothespins, and Other Simple Things

Ron Marson, TOPS Learning Systems, 2000.

topscience.org

A twenty-lesson collection of creative experiments using very simple supplies. Recommended for grades 3–8, but fine for younger kids with adult help.

Life Science

Ranger Rick

National Wildlife Foundation; www.rangerrick.org

A magazine for animal lovers ages 7–12. Each issue includes animal facts, stories, and photos, puzzles, crafts, and contests.

1. Know that different animals have different habitats.

Kids should know about forest, pond, desert, prairie, arctic, and ocean habitats and the different plants and animals that live there.

Many creative picture books cover animal habitats, among them Kate Messner's *Over and Under the Pond* (Chronicle Books, 2017), Steve Jenkins's *Down, Down, Down: A Journey to the Bottom of the Sea* (HMH, 2016), and the One Small Square series (Donald M. Silver; McGraw-Hill, 1997), in which readers learn about the lush life in one small square of woods, savanna, desert, rain forest, pond, cave, coral reef, and more.

Marianne Berkes's *Over in the Grasslands: On an African Savanna* (Dawn, 2016) is a rhyming picture-book introduction to the animals of the savanna, with an appendix of additional facts. Also by Berkes, in the same format, are several similar titles, among them *Over in the Jungle*, *Over in the Forest*, *Over in the Ocean*, and *Over in the Arctic*.

2. Understand the food chain.

Kids should know that animals can be classified according to what they eat, as carnivores, herbivores, insectivores, and omnivores.

Patricia Lauber's *Who Eats What?* (HarperCollins, 2016), in the Let's-Read-and-Find-Out Science series, is a simple introduction to food chains and webs.

Explore Predators and Prey!

Cindy Blobaum. Nomad, 2016.

A cartoon-illustrated guide filled with interesting information and twenty-five projects, among these making and keeping a predator-and-prey science journal.

What Do You Do If Something Wants to Eat You?

Steve Jenkins. Houghton Mifflin Harcourt, 2001.

Spray ink? Swell up like a balloon? Play dead? Run? All about the methods animals use to protect themselves from predators.

Also by Jenkins, see *What Do You Do with a Tail Like This?* (Houghton Mifflin Harcourt, 2008), a picture-book explanation of how different animals use their eyes, ears, noses, feet, and tails.

What If You Had Animal Teeth?

Sandra Markle. Scholastic, 2013.

What if your front teeth were replaced by those of a beaver, shark, elephant, snake, or hippopotamus? Photos of animals are paired with cartoons of kids with the equivalent animal teeth. Readers learn how animals' teeth are adapted for their survival.

In the same series: *What If You Had Animal Hair?*, *What If You Had Animal Ears?*, *What If You Had Animal Feet?*, *What If You Had an Animal Nose?*, and *What If You Had Animal Eyes?*

3. Know that plants require soil, water, air, sunlight, and nutrients to grow; know what photosynthesis is and understand the role of chlorophyll.

Try hands-on activities involving sprouting seeds and growing plants. Good resources include Laurie Carlson's *Green Thumbs: A Kid's Activity Guide to Indoor and Outdoor Gardening* (Chicago Review Press, 1995) and TOPScience's *Green Thumbs: Radishes* (topscience.org), a well-designed twenty-lesson study on plant growth using very simple supplies.

Kids Gardening

kidsgardening.org

Books, lesson plans, and activities for young gardeners.

4. Survey animal taxonomy.

Introduce the basic principles of taxonomy (classification). Kids should know that animals can be grouped into classes and families—insects, fish, amphibians, reptiles, birds, and mammals—and should know the basic

characteristics of each. Pair with fiction and nonfiction books and poems about representative animals, as well as field trips and hands-on activities.

The Animal Book

Steve Jenkins. Houghton Mifflin Harcourt, 2013.

Kids of all ages will be mesmerized by this one. A spectacularly illustrated compendium covering all things animal, from behaviors, senses, predators, defenses, and extremes—who's the smallest, the longest, the deadliest?—to an overview of evolution.

Creature Features: Twenty-Five Animals Explain Why They Look the Way They Do

Steve Jenkins. Houghton Mifflin Harcourt, 2014.

Written as a series of letters and replies: “Dear tapir: Why is your nose crooked?” “Dear frilled lizard: What are you wearing around your neck?” “Dear giraffe: Why is your tongue purple?”

Feathers: Not Just for Flying

Melissa Stewart. Charlesbridge, 2014.

The many uses of feathers, with wonderful illustrations.

The Illustrated Compendium of Amazing Animal Facts

Maja Safstrom. Ten Speed Press, 2016.

Did you know that owls have three eyelids? That ostriches can't walk backward? A delightfully illustrated collection filled with fascinating facts.

Lifetime

Lola M. Schaefer. Chronicle Books, 2016.

The amazing numbers in animal lives. For example, in one lifetime, a caribou will shed ten sets of antlers, a woodpecker will drill thirty roosting holes, and a seahorse will have a thousand babies.

Many: The Diversity of Life on Earth

Nicola Davies. Candlewick, 2017.

A wonderful overview of the vast diversity and interdependence of life on the planet.

National Geographic Book of Animal Poetry

J. Patrick Lewis, ed. National Geographic, 2012.

Two hundred poems by many different poets, paired with photographs.

5. Define and discuss *extinction* and *endangered species*.

Know what extinction is, and understand what an endangered species is. Most first graders love dinosaurs; you might start with them.

Almost Gone: The World's Rarest Animals

Steve Jenkins. HarperCollins, 2006.

One of the Let's-Read-and-Find-Out Science series.

Animals of a Bygone Era

Maja Safstrom. Ten Speed Press, 2017.

Giant scorpions, mammoths, miniature horses, and a lot of bizarre underwater creatures.

Can We Share the World with Tigers?

Robert E. Wells. Albert Whitman & Company, 2012.

Well-presented information on wildlife conservation, endangered species, and tigers.

Digging Up Dinosaurs

Aliki. HarperCollins, 1998.

How scientists dig up and assemble dinosaur bones. In the same Let's-Read-and-Find-Out Science series, see Aliki's *Fossils Tell of Long Ago* (2016), *Dinosaurs Are Different* (1986), and *My Visit to the Dinosaurs* (1985).

The Dinosaurs of Waterhouse Hawkins

Barbara Kerley. Scholastic, 2009.

In the nineteenth century, nobody knew what a dinosaur looked like—until imaginative artist Waterhouse Hawkins built the world's first life-size models.

Adopt an Endangered Animal

gifts.worldwildlife.org/gift-center

You don't get a real tiger, elephant, panda, polar bear, or snow leopard to take home, but your donation to the World Wildlife Fund does get you a color photo of your chosen animal, a species card telling all about it, and an adoption certificate.

6. Introduction to evolution.

Among reputable scientists, there is no controversy about evolution. It's a linchpin of modern science.

Grandmother Fish

Jonathan Tweet. Feiwel & Friends, 2016.

A first introduction to evolution via Grandmother Fish, who lived a very long time ago.

Life Story

Virginia Lee Burton. Houghton Mifflin Harcourt, 2009.

The history of the earth from the beginning to the present in four dramatic acts.

Our Family Tree

Lisa Westberg Peters and Lauren Stringer. Houghton Mifflin Harcourt, 2003.

A picture-book story of evolution. When we began, we were just tiny round cells in a deep dark sea.

The Story of Life

Catherine Barr and Steve Williams. Lincoln Children's Books, 2015.

From the first cells through jellyfish, worms, fish, land animals, dinosaurs, and on.

7. Understand the dangers of pollution and environmental destruction, and the benefits of conservation and recycling.

The Human Footprint

Ellen Kirk. National Geographic, 2011.

How many glasses of milk, showers, candy bars, and pairs of jeans make up a lifetime?

Just a Dream

Chris Van Allsburg. Houghton Mifflin Harcourt, 2011.

Walter, a shameless litterbug, has a dream in which he's transported into a distant future where he sees the impact thoughtless human beings can have on the planet.

The Lorax

Dr. Seuss. Random House, 1971.

An object lesson in caring for nature, after the villainous Once-ler—despite warnings from the Lorax—devastates the environment.

The Wump World

Bill Peet. Houghton Mifflin Harcourt, 1981.

The Pollutians invade Wump World, turn the lush green meadows into smoky cities, and drive the dismayed Wumps underground.

Project Learning Tree

www.plt.org

An environmental learning program for preschoolers through grade twelve, with lesson plans and activities classified by age group. Free samples available for download.

It's also important for kids to know that they're not helpless when it comes to the environment. There are many things that they can do to make a difference.

The New 50 Simple Things Kids Can Do to Save the Earth

Earthworks Group. Andrews McMeel, 2009.

Many suggestions for projects and helpful resources.

Miss Rumphius

Barbara Cooney. Puffin, 1985.

A beauty of a book, in which Miss Rumphius fulfills her lifelong dreams of traveling the world, living in a house by the sea, and doing something to make the world more beautiful.

Olivia's Birds

Olivia Bouler. Sterling, 2011.

An 11-year-old girl raised more than \$175,000 for the Gulf Coast oil spill recovery by selling her bird paintings.

On Meadowview Street

Henry Cole. Greenwillow, 2007.

Caroline lives in a development on Meadowview Street, where there's not a meadow in sight—until she notices a single small flower and decides to build her own wildflower preserve.

Wangari's Trees of Peace

Jeanette Winter. Houghton Mifflin Harcourt, 2008.

When Wangari returned to her native Kenya after spending many years away, she was horrified to see how many trees had been cut down—and so she began planting seedlings to replace them. The true story of Wangari Maathai, environmentalist and winner of the Nobel Peace Prize.

We Are Extremely Very Good Recyclers

Lauren Child. Dial, 2009.

Charlie's little sister Lola has entered a recycling competition: if she can recycle one hundred plastic, metal, and paper items, she'll win her very own tree. Includes recycling tips.

8. Know that the human body is made up of several different physiological systems; understand the germ theory of disease.

Kids should know that their bodies are composed of skeletal, muscular, digestive, circulatory, and nervous systems, and should have a general idea of what each system does. They should also know what bacteria and viruses are, and understand the reason for vaccinations.

Several books in the Let's-Read-and-Find-Out Science series cover human anatomy and physiology. Also see Joanna Cole's *The Magic School Bus Inside the Human Body* (Scholastic, 1990).

The Bacteria Book

Steve Mould. DK, 2018.

Illustrated with bright infographics, cartoons, and color photographs, this is an excellent overview of bacteria, viruses, fungi, algae, protozoa, and archaea. Learn about glowing squid, zombie ants, and antibiotics, and find out what life would be like if you were shrunk to the size of a bacterium. (Example: A grain of rice would look like a mountain.)

Germs Make Me Sick

Melvin Berger. Scholastic, 2015.

In the Let's-Read-and-Find-Out Science series, a picture-book overview of how bacteria and viruses make us sick and how the body works to fight them off.

Inside Your Insides: A Guide to the Microbes That Call You Home

Claire Eamer. Kids Can Press, 2016.

Bacteria aren't all bad. Meet your microbiome—that is, the trillions of microbes that live in and on the human body, many of which we couldn't do without.

Tiny Creatures: The World of Microbes

Nicola Davies. Candlewick, 2016.

A wonderful overview of the world of microbes: “A single drop of seawater can hold twenty million microbes. That’s about the same as the number of people in New York State.”

Earth and Space Science

1. Know basic features of the sun, moon, and stars.

Kids should understand that the earth rotates on its axis (which causes day and night) and revolves around the sun (which takes an entire year). They should also know that the sun is a star that generates heat and light, and that the moon orbits the earth and goes through a series of shape-changing phases each month. They should be aware that the stars of the night sky are said to be arranged in patterns called constellations and be able to identify some of the more obvious ones, such as the Big Dipper.

365 Starry Nights

Chet Raymo. Simon & Schuster, 1990.

A good resource for astronomy-minded families, this book has maps, short explanations, and viewing projects for every night of the year.

The Stars: A New Way to See Them

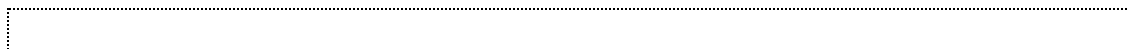
H. A. Rey. Houghton Mifflin Harcourt, 2016.

A kid-friendly guide to the night sky, with clever artwork that makes the constellations much easier to identify.

Lie Back, Look Up

liebacklookup.com

By an astronomy teacher, family adventures with the night sky, including projects, activities, and viewing helps.



Do You Need a Telescope?

Amateur astronomy can range from rock-bottom cheap to extremely expensive, depending on the extent of your family's interests and pocketbook. At the simplest level, our family—to a person enthusiastic sky watchers—has done pretty well with five pairs of eyes, a flashlight wrapped in red cellophane, and a book of star maps. The eyes are for looking up, the star maps tell you what you're looking at, and the red cellophane preserves your night vision in between. Naked-eye astronomy is fun and friendly, and—with six thousand visible stars up there every clear night—there's always plenty of material to work on.

Next step up from the unaided eye is a set of binoculars, which are portable, versatile, and easy to use. Binoculars come in a range of sizes, usually with defining numbers printed somewhere on the eyepiece: 6×25 , for example, or 7×35 . The first number—the 6 or 7—is the magnifying power of the binoculars; the second gives the diameter of the objective lenses (the big lenses in the front) in millimeters. The bigger the objectives, the more light enters the binocular tubes, and the brighter and clearer the observed image. There's a trade-off, however: as the objectives get bigger, the binoculars also get bigger, heavier, and harder to hold, and may even need to be propped on a tripod. A 7×50 binocular is generally recommended for amateur astronomers.

Finally, there are telescopes. Kids can have terrific astronomical experiences without one—but some celestial sights will simply be out of reach. There are

three major types of telescopes. In refracting telescopes, a primary convex lens collects the light and forms an image, which is then magnified by the lens in the eyepiece. In reflecting telescopes, light is collected by a concave mirror, then bounced off a second mirror and reflected into the eyepiece. Compound or catadioptric telescopes—the best known are the Schmidt-Cassegrains—use a combination of mirrors and lenses. To view the sky through a refracting telescope, you position yourself at one end and look straight through the tube, like a pirate peering through a spyglass. With a reflecting telescope, you stand beside the scope, peeking through an eyepiece positioned perpendicular to the telescope's main tube. Refracting telescopes are noted for their nice, sharp images, and they're easy to take care of. Therefore, this is probably the telescope of choice for astronomers who are nervous about tinkering with their machines. Reflecting telescopes deliver brighter images and are generally somewhat cheaper; their downside is that their mirrors periodically wiggle out of line and require recalibration.

In all telescopes, diameter is the name of the game: that is, the fatter the telescope, the better it is. Diameter determines the light-collecting ability of the objective lens in a refracting telescope or of the mirror in a reflector. The bigger the lens or mirror, the more light is admitted to the instrument, and the better you'll be able to see. A 60 mm refractor or a 4½-inch reflector is recommended for beginners. Price plays a role here, of course; increasingly bigger telescopes become increasingly more expensive, and Schmidt-Cassegrains—for serious observers—cost upward of \$1,000.

Reputable dealers in astronomical instruments are more reliable (and more helpful) than the average neighborhood department store. Avoid anything that's either rickety or plastic: the instability will make for a miserable viewing experience, and plastic is optically lousy. A good used telescope, on the other hand, can be an excellent buy: telescopes, unless monumentally abused, don't wear out.

Sources for telescopes and binoculars include Orion Telescopes & Binoculars (www.telescope.com) and Meade Instruments (www.meade.com).

2. Know the names and characteristics of the planets.

Kids should know the names of the planets in order and some of their major features.

And Then There Were Eight

Laura Purdie Salas. Capstone, 2016.

Poems about space, paired with beautiful photographs.

Explore the Solar System!

Anita Yasuda. Nomad, 2009.

All about the solar system, from the phases of the moon to the planets and the Milky Way, with twenty-five projects and activities.

Our Solar System

Seymour Simon. HarperCollins, 2014.

Illustrated with gorgeous full-color photos of planets and spacecraft, this book covers the origin of the solar system, the sun, and the planets and their moons.

Also by Simon in the same format, see *The Universe* (2006), *Galaxies* (1991), *Stars* (2006), *Destination: Space* (2006), *The Sun*

(1989), *Earth* (2003), *The Moon* (2003), *Destination: Jupiter* (2000), *Destination: Mars* (2016), and other individual books on the planets.

3. Understand the composition of the earth.

Kids should be introduced to the inner layers of the earth and their compositions: crust, mantle, outer core, and inner core. They should understand what causes volcanoes, know that there are three major kinds of rocks (igneous, sedimentary, and metamorphic), and understand how each type is formed. A perfect time to start your own rock collection.

Dirtmeister's Nitty Gritty Planet Earth

Steve Tomecek. National Geographic, 2015.

Part cartoon-illustrated graphic novel, part scientific explanation, this is a catchy introduction to rocks, minerals, fossils, and the workings of the earth.

Explore Rocks and Minerals!

Cynthia Light Brown. Nomad, 2010.

An appealing introduction to geology, variously covering the major types of rocks, the rock cycle, and fossils. With twenty projects and activities, including making crystals and baking volcanic cookies.

Planet Earth/Inside Out

Gail Gibbons. HarperCollins, 1998.

A brightly illustrated introduction to the earth, inside and out, with great colorful diagrams.

The Street Beneath My Feet

Charlotte Guillain. Words & Pictures, 2017.

A fascinating journey underground through tunnels and pipes, animal burrows, and rock layers, down to the earth's molten core.

For young engineers, pair this one with David Macaulay's *Underground* (Houghton Mifflin Harcourt, 1983), an exquisitely

illustrated account of the vast underground systems that support a city.

Volcanoes

Seymour Simon. HarperCollins, 2006.

Illustrated with wonderful color photos, this is a clearly written introduction to the science and excitement of volcanoes.

Also by Simon, see *Earthquakes* (2006).

4. Observe and identify weather changes, both daily and seasonal.

Try charting daily weather changes on a calendar. A useful resource here is a simple back porch weather station. Available for purchase or check online for instructions for building one of your own.

Seymour Simon has many excellent photo-illustrated books on weather. Titles (HarperCollins) include *Tornadoes*, *Hurricanes*, *Lightning*, *Storms*, and the general-purpose *Weather*.

Bringing the Rain to Kapiti Plain

Verna Aardema. Puffin, 1992.

A rhyming tale from Africa about the coming of the rain to drought-stricken Kapiti Plain.

The Cloud Book

Tomie de Paola. Holiday House, 1975.

A charmingly illustrated introduction to clouds, including descriptions of the major cloud types and a very silly cloud story.

Explore Weather and Climate!

Kathleen M. Reilly. Nomad, 2012.

Includes “Words to Know” boxes, fascinating facts, basic background information, and twenty-five cool projects, among them making a storm in a bottle and an edible climate map.

Snowflake Bentley

Jacqueline Briggs Martin. Houghton Mifflin Harcourt, 2009.

The biography of Wilson “Snowflake” Bentley, whose photomicrographs of snowflakes taught us amazing things about snow. Illustrated with woodblock prints by Mary Azarian.

Foreign Language

See [this page](#).

The Arts

Visual Art

The Young Rembrandts program—founded in 1988—uses a step-by-step method to teach kids drawing. Now a national franchise, Young Rembrandts provides drawing classes for preschoolers (ages 3–5) and elementary-level students (ages 6–12). See the website at www.youngrembrandts.com to learn more about the program or to locate classes in your area.

Deep Space Sparkle

www.deepspacesparkle.com

Art lesson plans and resources for grades K–6, categorized by subject and technique. Various categories include birds, nature, art and literature, architecture, transportation, and the masters.

KidArtLit

www.kidartlit.com

Each month subscribers get a book, materials for an art project based on the book, an instructional guide, and bonus gifts. Various

memberships available, including sibling kits for multiple children. For ages 3–8.

Art is wonderful—but kids can find it frustrating when a project doesn't come out just the way they hoped. This can even lead to throwing artwork on the floor and stamping on it. Try these:

Be a Perfect Person in Just Three Days!

Stephen Manes. Cadwallader & Stern, 2018.

In this hilarious short chapter book, Milo finds a mysterious book at the library—*Be a Perfect Person in Just Three Days!*—and sets out to follow the instructions. But it turns out that being perfect isn't all it's cracked up to be.

Beautiful OOPS!

Barry Saltzberg. Workman, 2010.

So you've goofed. Turn that spill, splotch, or tear into something spectacular! Every mistake is a new opportunity.

The Dot

Peter Reynolds. Candlewick, 2003.

Vashti insists she can't draw, and to prove it she jabs her pencil at the paper and makes a dot. Her teacher frames it—which inspires Vashti to head out on a surprising journey of artistic self-discovery.

1. Know the primary colors and how these are mixed to produce secondary colors.

Kids should know that the three primary colors are red, blue, and yellow, and should have hands-on experience playing around with these to discover that red plus blue makes purple, red plus yellow makes orange, and blue plus yellow makes green. (And, inevitably, that everything mashed together makes brown.) They should observe and discuss the use of color in famous paintings.

Pair this with Mary O'Neill's *Hailstones and Halibut Bones* (Doubleday, 1990), a collection of poems about every color of the visible

spectrum.

From my homeschool journal (Josh is 10; Ethan, 9; Caleb, 7):

To the local art center this afternoon where the boys are taking classes. The current picks aren't turning out all that well. Ethan and Caleb are both taking Painting and Drawing, with a teacher who—according to Ethan—has the personality of a wet sock. As of the third class, the kids are still doing geometric paintings of assigned shapes and colors, which they find restrictive. Ethan today cracked. “This time,” he told me, “I mixed my own colors when she wasn't looking.”

2. Be familiar with the elements of line, shape, texture, space, light, and shadow.

Discuss these elements using examples of artwork. Different kinds of lines, for example, include vertical and horizontal, curved and diagonal, thick, and thin; textures include smooth, rough, bumpy, fuzzy, and so on.

There are numerous apps and online sites where kids can experiment with digital art tools. For example, see Drawing Pad (Darren Murtha) for iPad, Android, or Kindle Fire, and Art Set (LOFOPI) for Android.

3. Identify different kinds of pictures, for example: portraits, still lifes, abstract art, landscapes.

4. Study the works of a selection of well-known artists.

Full-color postcard reproductions of artists' works are inexpensive, easy to handle, and lend themselves to any number of projects and discussions.

For a more broad-based experience, pair artwork with biographies of artists, timelines, and hands-on projects. A study of Degas, for example, might include a biography of the artist, fiction and nonfiction books on ballet, a sample ballet lesson, and a clay modeling project.

5. Experiment with a range of art techniques.

Try drawing, painting, collage, modeling media, printmaking, or weaving. Save cardboard, cans, tubes, bottle tops, and widgets and make recycled-art sculptures.

Music

First graders should participate in a multifaceted music program, combining music history, theory, appreciation, and performance.

1. Understand rhythm, melody, pitch (high/low), dynamics (loud/soft), tempo (fast/slow), and timbre (sound quality). Relate these concepts to sample musical selections. Experiment with simple rhythm instruments.

2. Memorize and sing simple songs.

Learn an assortment of traditional folk songs, spirituals, patriotic songs, campfire tunes, and just plain silly songs. Popular here: “Bunny Boo-boo” and “The Cat Came Back” (in our case, often performed in the car).

I Hear America Singing

Kathleen Krull. Knopf, 2003.

Easy musical arrangements and lyrics to sixty-two traditional American folk songs, among them “Home on the Range,” “I’ve Been Working on the Railroad,” “On Top of Old Smokey,” and “This Land Is Your Land.” For each, there are notes about the song’s history. The book comes with a CD.

3. Listen and respond to selections by famous composers.

Pair listening sessions with biographies of composers, fiction and nonfiction books, and related activities.

See Mike Venezia's Getting to Know the World's Greatest Composers series ([this page](#)).

4. Know the four families of instruments in the orchestra: strings, brass, woodwinds, and percussion.

Kids should be able to identify instruments by look and sound and be able to group instruments into appropriate categories.

Drama

Reader's Theater is an approach to reading in which kids invent and/or perform short plays based on popular short stories or picture books with no or minimal props.

See, for example, *Multicultural Folktales* (Suzanne I. Barchers; Libraries Unlimited, 2000), Reader's Theater scripts for forty folktales from thirty different countries, suitable for elementary-level kids.

Charades, in which a player acts out a word, quotation, or saying while teammates guess, is a great drama activity for a wide range of ages. Available as card games and apps—or, of course, you can invent your own.

Amazing Grace

Mary Hoffman. Dial, 1991.

Imaginative Grace gives herself the starring role in every story she hears—and she knows just who she wants to be in the class play, *Peter Pan*.

Full Moon and Star

Lee Bennett Hopkins. Abrams, 2011.

When Kyle decides to write a play about the moon, best friend Katie decides to write a companion play about a star.

Lights on Broadway

Harriet Ziefert. Blue Apple, 2009.

A creative alphabetical introduction to the theater, from actors and auditions through costumes, dressing rooms, and understudies.

Philosophy and Comparative Religion

Regardless of your religious beliefs or lack thereof, Christian Bible stories have shaped Western art, literature, and history, and kids should be familiar with them as common cultural references. Kids should also know the symbols, traditions, and stories behind such major world religions as Islam, Hinduism, Buddhism, Sikhism, and Judaism, and be familiar with Native American spiritual beliefs.

Noah's Ark and Other Bible Stories

Marcia Williams. Walker Books, 2010.

Eleven favorite tales from the Old Testament in Marcia Williams's signature comic-strip style. The Ark, on the cover, looks like a giant duck.

Catherine Marshall's Story Bible

Catherine Marshall. Crossroad, 1987.

This is out of print but is worth the effort to track down. It includes well-done retellings of thirty-seven stories from the Old and New Testaments, illustrated with children's art.

The Barefoot Book of Jewish Tales

Shoshana Boyd Gelfand. Barefoot Books, 2017.

Eight engaging tales from the Jewish tradition.

Golden Domes and Silver Lanterns: A Muslim Book of Colors

Hena Khan. Chronicle Books, 2015.

A simple introduction to the world of Islam, in which red is for a prayer rug, blue is for a hijab, gold is for the dome of a mosque. By the same author, see *Crescent Moons and Pointed Minarets: A Muslim Book of Shapes* (2018) and *Night of the Moon: A Muslim Holiday Story* (2018).

Muhammad

Demi. Margaret K. McElderry, 2003.

A beautifully illustrated picture book about the founder of Islam.

Also by Demi, in the same picture-book format, are *Buddha* (Henry Holt, 1996), *The Fantastic Adventures of Krishna* (Wisdom Tales, 2013), *Jesus* (Margaret K. McElderry, 2005), and *The Dalai Lama* (Henry Holt, 1998).

Zen Shorts

Jon J. Muth. Scholastic, 2005.

Stillwater, a giant panda, shows up in the backyard of a trio of siblings and tells instructive anecdotes about generosity, spontaneity, and forgiveness. For more of Stillwater's Zen tales, see *Zen Ties* (2008), *Zen Ghosts* (2010), and *Zen Socks* (2015).

Zlateh the Goat and Other Stories

Isaac Bashevis Singer. HarperCollins, 1984.

A collection of seven traditional tales from Chelm, the Jewish village of fools.

Health and Physical Education

1. Kids should understand the importance of good nutrition, adequate sleep, cleanliness, tooth care, and regular exercise.

In homeschool environments, parents generally take care of this in the course of daily living. School-mandated curricula often require “abuse” education from the early grades on, in which children are cautioned about tobacco, alcohol, drugs, and sexual molestation. And, of course, it’s always a good idea to teach children techniques to ensure personal safety.

2. When to discuss sex? Usually later—but it depends on the kids, the family, and the circumstances.

If your kids have questions, the following books are recommended for ages 4–8:

It’s Not the Stork

Robie H. Harris. Candlewick, 2008.

Nicely presented information for the gamut of questions early-elementary kids ask about their bodies, themselves, and where babies come from.

Mommy Laid an Egg, Or Where Do Babies Come From?

Babette Cole. Chronicle, 1993.

In this clever twist, a pair of kids, faced with squeamish parents claiming that babies are made of gingerbread, delivered by dinosaurs, or found under rocks, explain the truth of the matter via zany diagrams.

3. First graders should be able to skip, run (without falling over), and throw and catch beanbags and balls.

4. Participate in athletic indoor and outdoor activities.

Hopscotch, tag, hide-and-seek, and jump rope are always fun.

Consider yoga for kids, which not only builds strength and flexibility but is said to teach participants about balance, breathing, relaxation, and quieting the mind.

Life Skills

By this age, kids should be able to make their beds, clean the bathroom after using it (don't leave wet towels on the floor), and wash and dry the dishes.

They should also be able to help with cooking, including making—on their own—simple meals such as sandwiches. There are dozens of cookbooks available for kids of all ages. Mollie Katzen's *Pretend Soup* (Tricycle Press, 1994), for example, is a charmingly illustrated vegetarian cookbook for ages 3–8, with which kids can make not only Pretend Soup but also Bagel Faces, Zucchini Moons, and Number Salad.

As kids get older, they become increasingly able to express and control their feelings and learn to be more thoughtful and considerate of others—but it's not always easy, and they often need some help along the way.

Elbert's Bad Word

Audrey Wood. Houghton Mifflin Harcourt, 1996.

At an elegant garden party, Elbert picks up a bad word—in the form of a little rat-like creature—which bursts out, to the horror of all around him, when a croquet ball lands on his great toe. Luckily the gardener, a wizard, has a brilliant cure.

Feelings

Aliki. Greenwillow, 1986.

Sometimes it's hard to explain exactly how you feel—but this delightfully designed and illustrated book is a great help.

What If Everybody Said That?

Ellen Javernick. Two Lions, 2018.

What if everybody said “No boys allowed” or “Me first”? A cleverly illustrated account of how our words have consequences.

In the same format, see *What If Everybody Did That?* (2010).

Computer and Technology Skills

Continue to reinforce the skills introduced in kindergarten. Public school curricula suggest adding the use of the backspace key and delete function, and encouraging kids to explore age-appropriate websites, experiment with digital drawing tools, and create simple works combining text and graphics.

At all ages, emphasize safe online behavior.

Hello Ruby: Journey Inside the Computer

Linda Liukas. Feiwel & Friends, 2017.

When a cursor stops working, Ruby shrinks to tiny size and enters her father's computer, learning about bits, logic gates, CPU, RAM, ROM, and software. The story is accompanied by activities.

Also see *Hello Ruby: Adventures in Coding* (2015) and *Hello Ruby: Expedition to the Internet* (2018).

See coding resources, [this page](#), [this page](#).

Engineering

Awesome Engineering Activities for Kids

Christina Schul. Rockridge Press, 2019.

Marble runs, bridges, toothpick towers, catapults, egg drops, and more for ages 5–10.

STEAM Kids

Anne Carey et al. SteamKids, 2016.

Over fifty projects, designed by a team led by an MIT engineer. Included is a ten-week activity planner and field trip suggestions. Targeted at ages 4–10.

Engineering Is Elementary

www.eie.org

Designed by the Museum of Science, Boston, these engineering units are appropriate for preschoolers, kindergartners, or elementary kids (grades one through four). Units consist of a storybook, a teacher's guide, and a building kit. Only the storybooks can be purchased individually; as of now, everything else comes in packs of thirty.

TeachEngineering

www.teachengineering.org

Free STEM curriculum for grades K-12 based on the Next Generation Science Standards. Many projects and activities, categorized by grade.

CHAPTER 7

Grade Two

The memory of being read to is a solace one carries through adulthood. It can wash over a multitude of parental sins.

—KATHLEEN ROCKWELL LAWRENCE

Language Arts

Reading

Second graders are expected to enhance and expand upon the skills that they acquired in grade one, honing their decoding (sounding out) abilities and increasing their vocabulary and reading fluency. The important thing here, however—keep your eye on the ball—is that kids enjoy reading. And nothing will kill that joy faster than drill and flavorless workbook exercises.

Phonics, Decoding, and Word Recognition

1. Decode regular two-syllable words.

The next step after *cat* and *mat* is the ability to decipher such doubleheaders as *rocket* and *butter*.

2. Understand the basic rules of syllabication.

Second graders should know how to divide words into syllables. In words with a VCV (vowel-consonant-vowel) pattern, for example, syllables are divided V/CV, as in *di/ver* or *ri/der*. In words with a VCCV pattern, syllables are divided VC/CV, as in *din/ner* or *flip/per*.

As it turns out, there are six different kinds of syllables, and learning to deal with these, educational researchers tell us, can help students spell and decipher unfamiliar words. I haven't noticed this, but I do know that syllabication periodically pops up on standardized tests, so if your kids are required to take such, it may be worth practice.

3. Increase knowledge of sight words.

According to the sight word lists (see [this page](#)), there are more than forty words recommended for memorization by second graders, among them *about*, *bring*, *eight*, *does*, *green*, *right*, *which*, *write*, and *your*.

4. Know meanings of common abbreviations.

Examples include personal titles (Mr., Ms., Dr.), months of the year and days of the week, and abbreviations commonly found in addresses (Rd., St.).

5. Read grade-appropriate materials aloud with proper expression and intonation.

When in doubt, refer to the five-finger rule (see [this page](#)).

Reading Comprehension

1. Discuss previously read material, recalling and describing details of plot, characters, and setting.

Kids should be able to compare books by different authors, contrasting plots, characters, and settings. They should also be able to compare different versions of the same story—for example, check out the many takes on the stories of Cinderella or the Three Little Pigs—and to propose alternative outcomes.

Inventing alternative endings or fractured fairy-tale variations of classic plots was always a favorite among our kids. If you need examples to get imaginations off the ground, try Jon Scieszka's *The True Story of the 3 Little Pigs* (Puffin Books, 1996), a hilarious version told from the wolf's point of view; Janet Perlman's *Cinderella Penguin* (Puffin Books, 1995), in which all the characters, from handsome prince to wicked stepsisters, are penguins, and Cinderella goes to the ball in a little glass flipper; or Mo Willems's *Goldilocks and the Three Dinosaurs* (Balzer + Bray, 2012).

Join—or create—a book club.

2. Be able to obtain specific information from print materials.

Second graders should be able to use structural features of the text—table of contents, chapter headings, index, and so on—to locate specific information. They should also be able to interpret material presented in diagrams, charts, and graphs.

3. Follow two-step written instructions.

Ed Emberley's drawing books (LB Books) are great exercises in following multi-step instructions for turning out everything from trucks and trains to cats, clowns, and kangaroos. For example, see *Ed Emberley's Drawing Book of Animals*, *Great Thumbprint Drawing Book*, *Big Green Drawing Book*, and *Big Purple Drawing Book*.

4. Identify rhyme, rhythm, alliteration, simile, and metaphor in poetry. Read and recognize limericks.

See Brian P. Cleary's cartoon-illustrated *Skin Like Milk, Hair of Silk: What Are Similes and Metaphors?* (Millbrook, 2014) and *Chips and Cheese and*

Nana's Knees: What Is Alliteration? (2017).

My Dog Is as Smelly as Dirty Socks

Hanoch Piven. Dragonfly Books, 2012.

Simile-laden family descriptions—"My dad is as jumpy as a spring"—illustrated with collage portraits. (Fun project! Try making your own.)

A Surfeit of Similes

Norton Juster. William Morrow, 1989.

Clever as zippers and fresh as a peach. A wonderful collection.

5. Experience a wide range of literary materials, including fiction and nonfiction books, myths, folktales, fables, multicultural stories, and poems.

The Junior Great Books program ([this page](#)) for second grade includes two fiction series, including such selections as "The Happy Lion" by Louise Fatio, the Chinese folktale "The Jade Stone," "Jack and the Beanstalk," and "The Velveteen Rabbit," all with thought-provoking discussion questions.

Often recommended for grade two:

The Boxcar Children Series

Gertrude Chandler Warner. Albert Whitman.

The four orphaned Alden children, determined to stay together, set up home in an abandoned boxcar. By the end of book one, they've been adopted by a wealthy grandfather. There are many titles in the series, in which the Aldens solve mild mysteries.

Geronimo Stilton Series

Geronimo Stilton. Scholastic.

Geronimo Stilton is the editor of *The Rodent Gazette*, Mouse Island's premier newspaper. There are dozens of titles in this hilarious series, in which Geronimo has multiple adventures around the world, through time, and in Fantasyland.

The Littles Series

John Peterson. Scholastic.

The Littles are a family of tiny people (with mouse-like tails) who live in the walls of the Bigg family house. Many short adventurous titles.

Magic Tree House Series

Mary Pope Osborne. Random House.

Short chapter books in which Jack and Annie visit a mysterious treehouse filled with books that has the power to whisk them off on adventures through time. Many titles.

Ranger in Time Series

Kate Messner. Scholastic.

Ranger didn't make it through search-and-rescue training (he's distracted by squirrels), but as a canine time traveler, he's heroically saved many, from the Oregon Trail to ancient Rome to D-Day. Many short-chapter titles.

Writing

1. Practice manuscript handwriting skills, improving accuracy and legibility.

Like first graders, second graders ordinarily use paper with a broken midline for guidance in forming letters. Handwriting improves with practice; encourage kids to write daily.

2. Experiment with a range of writing projects, including short stories, poems, nonfiction reports, journal entries, and letter writing.

3. Know and use the correct format for a friendly letter, including date, salutation, body, closing, and

signature.

The best way to perfect one's letter-writing skills, of course, is by writing letters. Encourage your kids to correspond with friends and family. Track down pen pals. Write to favorite fictional characters like the Tooth Fairy and Santa Claus.

How important is the standard format for a friendly letter? Not particularly—these are *friendly* letters, right?—but it's easy to test, and thus often is featured on standardized tests.

Expand on letter-writing experiences by making illustrated postcards or pop-up cards. Good book supplements include Janet and Allan Ahlberg's *The Jolly Postman* (Little, Brown, 2001), which has letters to fairy-tale characters tucked in envelope-like pages; and Alma Flor Ada's *Dear Peter Rabbit* (Atheneum, 1997).

4. Recognize complete and incomplete sentences. Identify subject and predicate.

The subject of a sentence is what the sentence is all about; the predicate is the sentence's main verb. A simple sentence contains one subject and one predicate. Kids should be able to identify subject and predicate in such sentences as "The cat sat on the mat," and "The cow jumped over the moon."

5. Identify nouns, verbs, and adjectives, and use adjectives in a comparative sense by adding *-er* or *-est*.

6. Identify synonyms, antonyms, and homonyms.

Second graders, given a sample word, should be able to come up with an appropriate synonym or antonym, and should recognize common homonyms.

The late Richard Wilbur, second poet laureate of the United States after Robert Penn Warren, wrote a number of witty collections for kids, among them *Opposites* (1973) and *More Opposites* (1991). These appear to be out of print, but if you can track down used or online versions, it's well worth

the trouble. Try this one, from Wilbur: “What’s the opposite of riot? / It’s lots of people keeping quiet.”

The Boy Who Loved Words

Roni Schotter. Schwartz & Wade, 2006.

Selig loves words—and wants to spread (that is, *sprinkle*, *disburse*, and *broadcast*) the best words to others.

Also see *Max’s Words* by Kate Banks (Farrar, Straus and Giroux, 2006) and *The Word Collector* by Peter H. Reynolds (Orchard Books, 2018).

Make your own eccentric word collections. (Syzygy? Kibosh?)

7. Change regular verbs to the past tense by adding -ed; know the present and past tenses of common irregular verbs.

Kids, for example, should know the irregular past tenses of such verbs as *to be*, *to have*, *to see*, *to do*, *to go*, *to come*, *to run*, *to give*, and *to sing*. Usually kids pick this up in the course of ordinary conversation and reading.

8. Change regular nouns to plural form by adding -s; change nouns ending in -s, -ss, -sh, -ch, or -x to plural form by adding -es.

In the Words Are CATegorical series, Brian P. Cleary’s *Feet and Puppies, Thieves and Guppies* (Millbrook Press, 2014) is a playful guide to irregular plurals.

9. Spell phonetically regular words and second-grade-level sight words from dictation.

Try word games such as Sight Words Bingo (Trend Enterprises), Pictionary (Mattel), and Hangman.

10. Capitalize proper nouns; the first word of sentences; the pronoun *I*; the names of holidays, months, and days of the year; the names of countries, cities, and states; and the main words in book titles.

11. Know the correct use of periods, question marks, exclamation points, and quotation marks. Use commas correctly in dates and addresses.

Listening and Speaking Skills

1. Retell stories in proper sequence.

After hearing a story, for example, kids should be able to retell it in their own words. Try recording kids' oral stories and playing them back so that the kids can hear themselves talk.

2. Memorize and recite short poems and rhymes.

Possibilities for this age group include Christina Rossetti's "Who Has Seen the Wind?," Carl Sandburg's "Fog," and Emily Dickinson's "I'm Nobody. Who Are You?"

3. Give short oral reports based on facts drawn from a number of different sources.

Challenge kids to give frequent short accounts of topics of personal interest: crickets, penguins, submarines, dinosaurs, pianos, the moon. In lieu of show-and-tell, try family "Teach Us Something" times for the kids.

Study Skills

1. Use a beginner's dictionary to check word definitions and spellings.

There are many illustrated beginner's dictionaries in print for kids in this age group, as well as a wealth of sources online.

2. Be able to alphabetize to the second or third letter.

For example, kids should be able to order such words as *bat*, *bean*, and *bog*, or *cart*, *castle*, and *candy*.

Mathematics

A major advance for second-grade-level mathematicians is the introduction of multiplication as a fast and fancy way to add. Supplement math with picture books, of which there are many featuring such math concepts as addition, subtraction, multiplication, fractions, place value, money, and measurement.

Support mathematical thinking with puzzles, challenges, and math-related games. Check out online chess games for kids.

Encourage kids' questions, which are often the best part of math. From our boys: "Can animals count?" "What's the biggest number there is?" "How come everything is in tens? Why not nines or eights?" "How did the Egyptians count?" "What's a cubit?" "If you've got a big flock of birds flying by, how do scientists figure out how many birds are in the flock?" "How many Cheerios are in a box of Cheerios?" "How many stars are there?" "How long would it take a spaceship to get to Pluto?" "How long would it take to count to a trillion?" "How does an abacus work?" "What did it mean when pirates had pieces of eight?" "Why do quarters have little ridges around the edge?" "How much was wampum worth?" "What's 10× on a microscope?" "Is gold more expensive than diamonds?"

That's the way kids learn. And supporting that curiosity is far more important than inculcating addition facts or rehearsing the ability to write "eighty-nine."

Also see Miquon Math and other resources ([this page](#)).

Need to know the definition of *mean*, *median*, *variable*, *quotient*, or *heptagon*? The Maths Dictionary for Kids at www.amathsdictionaryforkids.com/dictionary.html has hundreds of colorfully illustrated definitions of mathematical terms.

Number Theory

1. Recognize and write numbers 0 to 1,000. Be able to read and write number words to 100.

2. Order and compare numbers to 1,000 using greater than (>), less than (<), and equals (=) signs.

3. Be able to count to 100 by twos, threes, fives, and tens.

Second graders should also be able to count by tens starting with any given number (e.g., 23, 33, 43, 53...), and by fifties and hundreds to 1,000. A useful resource here is a hundred chart.

4. Understand place values for ones, tens, hundreds, and thousands.

Various kinds of printable place value mats are available online, suitable for games with manipulatives or written numbers.

Dino Math Tracks

Learning Resources

A mathematical board game for kids ages 6 and up, playable at different levels, that teaches counting, addition, subtraction, and place value through the thousands—with dinosaurs!

Sir Cumference and All the King's Tens

Cindy Neuschwander. Charlesbridge, 2003.

One of the Math Adventures series, in which Sir Cumference, his wife, Lady Di of Ameter, and son Prince Radius have many mathematical adventures. In this book, they're planning a gigantic birthday party for King Arthur, with tens, hundreds, and thousands of guests.

5. Round numbers to the nearest ten.

6. Write numbers in expanded form through the hundreds.

In expanded form, numbers are dissected into their component ones, tens, hundreds, and so on, a process that reinforces the concept of place value and gives kids another slant on the structure of multi-digit numbers. In expanded form, for example, $729 = 700 + 20 + 9$.

7. Understand the concept of even and odd numbers.

Kids should also know the meanings of *dozen*, *half dozen*, and *pair*.

8. Use tallies for counting and score keeping.

9. Identify ordinal positions from first through twentieth.

10. Recognize and write fractions from $\frac{1}{10}$ to $\frac{1}{2}$.

Kids should be introduced to the terms *numerator* and *denominator*, and should know which fractions are equal to 1 (for example, three $\frac{1}{3}$ pieces or $\frac{3}{3} = 1$ whole). Check out fraction games online.

11. Recognize and extend repeating patterns using symbols, pictures, or manipulatives.

12. Collect, organize, and record data using pictorial and bar graphs.

Collect data in real-life situations. For example, what are the eye and hair colors among the kids in your play group, art class, or soccer team? In which month do your friends have birthdays? When rolling a pair of dice, which sum is rolled most often? In each case, what do the data look like? How big a sample do you need for reliability?

Animals by the Numbers

Steve Jenkins. Houghton Mifflin Harcourt, 2016.

A wide range of fascinating facts about animals, presented through diagrams, graphs, pie charts, and more.

Also see Jenkins's *Dinosaurs by the Numbers* (2019).

Information Everywhere

DK, 2013.

The world explained, using statistics and graphics: How many people are on the planet? What are your chances of being killed by a coconut?

Operations

1. Know basic addition and subtraction facts through 20.

There's a lot that can be done here with nothing more than a pair of dice. Take turns rolling, and race your way to 100, adding as you go. Then race your way back to zero, subtracting.

2. Understand the inverse relationship between addition and subtraction.

Or, if you prefer, know that subtraction is the opposite of addition: $4 + 2 = 6$ and $6 - 2 = 4$.

3. Understand the relationships within the addition and subtraction fact “families.”

A fact family is a group of related math facts such as the following:

$$3 + 5 = 8 \quad 5 + 3 = 8 \quad 8 - 3 = 5 \quad 8 - 5 = 3$$

4. Review the commutative property of addition.

Put simply, this means that no matter what order numbers are added in, the answer comes out the same.

5. Estimate sums and differences to 100.

Estimation skills—a down-to-earth commonsense component of math—are of inestimable value to mathematicians of all ages. Estimation ability to 100 requires a good grasp of rounding to the nearest ten. Kids should be able to assess such problems as $38 + 37 + 19$ and know that the answer is somewhere around 100. Useful in later life for quickly assessing grocery bills, contractors’ fees, and income tax.

Great Estimations

Bruce Goldstone. Square Fish, 2010.

How many jelly beans are in the bowl? How many people are in the swimming pool? How to estimate, illustrated with color photos.

6. Solve two- and three-digit addition and subtraction problems with and without regrouping.

To cope with regrouping, kids will need a solid understanding of place value. Regrouping is a collective term for “carrying” or “borrowing,” the process by which number quantities are passed back and forth from one decimal place to another while solving a problem.

7. Recognize the multiplication sign (\times); know the definitions of *factor* and *product*.

In the multiplication problem $5 \times 3 = 15$, for example, 5 and 3 are the factors; 15 is the product.

8. Know the commutative property of multiplication.

This is a fancy way of saying that numbers can be multiplied in any order with the same result. For example, 3×4 is the same as 4×3 .

9. Know the multiplication facts through the five-times table.

Second graders should also know how to multiply by 0, 1, and 10.

There are dozens of multiplication games online, many with associated printables. Try Multiplication Bingo.

Bingo!

There are many free sites online for designing and printing your own bingo cards. For example, see myfreebingocards.com. Invent your own games!

10. Understand the use of variables and use these in number sentences.

This is a first exposure to algebra. A variable is a numerical unknown, generally represented in mathematical equations by a letter, such as the ever-popular x . Kids should be able to solve such simple equations (aka number sentences) as $4 + x = 7$.

See Hands-On Equations ([this page](#)).

11. Solve simple one-step addition, subtraction, and multiplication problems, including both horizontal and vertical numerical problems and word problems.

As popularly practiced, this generally involves lots and lots of worksheets. This isn't necessarily the way to go. Kids should be encouraged to apply varied techniques to problem-solving, to model problems with symbols or manipulatives, and to describe problems and their solutions in everyday language. This last is a technique with multiple benefits: it simultaneously clarifies thought processes, hones language skills, and enhances mathematical expertise. Written descriptions of math problems are an integral part of Writing Across the Curriculum programs (see wac.colostate.edu/resources/wac/intro), in which kids write in all academic disciplines.

12. Apply mathematical knowledge to other areas of the academic curriculum and to everyday situations.

Memory thrives on connections, which is why cross-curricular or multidisciplinary studies—in which kids cover many different aspects of a topic from a range of perspectives—are so effective. The multifaceted approach provides an immense number of interlinked associations. The principle similarly applies to math. The skills kids learn are reinforced by applications to a variety of academic and daily-life situations. Double or halve recipes. Figure out how fast a wagon train traveled based on how long it took to get from Missouri to California. Find out how high you could jump if you were a kangaroo.

13. Introduce concepts of probability.

That's a Possibility!

Bruce Goldstone. Henry Holt, 2013.

Readers learn to differentiate among the possible, probable, and impossible, with many photo-illustrated examples.

Also see Loreen Leedy's *It's Probably Penny* (Henry Holt, 2007); Amy Axelrod's *Pigs at Odds* (Aladdin, 2003); and Edward Einhorn's *A Very Improbable Story* (Charlesbridge, 2008).

Money and Measurement

1. Recognize and know the relative values of pennies, nickels, dimes, quarters, half dollars, and dollar bills.

2. Determine values of given combinations of bills and coins, and write the amount using either the cent sign or the dollar sign and decimal point.

3. Add and subtract money and make change.

4. Compare and order objects by length, weight, and volume.

Kids should experiment with rulers, measuring tapes, arm and pan balances, and liquid measures. Second graders should become familiar with both English and metric measures of length. They should also know that 1 foot contains 12 inches; 1 yard contains 3 feet; and 1 centimeter is about half the size of an inch. They should know that weight is measured in tons, pounds, and ounces; that volume is measured in cups, pints, quarts, and gallons; and that the metric measure 1 liter is approximately equal to 1 quart.

Kids should also know the difference between mass and weight. Mass is the quantity of matter in a given body; weight is a measure of the force of gravity acting on that body. This is why—though your mass stays just the same—you'd weigh a lot less on the low-gravity moon and a lot more on high-gravity Jupiter. Calculate your weight on the different planets of the solar system. And you might toss out the old conundrum: "Which weighs more, a pound of feathers or a pound of lead?"

From my homeschool journal (Josh is 9; Ethan, 7; Caleb, 5):

We read Ts'ao Chung Weighs an Elephant this morning, the story of a Chinese boy who figured out how to weigh an elephant by loading it on a boat, marking the water level on the side of the boat, then removing the elephant and loading the boat with stones until it sank to the same water level. The boys, intrigued, repeated the elephant experiment in the bathtub, using a plastic toy boat and a can of soup with a paper elephant pasted on the side.

We marked the water level on the side of the boat, first empty, then with the elephant. The boys then filled the boat with pebbles until the water-level line matched that reached with the elephant. (Actually the first two times around they sank the boat, due to overenthusiasm.) We then weighed the elephant/soup can and the pebbles on the kitchen scale, thus proving that they weighed exactly the same. Josh: "Hey! This really works!" Caleb: "Let's weigh the cat!"

5. Know how to read a thermometer, measure temperatures in degrees Fahrenheit, and recognize the degree sign.

Kids should also know the boiling and freezing points of water and average body temperature in both Fahrenheit and Celsius.

6. Know the names of the months of the year in order.

Kids should also be able to use a calendar to determine the day, week, month, and date.

7. Tell time to the quarter hour.

Geometry

1. Identify the basic two-dimensional figures: circle, square, rectangle, and triangle.

Try playing with tangrams. A tangram is a dissection puzzle consisting of seven flat shapes: triangles, parallelograms, and squares. The trick is to assemble them into specific shapes shown on cards or in accompanying puzzle books, given only in outline. Tangrams are available for purchase (in wood, plastic, or foam) or can be printed and downloaded from the internet; there are also many online tangram games.

Pair with Ann Tompert's *Grandfather Tang's Story* (Dragonfly Books, 1997), in which a grandfather tells a folktale to his little granddaughter using tangram shapes, which segue from foxes to rabbits, dogs, squirrels, and geese.

2. Identify the basic three-dimensional figures: sphere, cube, cone, pyramid, and cylinder.

There are many sources online for printable templates for making your own foldable 3-D figures. (These are easier to work with if printed on cardstock rather than paper.)

From my homeschool journal (Ethan is 6):

Ethan—all by himself—just discovered the third dimension. He was drawing at the dining room table when he suddenly started shouting “Mom! Come quick!” I came running—expecting blood—and found that he’d figured out how to draw cubes. The cube discovery was rapidly followed by three-dimensional rectangles, houses, barns, and cereal boxes, and then a three-dimensional can (Me: “That’s a cylinder”) and a pyramid. Ethan is thrilled.

3. Recognize and differentiate among horizontal, vertical, parallel, and perpendicular lines.

4. Identify congruent figures.

Congruent figures have both the same shape and the same size. Kids should be able to pick these out regardless of orientation or position.

Why? The best explanation seems to be that this will be useful later, in formal studies of geometry.

5. Identify and create symmetrical figures and designs.

Try making symmetrical cutout shapes from folded paper; experiment with mirrors to make mirror images. Design and paint your own barn quilts.

Pair with poetry. Marilyn Singer’s illustrated *Mirror Mirror* (Dutton Books, 2010) is a book of “reverso poems” that can be read either forward or backward.

Try a game of Mirrors. Popular in drama groups for honing concentration skills, in this game partners stand facing each other and one person, the leader, makes simple gestures while the other, the mirror, imitates the leader, just as a real mirror would.

6. Measure perimeter and area.

Kids should know that perimeter is measured in units of length, while area is measured in square units, such as square inches, square feet, and square centimeters.

Measure your kitchen table, the kids’ bedrooms, the house. What’s the biggest table in the world—and how many people can sit down at it for dinner? How big is the White House? What about Buckingham Palace? Could the Great Pyramid fit on an aircraft carrier?

History and Geography

History and geography curricula often disagree over both the content and order in which topics are presented to schoolchildren. Recent history standards often stress the importance of history as stories, urge a broad-

based presentation of the multicultural aspects of history, and suggest that world and American history be introduced at early ages and then repeated in greater depth as students reach the older grades. Homeschoolers, who have freedom to follow their own interests, may want to substitute alternative topics for those listed below or to pursue some of the listed topics for longer periods of time and in greater detail. Mix and match in ways that work for your kids.

Supplement history lessons with timelines, hands-on activities, videos, music, art projects, field trips, and reading material of all kinds, including fiction and nonfiction books, biographies of prominent people, legends and folktales, and poems.

American History

Since a general overview of history through the Revolutionary War and the beginnings of the new nation was presented to kids in first grade, second-grade history might take the story up where it last left off.

1. The War of 1812.

Topics to cover include the reasons for the war, Oliver Hazard Perry and the Battle of Lake Erie, *Old Ironsides*, James and Dolley Madison and the burning of the White House, Francis Scott Key's "The Star-Spangled Banner," Andrew Jackson and the Battle of New Orleans, and the pirate Jean Laffite, who defended New Orleans against the British and (maybe) left some hidden treasure behind.

Dolley Madison Saves George Washington

Don Brown. Houghton Mifflin Harcourt, 2007.

The picture-book story of First Lady Dolley Madison, who saved George Washington's portrait when the British burned the White House.

Lives of the Pirates: Swashbucklers, Scoundrels (Neighbors Beware!)

Kathleen Krull. Houghton Mifflin Harcourt, 2013.

A collection of short, lively biographies of nineteen different pirates, among them Captain Kidd, Blackbeard, Grace O'Malley, Black Sam Bellamy, and Jean Laffite.

Long May She Wave

Kristen Fulton. Margaret K. McElderry, 2017.

When the commander of Fort McHenry in Baltimore needed the biggest flag he could get, young Caroline Pickersgill and her family rose to the challenge. The flag, which was 42 by 30 feet (connect this to math), inspired Francis Scott Key to write "The Star-Spangled Banner."

Mr. Madison's War

Kassandra Radomski. Capstone, 2013.

One of the Causes and Effects series, in which each 32-page book explains the causes and effects of an important historical event.

Old Ironsides: Americans Build a Fighting Ship

David L. Weitzman. Houghton Mifflin Harcourt, 1997.

The story of the building of the famous ship, as told by the son of a ship's carpenter. Great drawings and diagrams make this one a plus for young engineers.

The Star-Spangled Banner

Peter Spier. Dragonfly, 1992.

A line-by-line illustrated version of the national anthem. Included are pictures of American Revolutionary War flags and a reproduction of Francis Scott Key's original manuscript.

The Star-Spangled Banner in Translation

Elizabeth Raum. Capstone, 2016.

Each book in the helpful In Translation series provides background information and translates traditional speeches and documents into readily understandable language. (What's a rampart?)

The Town That Fooled the British

Lisa Papp. *Sleeping Bear*, 2011.

Citizens of the shipbuilding town of St. Michaels, Maryland, targeted by the British fleet during the War of 1812, saved themselves with a clever trick.

2. Westward expansion.

Topics to cover include Daniel Boone in Kentucky, the Louisiana Purchase, the building of the Erie Canal, the invention of the steamboat and the steam-powered locomotive, the Pony Express, the building of the transcontinental railroad, the Oregon Trail and the wagon trains, the Mexican-American War, the Gold Rush, and the impact of westward expansion on the Native Americans.

Amazing Impossible Erie Canal

Cheryl Harness. Aladdin, 1999.

The story of how DeWitt Clinton of New York built the longest uninterrupted canal in history—363 miles long, from Albany to Buffalo.

Daily Life in a Covered Wagon

Paul Erickson. Puffin, 1997.

In 1853, the Larkin family—Hiram and Hetty Larkin, their four children, and Matthew Belknap, their hired hand—pile into a covered wagon and head west on the Oregon Trail. The book is based on letters and diaries and is illustrated with diagrams and photos of artifacts.

Death of the Iron Horse

Paul Goble. Aladdin, 1993.

The Cheyenne had never seen a steam locomotive before, and they found the train horrifying—but one day in 1867, they managed to defeat it.

The Erie Canal

Peter Spier. North Country Books, 2009.

The pictorial story of the canal set to the words of the folk song “Low Bridge, Everybody Down.”

If You Traveled West in a Covered Wagon

Ellen Levine. Scholastic, 1992.

An interactive question-and-answer book: “How would you cross rivers when there were no bridges?” “Without road signs, how would you know where you were?” “How far would you travel in a day?” “What would you eat?”

Levi Strauss Gets a Bright Idea

Tony Johnston. Houghton Mifflin Harcourt, 2011.

The picture-book story of the invention of blue jeans, America’s most famous pair of pants, originally designed for Gold Rush prospectors.

The Quilt-Block History of Pioneer Days

Mary Cobb. Millbrook, 1995.

A history of the pioneers, with quilt-related projects.

Ten Mile Day

Mary Ann Fraser. Square Fish, 1996.

The story of the building of the Transcontinental Railroad—including the landmark day when Charles Crocker bet \$10,000 that his crew could lay a world-record ten miles of railroad track in a single day.

They’re Off! The Story of the Pony Express

Cheryl Harness. Simon & Schuster, 2002.

Eighty riders and five hundred horses delivered the mail from Missouri to California in just ten days.

Westward Expansion

Teresa Domnauer. Children’s Press, 2010.

A nicely done picture-book introduction, covering the reasons for the move west, western exploration, the treatment of the Native

Americans, the Mexican War, and the end of the frontier. One of the True Books series.

In the same series, see *The Oregon Trail* (Mel Friedman, 2010), *The California Gold Rush* (Mel Friedman, 2010), and *The Transcontinental Railroad* (John Perritano, 2010).

Westward Ho!

Laurie Carlson. Chicago Review Press, 1996.

All about the Wild West, with a timeline, maps, and many hands-on projects, among them sewing a sunbonnet, inventing a horse-trading game, and cooking up a batch of flapjacks.

3. Slavery, abolitionism, states' rights, and the Civil War.

Topics to cover include the national conflict over slavery; the abolitionists and the Underground Railroad; John Brown; secession; the Union and the Confederacy; prominent Civil War–era Americans, such as Harriet Tubman, Abraham Lincoln, Ulysses S. Grant, and Robert E. Lee; key events of the war; and the importance of the Emancipation Proclamation and the Gettysburg Address.

Helpful picture-book biographies include *Moses: When Harriet Tubman Led Her People to Freedom* (Carole Boston Weatherford; Hyperion, 2006); *Words Set Me Free: The Story of Young Frederick Douglass* (Lesa Cline-Ransome; Simon & Schuster, 2012); *Only Passing Through: The Story of Sojourner Truth* (Anne Rockwell; Dragonfly, 2002); and *Young Abe Lincoln: The Frontier Days and Abe Lincoln Goes to Washington* (Cheryl Harness; National Geographic, 2008).

Ben and the Emancipation Proclamation

Pat Sherman. Eerdmans Books, 2009.

Based on the true story of a young slave boy who taught himself to read, then was able to read to fellow slaves the wonderful news of the Emancipation Proclamation.

Escape North: The Story of Harriet Tubman

Monica Kulling. Random House, 2000.

The story of Harriet Tubman and the Underground Railroad. A Step into Reading book.

The Gettysburg Address in Translation

Kay Melchisedech Olson. Capstone, 2016.

From the In Translation series, this puts the Gettysburg Address into language kids can easily understand. How long is four score and seven years? What are unalienable rights?

If You Traveled on the Underground Railroad

Ellen Levine. Scholastic, 1993.

One of the interactive If You series, written in question-and-answer format. Sample questions include “How did the Underground Railroad get its name?” “Where was the safest place to go?” “How would you trick the slave hunters?” “What was the best time of year to escape?”

In the same format, see *If You Lived When There Was Slavery in America* (Anne Kamma; Scholastic, 2004) and *If You Lived at the Time of the Civil War* (Kay Moore; Scholastic, 1994).

Just a Few Words, Mr. Lincoln

Jean Fritz. Penguin, 1993.

The story of the Gettysburg Address for young readers.

Thee, Hannah

Marguerite de Angeli. Harvest Press, 2000.

Nine-year-old Hannah, growing up in a Quaker family in Philadelphia in the years before the Civil War, begins to appreciate her heritage when her family saves a runaway slave.

4. Immigration.

Topics to cover include the many different reasons immigrants came to the United States, their countries of origin, the symbolism of the Statue of

Liberty, Ellis Island, the process of becoming an American citizen, and the many ethnic groups and cultural traditions found in the United States today.

All the Way to America

Don Yaccarino. Dragonfly, 2014.

The author's great-grandfather arrived on Ellis Island with a little shovel, some family photographs, and some good advice about hard work and family roots.

Coming to America: The Story of Immigration

Betsy Maestro. Scholastic, 1996.

America is a nation of immigrants, beginning with the first people who entered North America via the Bering Land Bridge. A general overview through modern times, with interesting facts and a timeline.

If Your Name Was Changed at Ellis Island

Ellen Levine. Scholastic, 1994.

One of the If You series, written in interactive question-and-answer format. Questions include "What was Ellis Island?" "Why did people come to America?" "What did Americans think about the new immigrants?"

Molly's Pilgrim

Barbara Cohen. Scholastic, HarperTrophy, 1998.

Molly and her parents are Jewish and have emigrated from Russia to the United States to escape religious persecution—and her experience helps her third-grade classmates understand the true meaning of Thanksgiving.

Watch the Stars Come Out

Riki Levinson. Puffin, 1995.

The lovely tale of a little red-haired girl and her brother, who came across the sea to join their immigrant parents in America—as told to the red-haired great-granddaughter of that first little girl.

When Jessie Came Across the Sea

Amy Hest. Candlewick, 2003.

When the village rabbi gives 13-year-old Jessie a ticket to America, she hates to leave her grandmother—but ultimately they're reunited and both find a new life in their new land.

Movie: *An American Tail* (1986) is the cartoon story of Fievel, a young Russian mouse, who is separated from his family when they arrive in America and must survive on his own while trying to find them again. Our kids instantly learned all the songs. ("There are no cats in America and the streets are paved with cheese!") Rated G.

5. Civil rights.

Topics to cover include suffrage and voting rights; prominent suffragists, including Susan B. Anthony and Elizabeth Cady Stanton; the struggle for workers' rights and the abolition of child labor; the civil rights movement of the 1960s; and stories of prominent civil rights leaders such as Rosa Parks, Martin Luther King Jr., and Malcolm X.

WOMEN'S SUFFRAGE

Around America to Win the Vote

Mara Rockliff. Candlewick, 2016.

In 1916, suffragists Nell Richardson and Alice Burke (and a kitten) set out on a trip across the United States in a brightly colored car to help win votes for women.

The Ballot Box Battle

Emily Arnold McCully. Dragonfly, 1998.

On Election Day in 1880, young Cordelia accompanies next-door neighbor Elizabeth Cady Stanton to the polls and learns a lesson in courage.

If You Lived When Women Won Their Rights

Anne Kamma. Scholastic, 2008.

Once upon a time girls could not wear pants, play on sports teams, ride a bike, or go to college. But then things changed. One of the interactive question-and-answer If You series, with questions that include “What started the women’s rights movement?” “Who was Elizabeth Cady Stanton?” “Was there trouble when women voted?”

You Want Women to Vote, Lizzie Stanton?

Jean Fritz. Puffin, 1999.

The story of Elizabeth Cady Stanton and the fight for women’s suffrage, told in Fritz’s wonderful, human-interest-filled prose.

Also see Tanya Lee Stone’s picture-book biography of Stanton, *Elizabeth Leads the Way* (Square Fish, 2010).

WORKERS’ RIGHTS

Brave Girl

Michelle Markel. Balzer + Bray, 2013.

The story of Ukrainian immigrant Clara Lemlich, who in 1909 led the largest strike of women workers in U.S. history.

Click, Clack, Moo: Cows That Type

Doreen Cronin. Atheneum, 2000.

Farmer Brown’s cows get a typewriter and use it to protest the conditions in the barn.

Kid Blink Beats the World

Don Brown. Roaring Brook Press, 2004.

The story of the newsies’ strike of 1889, when the paper boys took on William Randolph Hearst’s *The Journal* and Joseph Pulitzer’s *The World*.

On Our Way to Oyster Bay

Monica Kulling. Kids Can Press, 2016.

Aidan and his friend Gussie want to go to school rather than work twelve hours a day in a Pennsylvania cotton mill, so they join Mother Jones on a march to President Theodore Roosevelt's house to protest child labor.

CIVIL RIGHTS

Child of the Civil Rights Movement

Paula Young Shelton. Dragonfly, 2013.

Told in verse, a picture-book story of the early days of civil rights activism, told by a daughter who marched with her parents and Martin Luther King Jr. from Selma to Montgomery.

Martin's Big Words

Doreen Rappaport. Hyperion, 2001.

A gorgeously illustrated introduction to the life of Dr. Martin Luther King Jr. for young readers.

Rosa

Nikki Giovanni. Henry Holt, 2005.

The story of Rosa Parks, who refused to give up her seat on a Montgomery, Alabama, city bus and became an inspiration to the civil rights movement.

Sit-In: How Four Friends Stood Up by Sitting Down

Andrea Davis Pinkney. Little, Brown, 2010.

The story of the Woolworth's lunch counter protest, where four students bravely sat down for racial equality.

World History

Faces

Cricket Media. shop.cricketmedia.com

Faces magazine, published nine times a year, introduces kids to cultures around the world, with articles, folktales, color photos, recipes, and hands-on projects. Each issue is devoted to a single country, region, or theme. As well as annual subscriptions, single back issues are available for order. Sample issues are “Great Rivers of the World,” “Festivals Around the World,” and “Desert People.”

Kids Discover

www.kidsdiscover.com

A magazine of social studies and science for ages 6–14, available either online or in print, with free downloadable teacher’s guides. Each issue includes information, color pictures and photographs, maps and diagrams. Sample history themes include “Ancient China,” “Ancient Egypt,” “Aztecs,” “Colonial America,” and “The Civil War.” Available by subscription, or purchase single issues.

You Wouldn’t Want to Be Series

Various authors. Franklin Watts.

Humorously presented factual accounts of history with colorful cartoonish illustrations. Many titles, covering everything from *You Wouldn’t Want to Be a Mammoth Hunter!* and *You Wouldn’t Want to Be a Sumerian Slave!* through *You Wouldn’t Want to Be a World War II Pilot!* and *You Wouldn’t Want to Be on Apollo 13!*

1. Survey the history of Asia, covering landmark historical events, culture, religion, and geography.

One choice for this age group: survey the countries of China, Japan, and India. For each, kids should locate the country on the map and identify its major geographical features; discuss cultural and religious features; read associated fiction and nonfiction books, folktales, and poems; and participate in hands-on projects and activities.

While studying India, for example, they might read the story of the elephant-headed god Ganesh and make elephant masks; while studying China, they might learn to count to ten in Chinese and try their hands at

making paper; and while studying Japan, they might experiment with origami and eat a Japanese meal with chopsticks.

CHINA: NONFICTION

All About China

Alison Branscombe. Tuttle, 2018.

An overview of Chinese history and culture, with stories, songs, hands-on projects, and games. Various short chapters cover famous historic places, geography, government, inventions, daily life, food, art, festivals, and animals. Other books in the series include *All About Japan* (2017), *All About Indonesia* (2018), and *All About Korea* (2018).

China

Hugh Sebag-Montefiore. DK, 2007.

One of the Eyewitness series. Each double-page spread covers a different Chinese topic, including language, city life, village life, food, religion, festivals, inventions, and more, all with terrific color photographs. In the same series, also see *Ancient China* (Arthur Cotterell, 2005).

Genghis Khan

Demi. Two Lions, 2009.

A picture-book biography of Temujin, born in a Mongol clan, who grew up to be the conqueror of the world.

Also see Demi's *Marco Polo* (2008).

Great Ancient China Projects You Can Build Yourself

Lance Kramer. Nomad, 2008.

Learn about Chinese architecture, paper, writing, warriors and weapons, merchants, explorers, food, music, science and more. Hands-on projects include making paper, a mini-yurt, a compass, a seismograph, and an abacus.

Kubla Khan: The Emperor of Everything

Kathleen Krull. Viking, 2010.

The picture-book story of Genghis Khan's grandson, who built the lavish city that became Beijing.

The Silk Road

Kathy Ceceri. Nomad, 2011.

Explore the world's most famous trade route with interesting historical background information, maps, pictures, fascinating facts, capsule biographies, and twenty hands-on projects.

You Wouldn't Want to Work on the Great Wall of China!

Jacqueline Morley. Scholastic, 2017.

A cartoon-illustrated account of China and the building of the Great Wall.

CHINA: FICTION

The Emperor and the Kite

Jane Yolen. Puffin, 1998.

A neglected little princess proves her worth when she saves her imprisoned father with her kite.

The Empty Pot

Demi. Square Fish, 1996.

The emperor is choosing an heir—and so he gives a flower seed to every child in the kingdom, promising the throne to whoever grows the best flower. Only Ping shows up with an empty pot.

Also by Demi, set in China, see *Liang and the Magic Paintbrush* (Square Fish, 1988); *The Boy Who Painted Dragons* (Margaret K. McElderry, 2007); and *The Girl Who Drew a Phoenix* (Margaret K. McElderry, 2008).

Lon Po Po

Ed Young. Puffin, 1996.

A Chinese retelling of Little Red Riding Hood, in which three girls defeat a wolf.

Ming Lo Moves the Mountain

Arnold Lobel. Greenwillow, 1993.

Ming Lo and his wife live in the shadow of a great mountain, which causes them no end of trouble—until a wise man shows Ming Lo how to make the mountain move.

The Nightingale

Hans Christian Andersen; many editions.

The emperor prefers the music box song of a jeweled mechanical nightingale—but it's the song of the real wild bird that saves him from death.

The Seven Chinese Brothers

Margaret Mahy. Scholastic, 1990.

A retelling of a traditional tale in which seven brothers with supernatural powers defeat a cruel emperor.

Yeh Shen

Ai-Ling Louie. Puffin, 1996.

A Chinese Cinderella story.

JAPAN: NONFICTION

All About Japan

Willamarie Moore. Tuttle, 2017.

A boy from the country and a girl from the city take readers on a tour of Japan, variously covering everyday life, holidays and celebrations, and language and culture. Included are a map, projects, and traditional Japanese stories.

How to Be a Samurai Warrior

Fiona MacDonald. National Geographic, 2007.

How good are you with a bow and arrow? A horse? Are you of honorable lineage? You might have a chance.

Also by MacDonald in this series are *How to Be a Roman Soldier*, *How to Be a Medieval Knight*, and *How to Be an Aztec Warrior*.

My Awesome Japanese Adventure

Rebecca Otowa. Tuttle, 2013.

An introduction to Japanese culture for kids through the diary of a fifth grader spending four months with a Japanese family as an exchange student.

You Wouldn't Want to Be a Samurai!

Fiona MacDonald. Franklin Watts, 2009.

One of the lively *You Wouldn't Want To* series, packed with catchy information and illustrated with cartoons.

JAPAN: FICTION

The Crane Wife

Odds Bodkin. Houghton Mifflin Harcourt, 2002.

The lovely and poignant story of a lonely Japanese sailmaker who nurses a wounded crane back to life and later finds a beautiful woman at his door.

The Funny Little Woman

Arlene Mosel. Puffin, 1993.

Once upon a time in Japan there lived a funny little woman who loved to laugh—and to make dumplings out of rice. One day one of the dumplings rolls away, and the funny little woman, while chasing it, falls into the clutches of the wicked three-eyed oni.

How My Parents Learned to Eat

Ina R. Friedman. Houghton Mifflin Harcourt, 1997.

The narrator, who uses both chopsticks and forks, tells the story of her parents—an American sailor and a Japanese woman—and

how they learned about each other's very different ways of eating.

Japanese Children's Favorite Stories

Florence Sakade. Tuttle, 2014.

An illustrated collection of twenty traditional stories, among them "Peach Boy," "The Magic Teakettle," "The Rabbit in the Moon," and "The Spider Weaver."

Kamishibai Man

Allen Say. Houghton Mifflin Harcourt, 2005.

Kamishibai means "paper theater"—and in Japan, the *kamishibai* men once rode their bicycles from town to town, entertaining audiences with stories on picture cards.

Check online for instructions for making your own cardboard *kamishibai* and sets of story cards.

The Tale of the Mandarin Ducks

Katherine Paterson. Puffin, 1995.

A cruel lord captures a beautiful mandarin duck—but when the bird pines for his mate, Yasuko, the little kitchen maid, and Shozo, the lord's one-eyed servant, set the duck free. When the angry lord sentences them both to death, the ducks save them. Beautifully illustrated in the style of old Japanese woodcuts.

INDIA: NONFICTION

Hands-On History: Ancient India

Daud Ali. Armadillo, 2014.

An illustrated history of the Indus Valley and Mughal Empire, with fifteen hands-on projects.

India

Sunita Apte. Scholastic, 2009.

One of the True Books: Countries series, which are short, creatively designed books filled with interesting facts and illustrated with color photos.

In the same series, see *China* (Mel Friedman, 2008) and *Japan* (Ann Heinrichs, 1997).

India

Manini Chatterjee. DK, 2002.

One of the Eyewitness series. Each double-page spread, illustrated with maps and photographs, covers a different topic on Indian history and culture.

INDIA: FICTION

Ahimsa

Supriya Kelkar. Tu Books, 2017.

Set in the 1940s, the story is told from the point of view of 10-year-old Anjali, whose Brahmin family becomes involved in Gandhi's independence movement.

Also see the similarly themed *The Night Diary* by Veera Hiranandani (Dial, 2018). These are both chapter books, recommended for ages 9–12. Good choices if you're teaching a multiage group.

Cinnamon

Neil Gaiman. HarperCollins, 2017.

Set in a mythical India, this is the story of Princess Cinnamon, who has eyes of pearl and who does not talk—until a magical tiger arrives at the palace.

The Elephant's Friend and Other Tales from Ancient India

Marcia Williams. Candlewick, 2014.

Eight animal folktales from India, charmingly illustrated in Williams's signature comic-strip style.

The Fantastic Adventures of Krishna

Demi. Wisdom Tales, 2013.

The god Vishnu sends Krishna to earth as a child, where he is raised by poor cowherds and grows up to battle the evil demon

kings.

Grandma and the Great Gourd

Chitra Banerjee Divakaruni. Roaring Brook, 2013.

A Bengali folktale in which Grandma, crossing the jungle to visit her daughter, must trick a trio of hungry animals to make it safely back home.

The Jungle Book

Rudyard Kipling; many editions.

The story of Mowgli, the man-cub, raised in the Indian jungle by the black panther Bagheera and the wise bear Baloo.

Monkey

Gerald McDermott. Houghton Mifflin Harcourt, 2014.

A trickster tale from India involving clever Monkey, a hungry crocodile, and some luscious mangoes on the far side of the river.

Rikki-Tikki-Tavi

Rudyard Kipling. William Morrow, 1997.

The story of Rikki-Tikki-Tavi, a brave young mongoose who wages a war to protect young Teddy and his parents from Nag and Nagaina, the cobras who live in their Indian garden. Illustrated by Jerry Pinkney.

2. Western civilization from the fall of Rome to the early Renaissance (400–1500 CE).

Last year's studies ended with the story of Rome; you might next pick up with the fall of Rome to the barbarians and the European Dark and Middle Ages. Topics to cover might include the rise of Christianity and Islam, the Byzantine Empire, the Battle of Tours, Charlemagne, the Holy Roman Empire, feudal society and everyday life in the medieval period, the code of chivalry, the Vikings, the Norman conquest of England, the Crusades, the Magna Carta and its importance, the Hundred Years' War, the Black Death,

Joan of Arc, Johannes Gutenberg and the printing press, and the fall of Constantinople to the Ottoman Turks.

Suggested literature links include children's versions of Chaucer's *Canterbury Tales*, the legends of King Arthur and his knights, and tales of Robin Hood. Castle blocks and model catapults are also a plus.

From my homeschool journal (Josh is 8; Ethan, 7; Caleb, 5):

The boys have been doing a weeklong program on the Middle Ages at the Denver Art Museum and it's been a blast. They've made helmets, shields with heraldic crests, swords, and stained-glass pendants; viewed the museum's medieval collection; and today had a visit by a falconer with birds. Ethan now wants a falcon.

Beowulf

Michael Morpurgo. Candlewick, 2015.

A retelling for young readers of the Old English epic tale of the Scandinavian hero who saved the Danes from the terrifying ogre Grendel and his sea-hag mother.

Castle

David Macaulay. Houghton Mifflin Harcourt, 1982.

Readers follow, step-by-step, the planning and building of a thirteenth-century Welsh castle, illustrated with wonderful detailed pen-and-ink drawings.

Also see the accompanying movie, *Castle* (PBS Home Video, 1983).

In the same format, also see Macaulay's *Cathedral* (Sandpiper, 1981).

Castle Attack: Make Your Own Medieval Battlefield

Rob Ives. Hungry Tomato, 2016.

Instructions for making your own medieval battlefield, using such simple materials as cardboard, aluminum foil, and plastic Easter eggs. Other books in Ives's Tabletop Wars series include *Break the*

Siege: Make Your Own Catapults and Surprise the Enemy: Make Your Own Traps and Triggers.

Castle Diary

Richard Platt. Candlewick, 2003.

The diary of 11-year-old Tobias Burgess, filled with details about everyday castle life.

Chaucer's Canterbury Tales

Marcia Williams. Walker Books, 2008.

Nine tales from medieval England, retold for a young audience and illustrated in Williams's signature comic-strip style.

Also see *Chanticleer and the Fox* (HarperCollins, 1982), illustrated by Barbara Cooney, the picture-book adaptation of Chaucer's story of the proud rooster who is tricked by a clever fox.

The Kitchen Knight: A Tale of King Arthur

Margaret Hodges. Holiday House, 2007.

Gareth, King Arthur's nephew, hides his identity and ends up working in the king's kitchen—until he gets a chance to serve as champion to a fair lady.

The Knight and the Dragon

Tomie dePaola. Puffin, 1998.

A reluctant knight—who has to resort to the castle library to look up dragon fighting—and an equally reluctant dragon, who has no idea how to battle a knight, plan to have a joust.

Also see Kenneth Grahame's classic *The Reluctant Dragon* (Square Fish, 1988) and Margaret Hodges's *Saint George and the Dragon* (Little, Brown, 1990).

A Medieval Feast

Aliki. HarperCollins, 1986.

The king and his court are coming to visit, and all the inhabitants of Camdenton Manor must come together to prepare a royal feast.

Medieval Lego

Grayson Beights. No Starch Press, 2015.

A short history of the Middle Ages from William the Conqueror to the Battle of Bosworth Field, all illustrated with Lego scenes and characters.

For Lego lovers, there are also many medieval- and castle-themed Lego building sets.

On Vikings, see [this page](#).

MOVIES

Based on T. H. White's book of the same name, *The Sword in the Stone* (Disney, 1963) is the cartoon story of how young Arthur (Wart), with the help of the wizard Merlin, becomes the king of England. Rated G.

Robin Hood (Disney, 1973) is the cartoon story of the legendary hero outlaw, with all the characters portrayed as animals. Robin and Marian are foxes. Rated G.

3. Survey medieval Africa.

Africa for Kids

Harvey Croze. Chicago Review Press, 2006.

An exploration of the African continent, its animals, plants, peoples, and cultures, with maps and related activities, among them making a snake bracelet and an elephant mask, and playing the oldest board game in the world.

Amazing Africa Projects You Can Build Yourself

Carla Mooney. Nomad, 2010.

Background information on African history, geography, and cultures, with "Words to Know" boxes, catchy facts in sidebars, and twenty-five projects, among them making a shield, an animal mask, a rain forest vine, and a batch of banana fritters.

Ashanti to Zulu

Margaret Musgrove. Puffin, 1992.

A beautifully illustrated alphabet book of African culture.

The Royal Kingdoms of Ghana, Mali, and Songhay

Patricia and Fredrick McKissack. Square Fish, 1995.

A chapter history of the major medieval kingdoms of Africa, with maps, details of everyday life, and accounts of such famous people as Sundiata, Mansa Kankan Musa, and Ibn Battuta.

Sundiata: Lion King of Mali

David Wisniewski. Clarion, 1999.

The picture-book story of the thirteenth-century king of Mali. Illustrated with cut-paper collages.

Geography

1. Name and locate the seven continents and four major oceans on a world map and globe, and know characteristics of each.

2. Continue to expand geographical knowledge based on studies in other academic disciplines.

State and world geography can easily be included across the curriculum. Use maps to locate states and countries mentioned in literature selections; link geography to history topics.

Try a **Flat Stanley** project. In Jeff Brown's picture book *Flat Stanley* (HarperCollins, 2013), the title character is squashed by a falling bulletin board, becoming so flat that he can be stuffed in an envelope and mailed. A popular project for kids is to make their own Flat Stanleys and mail them all over the country, looking for respondents who will take photos of Stanley in new environments and return him with accompanying postcards. (Ours made it to the Empire State Building and the Golden Gate Bridge.)

Everybody has pals who will help Flat Stanley along the way—the farther he travels, the better.

Postcrossing

www.postcrossing.com

Suitable for all ages, this is a postcard project in which participants send and receive postcards from many different locations all over the world. Online registration.

3. Make story maps.

This is a great way to reinforce geographical skills. Have kids listen to a story and then draw illustrative maps. After reading *The Three Little Pigs*, for example, kids should be able to invent a map showing the locations of the pigs' mother's house, the houses of straw, sticks, and bricks, the wolf's den, and so on.

See *The Once Upon a Time Map Book* ([this page](#)).

4. Understand the use of a map key or legend. Know the cardinal directions.

5. Define and locate Northern and Southern Hemispheres, the equator, and the North and South Poles. Introduce concepts of latitude and longitude.

In the News

See *Time for Kids* ([this page](#)).

Science

Science should also be linked to other disciplines across the curriculum—to math, history, literature, and the arts.

Getting to Know the World's Greatest Inventors & Scientists

Mike Venezia. Children's Press.

Each short biography in this series includes information on the subject's life and accomplishments, illustrated with photos and cartoons. There are many titles, featuring such scientists as Albert Einstein, Stephen Hawking, Marie Curie, Jane Goodall, Thomas Edison, and Rachel Carson.

Pair science with poetry! Douglas Florian's many science-based poetry books, all illustrated with paintings, cover everything from astronomy to dinosaurs, trees, lizards, and honeybees. Titles include *Comets, Stars, the Moon, and Mars* (Houghton Mifflin Harcourt, 2007), *Dinothesaurus* (2009), *Beast Feast* (1998), *Insectopedia* (2002), and more.

Also see Paul Fleischman's *Joyful Noise* (HarperCollins, 2005) and *I Am Phoenix* (1989), poems for two voices about insects and birds.

Field Guides

Always useful to take on a walk, hike, or picnic in the backyard, field guides are a godsend for identifying birds, bugs, rocks, and wildflowers when your kids inevitably point and say, "What's that?" We found that our adult editions were fine for all, but there are also abbreviated versions specifically targeted at kids.

Names to look for: the Peterson Field Guides (Houghton Mifflin Harcourt), which also include a shorter Young Naturalists series for kids; National Audubon Society Field Guides; National Geographic

Field Guides, and National Geographic's Ultimate Explorer Field Guide series for kids.

Take-Along Guides

Various authors. Cooper Square.

Identification guidelines, fun facts, and hands-on activities designed to encourage kids to explore nature. Many titles, among them *Birds, Nests & Eggs* (Mel Boring); *Trees, Leaves & Bark* (Diane Burns); and *Frogs, Toads & Turtles* (Diane Burns).

Physical Science

1. Investigate Newtonian physics: forces and motion.

Students should know that force is required to change an object's speed, should understand the concept of friction, and should know that gravity is the force that causes objects to fall toward Earth.

Pair with a biography of Isaac Newton, such as Kathryn Lasky's *Newton's Rainbow* (Farrar, Straus & Giroux, 2017) or Philip Steele's *Isaac Newton: The Scientist Who Changed Everything* (National Geographic, 2013).

Gravity

Jason Chin. Roaring Brook, 2014.

An excellent fact-filled explanation of gravity, with many kid-friendly examples.

Gravity Is a Mystery

Franklyn M. Branley. HarperCollins, 2007.

A simple introduction, with the help of a scientist and his dog.

2. Know the basic simple machines (lever, wedge, inclined plane, wheel, screw) and how they work.

The **Lego Simple Machines Set** includes over two hundred bricks along with gears, wheels, axles, levers, and pulleys; also available is an accompanying curriculum pack to help kids investigate the uses of simple and compound machines in everyday life. Also see the **Lego Chain Reactions** kit, with which kids can design and build amazing moving machines.

Michael Dahl's **Amazing Science: Simple Machines** series (Picture Window Books, 2006) features an individual book on each of the classic simple machines. Titles are *Cut, Chop, and Stop: A Book About Wedges*; *Pull, Lift, and Lower: A Book About Pulleys*; *Roll, Slope, and Slide: A Book About Ramps*; *Scoop, Seesaw, and Raise: A Book About Levers*; *Tires, Spokes, and Sprockets: A Book About Wheels and Axles*; and *Twist, Dig, and Drill: A Book About Screws*.

How Do You Lift a Lion?

Robert E. Wells. Albert Whitman, 1996.

Find out how to lift a lion, pull a panda, and more, with levers, wheels, and pulleys.

How Machines Work: Zoo Break

David Macaulay. DK, 2015.

An interactive book highlighting simple machines in everyday objects. Readers use pop-ups, flaps, and pull-outs to help Sloth and Sengi escape from the zoo.

Simple Machines

D. J. Ward. HarperCollins, 2015.

All about the six simple machines—levers, wheels and axles, pulleys, ramps, wedges, and screws—and what happens when you put two or more of them together.

3. Investigate magnetism.

Kids should continue the investigations begun in first grade. Points to cover include lodestones and electromagnets, magnetic fields, the earth's

magnetic poles, the workings of a compass, and the laws of magnetism (like poles repel, unlike poles attract).

Try making an electromagnet; experiment with “levitating” neodymium magnet rings; play with magnetic sculpture kits; make a compass; whip up a batch of magnetic slime. (There are online instructions for making magnetic slime; also see ready-made Crazy Aaron’s Magnetic Thinking Putty: Strange Attractor.)

4. Study and experiment with sound.

Through demonstrations and hands-on experiments, kids should discover that sound is caused by vibration and that changes in the speed of the vibration change the pitch of a note. Sound studies mesh readily with music and with studies of the biology of the senses. Kids should know, for example, that faster vibrations generate a higher pitch and slower vibrations produce a lower pitch, and that human speech results from vibration of the vocal cords or larynx.

Make a set of panpipes or build simple stringed instruments; play the musical glasses; make a buzzing noisemaker.

Pair with a biography of Alexander Graham Bell. (See Mike Venezia’s Getting to Know the World’s Greatest Inventors & Scientists series, [this page](#).)

Clang! Ernst Chladni’s Sound Experiments

Darcy Pattison. Mims House, 2017.

In the early 1800s, scientist Ernst Chladni toured Europe popularizing the science of sound. Even Napoleon was interested.

Musical Instruments: DIY Instruments to Toot, Tap, Crank, Strum, Pluck, and Switch On

Kathy Ceceri. Maker Media, Inc., 2017.

Chapters include “Singing Strings and Warbling Winds,” “Bells and Beats,” and “Eerie Electronic Music.” Substantive information and great projects; younger kids will need adult help.

5. Introduction to chemistry.

Chemists study matter: what it's made of, how it behaves, and how substances react and combine to form new substances. Kids love it. Think smells and slime.

See chemistry sets, [this page](#).

Explore Atoms and Molecules!

Janet Slingerland. Nomad, 2017.

Clear explanations, "Words to Know" lists, catchy fact boxes, and twenty-five hands-on projects, among them building molecular models and creating a periodic table guessing game.

Naked Eggs and Flying Potatoes

Steve Spangler. Greenleaf, 2010.

Messy, marvelous, kid-appealing experiments from the creator of the Mentos Diet Coke geyser.

Also see Spangler's *Fire Bubbles and Exploding Toothpaste* (2011), and check out the many activities and experiments at the Steve Spangler Science website at www.stevespanglerscience.com.

Science Experiments You Can Eat

Vicki Cobb. HarperCollins, 2016.

The science behind rock candy, popcorn, jelly, cupcakes, and more. Bonus: you can eat them all!

Life Science

1. Describe the life cycles of plants and animals.

A range of different species should be covered, including birds, frogs, butterflies, trees, and flowers. Kids should be able to define and describe the process of metamorphosis.

Try raising butterflies. The **Insect Lore Butterfly Garden** kit (www.insectlore.com) comes with a mesh habitat, a feeding station, and

five live caterpillars. Kids watch caterpillars eat, grow (measure them daily and graph the results), form chrysalises, and eventually emerge as painted lady butterflies. From caterpillar to butterfly takes about three weeks.

The Amazing Life Cycle of Butterflies

Kay Barnham. Barron's, 2018.

An attractive picture-book explanation, with suggestions for simple activities.

Explore Life Cycles!

Kathleen M. Reilly. Nomad, 2011.

Cartoon illustrations, explanations, fun facts, "Words to Know" boxes, and twenty-five projects and activities.

2. Describe seasonal changes as they affect plants and animals.

Points to cover include the reasons for and features of migration, hibernation, camouflage, and dormancy.

Bird, Butterfly, Eel

James Prosek. Simon & Schuster, 2009.

Bird, Butterfly, and Eel spend their summers together on a New England farm—but as winter approaches, they depart for very different places.

How Far Home?

Monika Davies. Amicus Ink, 2018.

How far do animals travel as they migrate with the seasons? A link to math.

Over and Under the Snow

Kate Messner. Chronicle Books, 2014.

Under the snow is "a secret world of squirrels and snow hares, bears, and bullfrogs." Find out how animals spend the winter.

3. Understand cell theory.

Kids should understand that living things are made of cells and that, in the body, these are organized into tissues, organs, and systems. They should also know the main parts of a cell and the differences between plant and animal cells. Check online for dozens of cool projects for making model cells, using everything from clay to candy to paper plates.

For early-elementary-level kids, a **Microslide Viewer** (American Educational Products) is an excellent resource. This looks like a microscope and works (more or less) like a microscope. However, it's much cheaper and—since it's made of heavy-duty plastic—is next to unbreakable, provided you don't stomp on it. It's designed for viewing Microslides, mounted strips of photomicrographs—that is, photos of specimens taken through actual microscopes. Kids simply stick the Microslide strip in the slot at the top of the viewer and observe each image through the microscope-style magnifying eyepiece. Many different Microslide sets are available for biology, geology, and even astronomy.

Enjoy Your Cells

Fran Balkwill. Cold Spring Harbor Laboratory Press, 2001.

An excellent picture book introduction to cells and cell theory.

Other titles by Balkwill include *Have a Nice DNA* (2002), *Gene Machines* (2002), and *Germ Zappers* (2001).

4. Continue the study of human body systems begun in first grade.

Kids should know the major organs of each and their functions. Check online for interactive human body models to make with your kids.

The Body Book

Donald M. Silver and Patricia J. Wynne. Scholastic, 2008.

A great selection of paper models to make. (Not consumable; you'll need to make copies of the templates and patterns in the book.)

The Fantastic Body: What Makes You Tick & How You Get Sick

Howard Bennett. Rodale Kids, 2017.

A comprehensive overview of all the systems of the human body with clear explanations, colorful diagrams, and lots of memorable and fascinating facts.

5. Know the five senses and their respective systems.

Topics to cover include sight, hearing, taste, touch, and smell using a range of fiction and nonfiction books and hands-on projects and activities.

Helen's Big World

Doreen Rappaport. Disney-Hyperion, 2017.

A picture-book biography of Helen Keller.

Horton Hears a Who

Dr. Seuss. Random House, 1954.

Keen-eared Horton, a brave and kind elephant, hears a cry for help from a small speck of dust and determinedly protects the Whos—"because a person's a person, no matter how small."

The Quiet Book

Deborah Underwood. Houghton Mifflin Harcourt, 2016.

A book about the many different kinds of quiet, among them "swimming underwater quiet," "pretending to be invisible quiet," and "lollipop quiet."

Pair with Underwood's *The Loud Book* (2018).

The Princess and the Pea

Hans Christian Andersen; many versions.

The classic tale of the test of a true princess, who is so sensitive that she can feel a single pea through layers of featherbeds.

The Noisy Paint Box

Barb Rosenstock. Knopf, 2014.

Abstract artist Vasily Kandinsky discovered as a little boy that he had synesthesia—that is, he experienced colors as sounds and

sounds as colors.

Six Dots: A Story of Young Louis Braille

Jen Bryant. Knopf, 2016.

Louis Braille lost his sight at the age of 5—and, determined to read, went on to invent an alphabet for the blind.

Earth and Space Science

1. Understand the water and rock cycles.

Topics to cover include the processes of evaporation, cloud formation, condensation, and precipitation; water vapor in the air (humidity); and groundwater. Kids should know the major types of clouds (stratus, cirrus, and cumulus). They should also understand the composition of soil, and be able to differentiate between weathering and erosion.

Learn about the role of earthworms in creating soil. See Wendy Pfeffer's *Wiggling Worms at Work* (HarperCollins, 2003) in the Let's-Read-and-Find-Out Science series, Kate Messner's *Up in the Garden and Down in the Dirt* (Chronicle Books, 2015), and Doreen Cronin's delightful *Diary of a Worm* (HarperCollins, 2003).

Experiment with kinetic sand, a squeezable sand that can be molded into every conceivable shape and never dries out. Available for purchase, or check online for instructions for making your own.

A Drop Around the World

Barbara McKinney. Dawn, 1998.

The travels of a droplet of water around the world and through the water cycle.

Explore Water!

Anita Yasuda. Nomad, 2011.

Learn about the water cycle, water resources, conservation, folklore, and technology, with twenty-five hands-on projects and activities.

In the same format, also see *Explore Rocks and Minerals!* (Cynthia Light Brown, 2010) and *Explore Soil!* (Kathleen M. Reilly, 2015).

The Magic School Bus at the Waterworks

Joanna Cole. Scholastic, 2004.

Ms. Frizzle and class follow the water, evaporating into the clouds, falling as rain, and eventually ending up in the school bathroom sink.

2. Continue previous studies of weather.

Encourage kids to take measurements and record weather data. Possible projects include making weekly and monthly temperature graphs, assembling a scrapbook of cloud photographs, and making an anemometer and a rain gauge.

See Kathleen M. Reilly's *Explore Weather and Climate!* ([this page](#)).

Weather

John Farndon. DK, 2017.

Filled with great photos and diagrams, this covers all things weather, including cloudspotting, superwinds, monsoons, colors in the sky, and weather lore and forecasting.

Foreign Language

As kids progress in their foreign language studies, programs should cover written as well as spoken language. Kids should read texts appropriate to their skill level, write sentences and short passages using correct grammar and vocabulary, and practice their chosen language (or languages) in skits, recitations, and conversations.

In second or third grade, kids are often first introduced to Latin.

Minimus

Barbara Bell. Cambridge University Press.

Minimus: Starting Out in Latin and *Minimus Secundus: Moving On in Latin*, for kids in grades two through six, use cartoon stories, tales from Greek and Roman mythology, and a mix of history and archaeology to teach Latin conversation and grammar. Both books center on the story of an actual historical Roman family who lived in Roman-occupied Britain in the first century CE: Flavius, a fort commander; Lepidina, his wife; their three children; their cat, Vibrissa; and Minimus, the family mouse.

Also see resources, [this page](#).

The Arts

Visual Art

Kids should experiment with a range of art media and techniques to create original artworks. They should also continue to develop their knowledge of historical and multicultural art—and they should have the freedom to experiment and enjoy what they’re doing.

Art can be readily incorporated into all subjects across the curriculum. When studying pattern-block tessellations in geometry, for example, show kids the artwork of M. C. Escher; when studying life in the Middle Ages, view illuminated manuscripts, tapestries, and period paintings.

The Ink Garden of Brother Theophane

C. M. Millen. Charlesbridge, 2010.

The picture-book story of a creative monk who devised beautifully colored inks for illuminated manuscripts.

Marguerite Makes a Book

Bruce Robertson. J. Paul Getty Museum, 1999.

In Paris in the 1400s, young Marguerite helps her father, a manuscript illuminator, prepare the illustrations for a beautiful Book of Hours for a noble patron.

Therese Makes a Tapestry

Alexandra S. D. Hinrichs. J. Paul Getty Museum, 2016.

In seventeenth-century Paris, young Therese works at the Gobelin's Manufactory, making tapestries for King Louis XIV.

1. Understand the function of the color wheel. Know the rules of color mixing, and experiment with tints and shades.

Many versions of printable color wheels are available online.

2. Be familiar with the elements of line, shape, texture, space, light, and shadow.

Identify these in a range of different types of artworks.

3. Identify different kinds of pictures: portraits, still lifes, abstract art, and landscapes.

Experiment with matching or grouping paintings by style, by subject, and by artist.

Come Look with Me

Gladys S. Blizzard and others. Charlesbridge.

Each book in the series introduces readers to twelve different paintings, with interactive discussion questions. Titles in the series include *Exploring Landscape Art with Children*, *Animals in Art*, *American Indian Art*, and *Discovering African American Art for Children*.

4. Continue to experience and discuss a variety of artworks by well-known artists throughout history, and

arts and crafts from a range of countries and cultures.

5. Know that architecture is the art of designing buildings.

Students should be familiar with a range of architectural styles and be able to define such terms as *column*, *dome*, and *arch*. Pair this with picture-book biographies of famous architects.

13 Buildings Children Should Know

Annette Roeder. Prestel, 2009.

The world's most iconic buildings from the Great Pyramid and the Parthenon to the Eiffel Tower, with color photos, background information, and a timeline.

Other titles in the series include *13 Architects Children Should Know* (Florian Heine, 2014), *13 Bridges Children Should Know* (Brad Finger, 2015), and *13 Skyscrapers Children Should Know* (Brad Finger, 2016).

The 13-Story Treehouse

Andy Griffiths. Square Fish, 2015.

Andy and Terry come up with a treehouse featuring everything from an underground laboratory to a see-through swimming pool and a marshmallow machine. Several sequels, in which the treehouse becomes ever bigger and more imaginative. Design a treehouse of your own!

Andrew Henry's Meadow

Doris Burn. Philomel, 2012.

Andrew Henry, feeling neglected at home, runs away to a meadow, where he builds fantastic themed treehouses for each of his friends.

Fallingwater

Marc Harshman. Roaring Brook, 2017.

The picture-book story of the building of Frank Lloyd Wright's masterpiece.

Also see *The Shape of the World* (K. L. Going; Beach Lane, 2017), a picture-book biography of Frank Lloyd Wright.

How a House Is Built

Gail Gibbons. Holiday House, 1990.

A picture-book account of house building, from blueprint to landscaping.

Iggy Peck, Architect

Andrea Beaty. Abrams, 2007.

Creative, irrepressible Iggy Peck, who builds fabulous structures from everything in sight, has been an architect since the age of 2.

Also see the accompanying *Iggy Peck's Big Project Book for Amazing Architects* (2017), a collection of more than forty suggestions for things to design, draw, and build.

Mr. Ferris and His Wheel

Kathryn Gibbs Davis. Houghton Mifflin Harcourt, 2014.

The story of the invention of the Ferris wheel, built by engineer/inventor George Ferris for the 1893 World's Fair.

Check out the **Lego Architecture** series, with which kids can build everything from the Leaning Tower of Pisa to the White House, Buckingham Palace, the Sydney Opera House, and the Great Wall of China. Also see the Amazing Child Montessori Roman Arch ([this page](#)).

6. Experiment with different art media and techniques to produce original artworks.

Try watercolor and tempera painting, pastels, sidewalk chalk, modeling compounds. Make mobiles, murals, weavings, and recycled sculptures. Fool around.

Music

Kids should participate in a multifaceted music program, including music participation, appreciation, history, and theory.

1. Know the definitions of *scale, staff, and treble clef*; know the names of the lines and spaces of the treble clef.

Names and positions of musical notes can be taught through the familiar acronym FACE (the notes of the space of the treble clef) and EGBDF or Every Good Boy Does Fine (the names of the lines). Kids should be able to sing the C major scale (do, re, mi, fa, sol, la, ti, do). (Try the song “Do Re Mi” from Rodgers and Hammerstein’s *The Sound of Music*.)

2. Identify whole, half, and quarter notes and whole, half, and quarter rests.

There are numerous books and workbooks on music theory for beginners; usually kids learn the rudiments when they begin playing a musical instrument.

3. Experiment with simple musical instruments.

Kids at this age often begin to learn to play the soprano recorder, which is inexpensive, easy to play, and fun for everybody. Other popular choices for young beginners include the piano or keyboard and the violin (available in graded sizes).

The Suzuki method, originally developed for teaching children as young as 3 to play the violin, now has materials for viola, cello, bass, piano, flute, harp, guitar, recorder, organ, and voice. See the Suzuki Association of the Americas at suzukiassociation.org for information.

4. Listen and respond to varied selections by famous composers.

Kids should also listen to multicultural musical pieces: try Chinese bamboo flute music, for example, while studying ancient China, or didgeridoo music while studying Australia. Try pairing musical selections with biographies of composers and other related resource books.

5. Know the names of the instrument families of the orchestra and their individual members.

Kids should recognize individual instruments and be able to group them in families (strings, woodwinds, brass, and percussion). Kids should also be familiar with keyboard instruments: upright and grand piano, harpsichord, and organ.

Drama

For a first introduction to Shakespeare, Lois Burdett's **Shakespeare Can Be Fun** picture-book series, targeted at ages 6–9, was developed with the help of Burdett's elementary students in Canada. The plays are translated into easy-to-understand rhyming couplets and illustrated with colorful kids' drawings. Titles include everything from *A Midsummer Night's Dream* to *Macbeth*.

On Stage: Theater Games and Activities for Kids

Lisa Bany-Winters. Chicago Review Press, 2012.

Improv games, simple scripts, mask making, and other theater activities.

Also by Bany-Winters, see *Show Time! Music, Dance, and Drama Activities for Kids* (2000).

Philosophy and Comparative Religion

Are we rich? Are we poor? How important is it to have lots of things? And why won't you buy me that newest expensive widget? Kids these days are inundated with pitches persuading them to buy, own, or beg for everything from the latest video game to the newest sequined sneakers. How to convince your kids that happiness doesn't come from stuff?

A 2016 article in *The New York Times*, based on a study by psychologist Tim Kasser, author of *The High Price of Materialism*, and financial consultant Nathan Dungan, proposed a six-step solution for kids with the "gimmies":

- Give kids a regular allowance and a place to put it: a piggy bank, Mason jar, or shoebox. Divide the money into three categories: spending, saving, and giving.
- Talk to your kids about your family finances and financial decisions. How do you decide whether or not to buy something? What do you buy that you can't have just one of? Have you ever bought something because somebody else thought you should?
- Differentiate between wants and needs.
- Keep track of what your kids spend—and be aware of what drives them to spend, save, or give, and how they feel about it afterward.
- Find a money mentor. Do you have a friend who's a champion at thrifty living?
- Keep money discussions alive as your kids grow older. Family financial decisions, after all, impact everybody.

The Giving Tree

Shel Silverstein. Harper, 2014.

In this much-debated picture book, a tree loves a boy—and gives him everything she has, until there's nothing left of her but a stump. See the Teaching Children Philosophy website at www.teaching-childrenphilosophy.org for background information and discussion questions.

King Midas and the Golden Touch

Many editions.

King Midas loves gold above all else, but when his fondest wish is granted—that everything he touches turns to gold—he finds that he's made a terrible mistake.

The Rainbow Fish

Marcus Pfister. North-South, 1999.

The gorgeous glittering Rainbow Fish refuses to share his beautiful scales, and that selfishness loses him all his friends. Eventually he takes the advice of a wise octopus and learns that giving is the way to be happy.

The Table Where Rich People Sit

Byrd Baylor. Aladdin, 1998.

Mountain Girl is dissatisfied with her family's simple lifestyle—"I tell my parents they should both get better jobs so we could buy a lot of nice new things. I tell them I look worse than anyone in school"—until her parents point out the wonders of all the nature that surrounds them, and Mountain Girl decides that perhaps her family is rich after all.

Connect philosophy to history studies. For example, Demi's *The Empty Pot*—set in China—is an object lesson in honesty; in the sequel, *The Greatest Power* (Margaret K. McElderry, 2004), the emperor challenges the children of the kingdom to choose the greatest power in the world. Is it money? Weapons? Beauty? A good discussion book.

Health and Physical Education

1. Be familiar with the elements of good nutrition and the structure of the food pyramid.

2. As a general rule, second graders should be able to skip forward and backward; to stop, start, and abruptly change direction while running; to throw and catch a ball accurately from a distance of ten feet; to kick a moving ball; and to dribble and bounce a ball against a wall.

3. Participate in athletic indoor and outdoor activities.

There are many ways for homeschoolers to enjoy an active athletic program. Join a community children's soccer team; take swimming, gymnastics, or dancing lessons; skate; hike; and ride a bike. It all counts.

4. The truth about sex, depending on who's asking what when.

It's So Amazing

Robie Harris. Candlewick, 2014.

Generally recommended for ages 7 and up, this provides all the answers about eggs, sperm, birth, babies, and families with cheerful, comic book-style pictures.

Where Did I Come From?

Peter Mayle. Lyle Stuart, 1973.

Perennially popular, this provides "the facts of life without any nonsense" for ages 6–9.

Life Skills

Kids by now should be able to do basic household chores such as dusting, sweeping, and folding clothes, doing dishes, and feeding pets. They should also be able to help with outdoor chores, which—depending on your

lifestyle—may include watering and weeding the garden, picking vegetables, collecting eggs, and feeding and watering animals.

They should be able to count and make change, and help make out a grocery list and compare prices at the store.

They should understand the responsible maintenance of outdoor toys and equipment, such as bicycles, skis, sleds, and skates. In other words, don't leave your bike out in the rain.

Computer and Technology Skills

Kids should continue to add to their existing computer skills.

It's generally recommended that kids begin formal keyboard typing somewhere between the ages of 7 and 10, depending on development of adequate hand-eye coordination. Available for beginners are learning keyboards, which have oversized (up to a square inch) color-coded keys.

1. Perform basic formatting tasks, including choices in font, style, and color, and use of bold, italic, and underlined words and letters.

2. Type short written pieces.

3. Use consistent spacing.

4. Use the return and tab keys.

5. Create graphic organizers for a range of subjects and topics.

Graphic organizers, or knowledge maps—of which there are many different types—are intended to help kids structure writing, brainstorm research,

classify ideas and concepts, solve problems, and communicate more effectively. Examples include webs, story and mind maps, KWL (know, want to know, learned) charts, and Venn diagrams. Dozens of examples and printable organizers are available online.

6. Continue to emphasize safe online behavior.

7. Expand on knowledge of coding. (See [this page](#), [this page](#).)

Engineering

Depending on your kids' interests, you might study bridges and buildings.

Bridges!

Jennifer Swanson. Nomad, 2018.

All about bridges, including types of bridges, famous bridges, and bridge engineering and design. Included are twenty-five bridge-related hands-on projects.

In this same series, see *Canals and Dams* (Anita Yasuda), *Skyscrapers* (Elizabeth Schmermund), and *Tunnels* (Jeanette Moore).

Pop's Bridge

Eve Bunting. Houghton Mifflin Harcourt, 2006.

Robert's father is helping to build the Golden Gate Bridge, hailed as an engineering marvel when it was finished in 1937.

Sky Boys: How They Built the Empire State Building

Deborah Hopkinson. Dragonfly, 2012.

A kid's view, from beginning to end, with a top-down look at New York City in 1931.

Twenty-One Elephants and Still Standing

April Jones Prince. Houghton Mifflin Harcourt, 2005.

When the Brooklyn Bridge was completed in 1883, it took P. T. Barnum and a parade of twenty-one elephants to convince people that it was safe to cross.

Young Engineers Series

Tammy Enz. Heinemann, 2017.

Each book in this series provides easy-to-understand background information and simple projects, illustrated with color photographs. Titles include *Building Bridges*, *Building Structures and Towers*, *Building Vehicles That Fly*, and *Building Vehicles That Roll*.

See Engino's **Structures: Buildings & Bridges** kit, with which kids can make nine different models (www.engino.com); or, from Thames & Kosmos, **Structural Engineering: Bridges and Skyscrapers**, with which kids can build twenty different models; and **The Big Engineering Makerspace science experiment** kit, which includes twenty-two models of real-world machines, among them a hydraulic lift, robotic arm, helicopter, and jet boat (www.thamesandkosmos.com). All appropriate for ages 8 and up.

CHAPTER 8

Grade Three

It should be noted that children at play are not merely playing about; their games should be seen as their most serious-minded activity.

—MONTAIGNE

Third grade is when kids usually first encounter standardized tests.

Possibly the worst thing we've ever taught a kid is to ask the question "Is this going to be on the test?" Despite protests from both parents and teachers about the damage to education done by "teaching to the tests," the public school system and most colleges continue to emphasize standardized testing. In some states, standardized tests are required of all homeschooled students. Our experience with these has been, admittedly, minimal. Ethan and Caleb, our youngest sons, both took the SATs in high school. Josh, our oldest, dug in his heels, claiming—justifiably, we thought—that the SAT could not possibly have much to say about the quality or quantity of his education.

When Josh was in third grade, however, we were living in Colorado, and Josh had to take the California Achievement Test (CAT). The test, given over the period of a week, was a maddening experience. Josh, who could read fluently, thought the phonics section was stupid and said so, repeatedly; and a major bone of contention was a series of questions on

fiction versus nonfiction (pick one). Josh ground to a halt on “Cats can talk?” which—he perspicaciously pointed out—was probably supposed to be fiction, but actually cats can communicate by meowing, so isn’t that a form of talking? I suspect the path was set here for rejecting the SATs.

Standardized test requirements vary from state to state. Common choices are the Iowa Test of Basic Skills (ITBS), the STAR tests (the Standardized Test for Assessment of Reading, now extended to include math), and, a more recent addition, the PARCC tests (Partnership for Assessment of Readiness for College and Careers) in math and language arts, paired to state standards and given annually to kids in grades three through eight.

For those facing standardized tests, there are many test prep and test practice possibilities available, and it’s best to prepare your kids for how tests work. Fill-in-the-bubbles is not a skill that comes naturally.

5-Minute Daily Practice: Test Taking

Jacqueline B. Glasthal. Scholastic, 2003.

Nearly 200 quick practice exercises for standard test formats, including multiple choice, true/false, fill-in-the-blank, and more.

Language Arts

Reading

Once kids have mastered the technical hurdles of learning to read, reading “instruction” becomes largely a matter of practice. As well as being read to, kids should simply be encouraged to read on their own, moving from picture books to short chapter books and on to increasingly complex works of literature as it suits them.

What about condensed books? I have to say I’ve never been a fan. Why, I thought, take a perfectly good book and pare it down to a pitiful shadow

of its original self? Then Josh, age 7, came across a box of Great Illustrated Classics in a used book store and begged that we buy them.

The Great Illustrated Classics (www.greatillustratedclassics.com) are hardbound classic titles, abridged and adapted for young readers. Josh's original ten—we still have them—were *The Adventures of Sherlock Holmes*, *Around the World in 80 Days*, *The Phantom of the Opera*, *Black Beauty*, *David Copperfield*, *Moby Dick*, *The Strange Case of Dr. Jekyll and Mr. Hyde*, *A Journey to the Center of the Earth*, *The Hunchback of Notre Dame*, and *The Man in the Iron Mask*. Josh loved them, so not long after we added more. And, for all my carping, they were a great success.

Josh quickly became familiar with the stories and characters, and he was tickled to be reading “grown-up books.” When he was older and ready to move into the unabridged adult versions of the classics, he was unintimidated and well prepared. To this day, ask him about favorite books and he'll always mention *Moby Dick*—which he fell in love with via the Great Illustrated Classics.

For somewhat older or more advanced readers, a similar series is the Classic Starts series (Sterling), 160-page abridged versions of many classics, among them *Treasure Island*, *The Adventures of Robin Hood*, *The Odyssey*, and *The Story of King Arthur and His Knights*.

Also see the Junior Great Books ([this page](#)), which for grade three includes both fiction and nonfiction components. Fiction themes include such selections as “The Magic Listening Cap,” “The Ugly Duckling,” and “The Emperor's New Clothes,” paired with challenging open-ended discussion questions.

1. Know common third-grade-level sight words.

From the Sight Words Lists ([this page](#)), third-grade words include *about*, *better*, *eight*, *laugh*, *myself*, *never*, *today*, *together*, and *warm*.

2. Decode phonetically regular multisyllabic words.

That is, using their knowledge of phonics, kids should be able to decipher such long but logical words as *abracadabra*.

3. Identify antonyms, synonyms, homophones (homonyms), and homographs.

Homophones are words that sound the same but are spelled differently and have different meanings, such as *there*, *their*, and *they're*. Homographs are words that are spelled the same but have different pronunciations and meanings, as in *lead* (in pencils) and *lead* (the opposite of follow).

4. Use the index, glossary, and table of contents to locate information in books.

5. Read grade-appropriate fiction and nonfiction material fluently, both silently and aloud.

Often suggested for grade three:

Bunnicula

Deborah and James Howe. Aladdin, 1979.

The newest pet in the Monroe household is a suspicious, possibly vampiric, bunny. Narrated by Harold, the family dog.

Ella Enchanted

Gail Carson Levine. HarperCollins, 2017.

In this Cinderella tale, Ella is inadvertently cursed by the fairy Lucinda, whose gift of obedience means that Ella—who has to do everything she's told—is fair game for her loathsome stepmother and wretched stepsisters.

Freddy the Detective

Walter R. Brooks. Overlook Press, 2010.

Freddy the Pig, after reading about Sherlock Holmes, sets himself up as a detective. One of a series starring the irrepressible Freddy, his animal friends on the Bean farm, and Simon the Rat and his gang of villains.

From the Mixed-Up Files of Mrs. Basil E. Frankweiler

E. L. Konigsburg. Atheneum, 1998.

Claudia and Jamie run away from home to live in the Metropolitan Museum of Art, where they discover a statue that just might be the work of Michelangelo.

Harriet the Spy

Louise Fitzhugh. Yearling, 2001.

Harriet writes down everything she knows about everyone in her notebook—but disaster strikes when the notebook falls into the wrong hands.

The Hobbit

J. R. R. Tolkien. Houghton Mifflin Harcourt, 2012.

The hobbit Bilbo Baggins sets off with thirteen dwarves and a wizard to defeat a dragon.

James and the Giant Peach

Roald Dahl. Puffin, 2007.

James, since his parents were killed by a rhinoceros, has been living with his dreadful aunts, Spiker and Sponge. That is, until he drops some magic crystals under the old peach tree.

Mrs. Frisby and the Rats of NIMH

Robert C. O'Brien. Aladdin, 1986.

Mrs. Frisby, a widowed mouse with four small children, needs to move her home—and gets help from the intelligent neighboring rats, survivors of experiments by the National Institute of Mental Health (NIMH).

The Phantom Tollbooth

Norton Juster. Bullseye Books, 1988.

A tollbooth mysteriously appears in Milo's room and takes him on a marvelous and word-witty journey to rescue the princesses Rhyme and Reason.

The Search for Delicious

Natalie Babbitt. Square Fish, 2007.

Young Gaylen is sent off to poll the kingdom for the definition of *delicious* for the new royal dictionary, but his journey becomes a far more complicated quest.

6. Show comprehension by answering questions about a finished text.

This is best accomplished naturally, in the course of ordinary conversation. Or try making your own book trivia game.

7. Experience a wide range of literature selections, including fiction and nonfiction books, multicultural folktales, myths and legends, and poetry.

Tales from the Arabian Nights

Donna Jo Napoli. National Geographic, 2016.

A gorgeously illustrated collection of tales from *One Thousand and One Nights*, including the stories of Aladdin, Ali Baba and the Forty Thieves, and more.

World Myths and Legends

Kathy Ceceri. Nomad, 2010.

An overview of myths and legends from the Middle East, Europe, Africa, Asia, Australia, and the Americas, with associated hands-on projects.

National Mythology Exam

www.etclassics.org

From Excellence Through Classics, the National Mythology Exam is an annual contest on Greek and Roman mythology for grades three through twelve.

8. Know the meanings of simile, metaphor, alliteration, and onomatopoeia.

Crunch and Crack, Oink and Whack!

Brian P. Cleary. Millbrook Press, 2019.

Celebrate Onomatopoeia Day with the kids of Clip-Clop Elementary School.

Froodle

Antoinette Portis. Roaring Brook Press, 2014.

All the birds caw, coo, chip, or peep—except for Little Brown Bird, who comes up with “Froodle.” Pair with bird song recordings.

A Mouthful of Onomatopoeia

Bette Blaisdell. Capstone Press, 2014.

Chomp, squeak, crunch, and crack! A photo-illustrated introduction to onomatopoeia.

9. Differentiate between fiction and nonfiction, and biography and autobiography.

10. Follow multi-step written instructions.

Examples: follow the instructions for building a model, playing a board game, or assembling household items.

Writing

In third grade, kids usually make the transition from manuscript handwriting to cursive. There are numerous commercial programs available for this—or you can invent your own, which is what we did. All you need is a paper tablet with ruled lines and a reasonable recollection of what your third-grade teacher’s handwriting looked like. Our kids promptly pointed out that neither my personal handwriting nor their father’s looked remotely like the handwriting I was foisting upon them. We convinced them to learn this introductory technique by telling them that they could branch out on their own later, provided they managed to be legible.

In recognition of their developing motor skills, third graders are usually given writing paper with narrower horizontal lines, but still with a broken midline for guidance purposes.

1. Switch to cursive in written work, with practice to perfect letter shapes, size, slant, and spacing.

2. Write frequently, exploring a range of genres, including stories, personal narratives, poems, essays, and reports.

Suggestions for young writers include keeping a journal, maintaining a book diary, writing a family newsletter, and corresponding with a pen pal. Kids should be familiar with the process of proofreading, editing, and revising a written work.

There are many sources online for writing prompts and story starters for kids of all ages.

The Mysteries of Harris Burdick

Chris Van Allsburg. Houghton Mifflin Harcourt, 1984.

A collection of fourteen black-and-white pictures, each with a mysterious title and a suggestive line or two of text. “Mr. Linden’s Library,” for example, shows a girl who has fallen asleep with an open book, from which a leafy vine is now sprouting. “He had warned her about the book,” the text reads. “Now it was too late.” Great as story starters.

3. Organize writing in coherent paragraphs.

Kids should be able to research a topic using different sources and present their findings in the form of an organized report, divided into paragraphs. Each paragraph should begin with an indented topic sentence, followed by supporting facts and/or additional details.

My Crazy Dog: My Narrative Essay

Darcy Pattison and Ewa O’Neill. Mims House, 2015.

Targeted at 5- to 10-year-olds, this series of picture books shows kids how to write various kinds of essays. Other titles are *I Want a Dog: My Opinion Essay*, *I Want a Cat: My Opinion Essay*, and *My Dirty Dog: My Informative Essay*.

4. Know and use the correct format for a friendly letter, including heading, salutation, body, and closing. Know the correct way to address an envelope.

Check online for instructions for making your own cool envelopes. Decorate them!

5. Distinguish between complete and incomplete sentences.

Kids should be able to identify the subject and predicate of a sentence and identify the four major sentence types: declarative (“I see a dog.”), interrogative (“Do you see a dog?”), imperative (“Drop the bone.”), and exclamatory (“He bit me!”).

6. Use capital letters correctly.

7. Use periods, question marks, exclamation points, and quotation marks correctly. Use commas between the day and year when writing a date, between city and state when writing an address, and in series within sentences.

Eats, Shoots & Leaves

Lynne Truss. G. P. Putnam's Sons, 2006.

This is the picture-book version of Truss's popular grammar book for adults, subtitled *Why, Commas Really Do Make a Difference!* Funny captioned illustrations demonstrate how a comma in the wrong place can lead to disaster.

In the same format, see Truss's *The Girl's Like Spaghetti* (2007) and *Twenty-Odd Ducks* (2008).

8. Use apostrophes in contractions and for singular and plural possessive nouns.

9. Identify common prefixes and suffixes.

Third graders should be able to deal with such prefixes as *re-*, *un-*, and *dis-*, and such suffixes as *-less*, *-ly*, *-er*, and *-or*.

See Robin Pulver's *Happy Endings: A Story About Suffixes* (Holiday House, 2012), Brian P. Cleary's *-Ful and -Less, -Er and -Ness: What Is a Suffix?* (Millbrook Press, 2016), and Cleary's *Pre- and Re-, Mis- and Dis-: What Is a Prefix?* (2015).

10. Know common abbreviations.

Kids should know, for example, the spellings and proper abbreviations of the months of the year, days of the week, titles (Mr., Ms., Dr., Capt.) and locations (Rd., St., Ave.).

The Gammage Cup

Carol Kendall. Houghton Mifflin Harcourt, 2000.

In this charmer of a chapter book, the land of the Minnipins is ruled by the elite Periods, whose names are abbreviations: Ltd., Co., Bros., Wm., Geo., Eng., Scot., Etc., Rd., St., and Ave. A great fantasy adventure with a lesson on tolerance.

11. Identify nouns, proper nouns, pronouns, verbs, and adjectives. Know the past, present, and future tenses of verbs.

12. Use conventional spelling for the bulk of written work.

Third graders are generally expected to have reached the transitional or correct stages of spelling ([this page](#)). They should be familiar with the rules of consonant doubling, know how to spell the plurals of words ending in y, and know the spellings of common homophones.

Listening and Speaking Skills

1. Make short oral reports.

Encourage kids to take turns giving oral reports on particular topics of interest, descriptions of a good book they've recently read, or accounts of a field trip, extracurricular class, or social event. Try show-and-tell in the living room. Serve cookies.

2. Tell stories to a group. Present short dramatizations.

3. Memorize and recite short poems.

Some suggestions include “Mother Doesn’t Want a Dog” by Judith Viorst, “My Shadow” by Robert Louis Stevenson, “Eletelephony” by Laura Elizabeth Richards, and “Clouds” by Christina Rossetti.

Study Skills

1. Be able to use the dictionary, encyclopedia, and thesaurus.

Kids will most likely—and most routinely—encounter these online.

2. Alphabetize materials to the third or fourth letter.

3. Be familiar with the use of the library.

Brian P. Cleary’s *Do You Know Your Dewey?* (Millbrook Press, 2012) is an exploration of the Dewey Decimal Classification (DDC) system for ages 7–

11.

Based on the ten main classes of the DDC and a lot of poking around on the library shelves, our kids each came up with personal DDC reading lists—one book per class. (Try it!)

Noah Webster and His Words

Jeri Chase Ferris. Houghton Mifflin Harcourt, 2015.

Webster's American Dictionary is the second-most-popular book printed in English. Learn all about Noah Webster and his dictionary in this clever and hilariously illustrated picture book.

Also see *Noah Webster's Fighting Words*, by Tracy Nelson Maurer (Millbrook, 2017).

The Right Word

Jen Bryant. Eerdmans, 2014.

The picture-book story of Peter Roget and his thesaurus, gorgeously illustrated by Melissa Sweet.

4. Follow multi-step oral and written directions.

Mathematics

Traditional landmark math events for kids in third grade are the acquisition of the times tables and the introduction of the concept of long division. Many of the listed topics are expansions of skills introduced in earlier grades. A ready knowledge of the basic arithmetic facts has many useful applications, both practical and academic, and it's a good idea for kids to get these under their belts.

On the other hand, it's hard to find a child who simply enjoys repetitive workbook pages. Ours didn't, and in hindsight I should have dropped them sooner. Most of us—admit it—remember long division problems as dull, if

not awful, and yet even in the age of calculators we continue to load these on our kids.

Some Alternatives or Supplements for Conventional Math

- **Logic puzzles**

There are dozens of books of logic puzzles and brainteasers available for kids of all ages, as well as many online sources.

- **Jigsaw puzzles**

There are versions for kids of all ages; also see blank design-your-own puzzles.

- **Cartesian art**

Sometimes known as “coordinate picture graphing,” these are basically connect-the-dots puzzles using coordinate graphing skills. Many activity books are available, as well as online sources.

- **Games**

Mancala, one of the world’s oldest games, is a two-player “count and capture” game with simple rules that encourage strategy and mathematical thinking. Many versions are available from toy and game stores; you can also make your own game (you’ll need an egg carton) or play online against a computer.

Among many other mathematical game possibilities are such old favorites as Yahtzee, Monopoly, chess, checkers, and backgammon. Qwirkle (Mindware), appropriate for a wide range of ages, is played like Scrabble but involves pattern making rather than spelling; and Clue (Hasbro) is a board-game exercise in deductive reasoning (Colonel Mustard? In the library? With the rope?). Also see Set ([this page](#)).

You can also invent your own board games—a great project—with nothing more than a sheet of cardboard or poster board, dice, markers, and small counters or figurines.

- **Coloring books**

Add a box of colored pencils and enjoy math. There are many coloring books devoted to tessellations, geometric patterns, fractals, mandalas, and other designs. See, for example, Alex Bellos's *Patterns of the Universe: A Coloring Adventure in Math and Beauty* and *Visions of the Universe: A Coloring Journey Through Math's Great Mysteries* (The Experiment, 2015 and 2016).

- **Origami**

There are many varied instruction books, with themes that include everything from animals and flowers to Star Wars and Pokémon.

Origami in Action: Paper Toys That Fly, Flap, Gobble, and Inflate

Robert J. Lang. St. Martin's Griffin, 1997.

Math/origami expert Robert Lang has instructions for everything from a flapping butterfly to (our favorite) a blow-up bunny.

- **Pop-Up cards**

See Joan Irvine's *How to Make Super Pop-Ups* (Dover, 2008), which includes instructions for over thirty projects.

For more of a challenge, try *Paper Automata* by Rob Ives (Dover, 1998), which has four working models to cut out and assemble, including a trio of running sheep and a pecking hen.

More Math Resources

See Miquon Math and other resources ([this page](#)).

The Adventures of Penrose, the Mathematical Cat

Theoni Pappas. Wide World, 1997.

Penrose investigates everything from zero to fractals, soap bubbles, infinity, polyhedrons, and a Fibonacci rabbit in short, catchy chapters.

Also by Pappas, see *Fractals, Googols and Other Mathematical Tales* (1993).

Cool Art with Math and Science Series

Anders Mann Hanson. Checkerboard Publishing.

This series features hands-on projects and activities with photo-illustrated instructions. Titles include *Cool Paper Folding*, *Cool Structures*, *Cool Optical Illusions*, *Cool Tessellations*, *Cool Flexagon Art*, and more.

G Is for Googol

David M. Schwartz. Tricycle, 1998.

An information-packed math alphabet book, from *abacus* and *binary* through *X-axis* and *zillion*.

The Grapes of Math

Greg Tang. Scholastic, 2004.

Clever mind-stretching math riddles, with humorous rhymes and bright illustrations.

Many titles, among them *Math Potatoes*, *Math for All Seasons*, *Mathterpieces*, and *The Best of Times*.

How Many Guinea Pigs Can Fit on a Plane?

Laura Overdeck. Feiwel and Friends, 2017.

How many bees does it take to make a jar of honey? How many soccer balls would fit inside a hollow Earth? Irresistible math questions for ages 7–11.

MathART

Carolyn Ford Brunetto. Teaching Resources, 1999.

Creative arts and crafts projects categorized under geometry, numbers and computation, measurement, patterns, statistics, and fractions. For example, kids make stained glass windows, pop-up cards, abacuses, mobiles, tessellations, and fraction quilts.

Mathematicians Are People Too

Luetta Reimer and Wilbur Reimer. Dale Seymour, 1995.

Well-written, lightly fictionalized stories from the lives of fifteen great mathematicians, including Pythagoras, Archimedes, Newton, and Euler. Volume 2 introduces another fifteen, among them Euclid, Descartes, and Benjamin Banneker.

Math Adventure Series

Cindy Neuschwander. Charlesbridge.

This series features the mathematical adventures of Sir Cumference, his wife, Lady Di of Ameter, and their son Radius. In *Sir Cumference and the First Round Table*, for example, a helpful carpenter (Geo of Metry) uses math to create the perfect treaty table; *Sir Cumference and the Dragon of Pi* features a transformation spell, a fire-breathing dragon, and magic involving circles. Many titles.

Number Theory

1. Know numbers through the hundred thousands, and be able to write these in both numerals and words. (But everybody loves even bigger numbers.)

Millions, Billions, & Trillions

David A. Adler. Holiday, 2014.

Understanding big numbers for ages 6 through 9, with lots of cool examples. (A quarter cup of sugar contains about one million sugar granules.)

2. Order and compare numbers to 999,999 using greater than (>), less than (<), and equals (=) signs.

3. Be able to count by twos, threes, fives, and tens, and by tens starting with any given number.

4. Understand place value through the hundred thousands.

5. Round numbers to the nearest ten and hundred.

6. Be able to write numbers in expanded form through the thousands.

For example: $7,863 = 7,000 + 800 + 60 + 3$.

7. Review the concept of odd and even numbers.

8. Identify ordinal numbers through one hundredth.

9. Know the meaning of square numbers.

Kids should use concrete models to establish the concept of square numbers. Using Cuisenaire rods or equivalent manipulatives, for example, kids can build the perfect squares from 2×2 to 10×10 , demonstrating, for example, that two 2-bars (a total of 4) forms a perfect square. Kids should know the perfect squares and square roots through 100 and should recognize the square root sign.

10. Know Roman numerals from I to XX (1 to 20).

See Arthur Geisert's *Roman Numerals I to MM* (Houghton Mifflin Harcourt, 2001), a clever search-and-count book with many pigs, and David Adler's delightfully illustrated *Fun with Roman Numerals* (Holiday House, 2009).

11. Understand the concept of negative numbers.

Kids should experiment with negative numbers, using a number line that lists numbers below zero. They should also be introduced to the use of negative numbers in daily life, as in below-zero temperatures. (This is particularly easy if you live in Vermont or Minnesota.)

12. Identify and compare basic fractions such as $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{10}$.

Kids should know the meaning of *numerator* and *denominator*. They should be able to compare fractions with like denominators using greater than ($>$), less than ($<$), and equal to ($=$).

13. Recognize and write mixed numbers.

Mixed numbers are numbers that combine a whole number and a fraction, as in $3\frac{1}{2}$.

14. Read and write decimal numbers through the hundredths place.

Kids should model decimals using base-10 blocks and grid paper. They should also know the decimal equivalents of $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$.

15. Collect, organize, and analyze data using bar and line graphs.

A good resource here is Dawn McMillan's *Wildlife Scientists* (Teacher Created Materials, 2008), which presents graphs, charts, and data analysis through real-life science studies: Ian Stirling's research on polar bears and Jane Goodall's on chimpanzees.

16. Locate points on a coordinate grid.

The idea of plotting points on a two-dimensional grid originated with French mathematician René Descartes, which is why this form of mathematical representation is called a Cartesian graph. In this first introduction to Cartesian graphing, kids should learn the names and positions of the x and y axes and how to locate a point on a grid based on known values of x and y .

See graph art workbooks, in which kids make connect-the-dot pictures based on Cartesian graphing skills, or play a game of Battleship. Battleship (Hasbro), the board game, includes

battleship boards, plastic ships, and pegs to designate hits (red) or misses (white). Players attempt to sink their opponent's ships using coordinate locations. Also see versions of Battleship online.

A Fly on the Ceiling

Julie Glass. Random House, 1998.

The tale of how Descartes—known as the father of analytical geometry—just may have come up with Cartesian graphing by watching a fly.

Operations

1. Review basic addition and subtraction facts.

2. Recognize addition and subtraction as inverse operations.

Kids should know that addition can be used to check the answers to subtraction problems and vice versa.

3. Add and subtract, with and without regrouping, with numbers of up to five digits.

4. Know basic multiplication facts through 10×10 .

5. Multiply two- and three-digit numbers by single whole numbers.

6. Estimate answers to addition, subtraction, and multiplication problems.

7. Recognize multiplication and division as inverse operations. Know the definitions of *dividend*, *divisor*, and *quotient*.

8. Divide two- and three-digit numbers by single whole numbers.

Kids should know that division problems can be checked by multiplying, and they should be able to solve division problems involving remainders.

9. Understand the use of parentheses in mathematical sentences to indicate the order of operations. (That is, whatever is in parentheses is done first.)

10. Solve two-step word problems using all four basic arithmetic operations.

11. Recognize and continue repeating patterns with numbers, symbols, or manipulatives.

12. Apply mathematical knowledge to other areas of the academic curriculum and to everyday situations.

Money and Measurement

1. Write amounts of money using dollar or cent signs and decimal points.

2. Perform basic arithmetical operations with money.

Kids should be able to add and subtract money amounts, and multiply and divide money amounts by single-digit whole numbers.

Mathematics is intended not only to prepare kids for mathematically oriented careers in astrophysics, biochemistry, and accounting but also to provide them with the numerical skills essential for daily life. This is perhaps best done by simply integrating arithmetic into the day's occupations: cooking, carpentry, or trips to the supermarket.

Try inventing a financial program of your own. Ours, which started when Josh was 9, Ethan 8, and Caleb 6, was part game, part slapstick comedy, and part mathematical challenge. It was an unfailing source of entertainment, and also gave the kids a feel for the process of real-life money management.

At the beginning, each boy laid the groundwork for the program by establishing his own imaginary home and business, complete with business cards and logos, building plans, pets, gardens, and means of transportation. Josh thus became the proprietor of the Black Cat Bookstore (rare and old books); Ethan became a freelance astronomer, supported by a research grant from the National Star Association; and Caleb became the owner of the Movement Robot Store, a small factory devoted to the manufacture of robots, all with amazing abilities.

Props for the program included packets of checks, deposit slips, and transaction record books left over from old bank accounts. We launched the program by providing each business with a wholly imaginary bank balance of \$1,000. Thereafter, each week, each businessperson received a handful of envelopes, each containing index cards noting various financial happenings: profits and losses, bills, unexpected expenses. The boys deposited money in their checking accounts, made car and insurance payments, paid telephone and electric bills, bought fuel, and paid taxes. They also balanced their checkbooks weekly, unlike their reprehensible parents.

And there are endless permutations. State and federal income taxes must be paid (we made copies of the official forms for each kid); donations are made to charities; pets are taken to the vet for rabies shots; and personal cars, planes, submarines, and hovercraft periodically break down. The astronomer receives an award for discovering a comet; the Black Cat Bookstore wins an award for Best Halloween Storefront Decorations; the Movement Robot Store invents a poodle-grooming robot that sells like hotcakes when the National Poodle Society comes to town.

There are commercial games that involve buying and selling—famously, Monopoly—but none ever quite had the appeal of the one we invented for ourselves.

Explore Money!

Cindy Blobaum. Nomad, 2014.

A short history of money and information on coins, bills, and banks, with twenty-five hands-on projects.

You Wouldn't Want to Live Without Money!

Alex Woolf. Franklin Watts, 2015.

From barter to banking, with clever cartoon illustrations.

3. Select appropriate measuring instruments for determining length, surface area, volume (liquid and dry), and weight using standard and nonstandard units.

Kids at this grade level should know English and metric measures for length, surface area, volume/capacity, and weight/mass.

They should know the accepted abbreviations for each unit and be able to identify approximate equivalencies between and within English and metric systems. That is, they should know that 3 feet equals 1 yard (within the system) and that 1 yard equals about 1 meter (between systems).

4. Measure temperature in both degrees Fahrenheit and Centigrade (Celsius).

Kids should know the freezing and boiling points of water in both systems.

5. Tell time to the nearest minute.

Kids should know the difference between A.M. and P.M.; be able to use a calendar to determine month, day, and date; and know the meaning of the terms *decade* and *century*.

You Wouldn't Want to Live Without Clocks and Calendars!

Fiona MacDonald. Scholastic, 2015.

From early astronomical observations to the latest in timekeeping technology, with humorous cartoon illustrations.

Geometry

Continue to reinforce and expand upon geometric concepts from previous years. Play with geometric puzzles and toys.

Spirograph

A geometric drawing toy made of interlocking gears and wheels with which kids can make spectacular spiraling designs of all kinds.

Kaleidograph

A paper kaleidoscope that generates many different patterns by rotating and flipping a collection of die-cut cards. Available in several versions.

Archimedes Square Stomachion Puzzle

Perhaps the world's oldest puzzle—said to have been developed by Archimedes himself more than two thousand years ago—this consists of a square tray containing fourteen polygons of different shapes and sizes. Mathematics research tells us that there are more than five hundred possible solutions.

Azul

Plan B Games

A gorgeous tiling board game based on Moorish art. For two to four players ages 8 and up.

1. Recognize and identify basic and more complex two-dimensional figures.

Kids should be familiar with the triangle, square, rectangle, and circle, as well as such multisided polygons as the pentagon, hexagon, and octagon.

See Norton Juster's *The Dot and the Line* (Chronicle Books, 2000), in which a creative line woos the dot away from a slothful squiggle by turning himself into a wonderful array of polygons; and Marilyn Burns's *The Greedy Triangle* (Scholastic, 2008), in which a piggish triangle demands more and more additional angles.

2. Recognize and identify common three-dimensional figures (geometric solids).

Kids should be familiar with the sphere, cube, rectangular solid, pyramid, cone, and cylinder.

Mummy Math

Cindy Neuschwander. Henry Holt, 2005.

On a trip to Egypt, Matt, Bibi, and dog Riley are trapped in a pyramid—and can escape only by deciphering the geometry-based hieroglyphics on the walls. Introduces kids to eight geometric solids.

3. Recognize and identify horizontal, vertical, parallel, and perpendicular lines.

Kids should also know the definitions of *point*, *line segment*, and *ray*.

4. Define *vertex* and *angle*.

Kids in third grade should know how angles are identified by letter names and be able to describe and recognize right angles.

Explore Shapes and Angles!

Jeanette Moore. Nomad Press, 2017.

Includes a timeline of geometry history, “Words to Know” lists, and twenty-five hands-on projects involving patterns, lines, curves, and shapes. For example, kids identify the angles in American Sign Language and design their own treehouse.

What's Your Angle, Pythagoras?

Julie Ellis. Charlesbridge, 2004.

A picture book about young Pythagoras and his discovery of his famous theorem.

Also by Ellis, see *Pythagoras and the Ratios* (2010), in which Pythagoras explores the mathematics of music.

5. Compare and contrast similar and congruent figures.

Congruent figures have the same size and shape; similar figures have the same shape but are different in size. Kids should be able to identify these regardless of orientation or position. They should also be able to define what kind of positional change a geometric figure has undergone: a slide, a rotation, or a flip.

6. Calculate perimeter and area.

7. Define and measure circumference and diameter.

Initial investigations of circumference should involve hands-on measurements of circles of various sizes (try pieces of string or cloth measuring tapes).

For a great family project, see online instructions for building versions of Stonehenge in your own backyard—or make a miniature Stonehenge model using clay or salt-dough, or try a Stonehenge model kit. All good practice in circles, with a history connection.

History and Geography

The mandated presentation of history varies widely from state to state and from packaged curriculum to packaged curriculum. In this guideline, kids continue to expand upon past history lessons, covering in greater depth

American history topics introduced in first and second grade and continuing ongoing world history narratives.

KEEPING HISTORY IN ORDER

Timeline (Asmodee) is a timeline-building card game for two to eight players, ages 8 and up. There are several game versions, including American History, Americana, Discoveries, Inventions, and Diversity, all of which are additive. You can also make your own with nothing more than a pack of index cards. Write the date on one side and a description (with optional illustration) on the other. Try putting them in order!

Also see timelines, [this page](#).

The World Series

Genevieve Foster. Beautiful Feet Books.

Genevieve Foster's World series are horizontal history books that show—through an interesting kid-friendly text—what was happening in various countries around the world during the lifetimes of featured famous people. For example, what was happening in China when George Washington was a boy? Titles are *Augustus Caesar's World*, *The World of Columbus and Sons*, *The World of Captain John Smith*, *George Washington's World*, and *Abraham Lincoln's World*.

Diary of a Time Traveler

David Long. Wide Eyed Editions, 2015.

Augustus, with the help of a magic diary, sets out on a tour of time from the Stone Age to the moon landing, meeting all the greats of history along the way.

Turn of the Century: Eleven Centuries of Children and Change

Ellen Jackson. Charlesbridge, 2003.

The book begins with John, son of Stephen, a 10-year-old peasant boy in the year 1000, and proceeds in hundred-year leaps to modern times. Each child's story is accompanied by an informative list of what life was like in his/her century.

American History

1. Pre-Columbian civilizations.

Topics to cover include the Maya, Aztec, and Inca Empires.

From the True Books: Ancient Civilizations series (Scholastic), see *The Ancient Maya* (Jackie Maloy, 2010); *The Aztec Empire* (Sunita Apte, 2010); and *The Inca Empire* (Sandra Newman, 2010).

Nicely designed, short, photo-illustrated texts, with associated resource lists.

Aztec

Laura Scandiffio. Annick Press, 2009.

What if kids in ancient times had had blogs? Check out this one by 12-year-old Yoatl, who lives in the Aztec capital of Tenochtitlán.

Great project: invent historical kids' blogs of your own.

Aztec, Inca & Maya

Elizabeth Baquedano. DK, 2011.

One of the books from the Eyewitness series, this covers Central American cultures from pre-Columbian Mesoamerica to the Spanish conquest, illustrated with maps and photos of artifacts.

Aztec News

Philip Steele. Candlewick, 2009.

What if ancient civilizations had daily newspapers? The *Aztec News* includes an account of the latest ball game, notes on farming, politics, and religion, and the headline "Invaders Flee City!"

Ballplayers and Bonesetters

Laurie Coulter. Annick Press, 2008.

Your job in ancient America: would you have been a high priest, a latrine boatman, or a slave? An account of life with the ancient Aztecs and Maya before the Spanish conquest.

Frozen Girl: The Discovery of an Incan Mummy

David Getz. Square Fish, 2018.

The story of the discovery of the five-hundred-year-old mummy of a 13-year-old Inca girl in the mountains of Peru.

You Wouldn't Want to Be an Aztec Sacrifice!

Fiona MacDonald. Franklin Watts, 2013.

Also see *You Wouldn't Want to Be a Mayan Soothsayer!* (Rupert Matthews, 2007) and *You Wouldn't Want to Be an Inca Mummy!* (Colin Hynson, 2007).

2. Survey Native American life and culture.

See Joy Hakim's *A History of US: The First Americans* ([this page](#)).

Kids should compare the cultures and lifestyles of a variety of tribes from different regions of the country, such as the Iroquois and Abenaki of the Northeast, the Cherokees of the Southeast, the Lakota Sioux of the Great Plains, the Hopi and Navajo of the Southwest, and the Chinooks of the Pacific Northwest. Studies should be supplemented with fiction and nonfiction books, native legends, and hands-on projects and activities. For example, kids might make sand paintings, pottery, or model totem poles, experiment with native recipes, or plant a Native American garden.

Explore Native American Cultures

Anita Yasuda. Nomad Press, 2013.

Introduces readers to the seven main Native American cultural regions, with twenty-five related projects.

Native American History for Kids

Karen Bush Gibson. Chicago Review Press, 2010.

A comprehensive overview, supplemented with timelines, maps, reproductions, photos, and capsule biographies of famous people. Included are twenty-one hands-on projects and activities.

True Books: Native Americans

Various authors. Children's Press.

Each 48-page book features a different Native American tribe, covering history and culture, with maps and photographs. Among the titles are *The Navajo*, *The Sioux*, *The Pueblo*, *The Iroquois*, *The Inuit*, *The Wampanoag*, *The Apache*, and more.

FICTION

The Arrow Over the Door

Joseph Bruchac. Puffin, 2002.

Set during the Revolutionary War, the story is told in the alternating voices of an Abenaki boy and a Quaker boy, one coming to terms with taking the British side of the fight, the other struggling with belief in nonviolence in a time of warfare.

Also by Bruchac, see *Children of the Longhouse* (Puffin, 1998).

The Birchbark House

Louise Erdrich. Disney-Hyperion, 2002.

The story of a young Ojibwa girl growing up on an island in Lake Superior in the mid-nineteenth century.

How I Became a Ghost

Tim Tingle. Roadrunner, 2015.

Told in the voice of a 10-year-old Choctaw boy, this is the story of his family's removal from Mississippi to the Midwest on the long trek known as the Trail of Tears. The first of a trilogy.

Indian Captive

Lois Lenski. HarperCollins, 1995.

A fictionalized account of the story of Mary Jemison, captured as a child by the Seneca, who comes to accept the Indians as her new family.

Sees Behind the Trees

Michael Dorris. Disney-Hyperion, 1999.

Walnut, a vision-impaired Native American boy, uses his other senses so effectively that he becomes known as "Sees Behind the

Trees.”

3. Age of Exploration: the Vikings.

Topics to cover include the geography of Scandinavia, the culture and lifestyle of the Vikings, Erik the Red and the discovery and settlement of Greenland, and Leif Ericson and the discovery of Vinland.

50 Things You Should Know About the Vikings

Philip Parker. QEB Publishing, 2017.

For three hundred years, the Vikings terrorized Europe—but they also had a rich and fascinating culture and society. This creatively designed book is packed with illustrations, maps, infographics, and photographs of artifacts. One of the large and varied 50 Things You Should Know About series.

Everything Vikings

Nadia Higgins. National Geographic, 2015.

Great visuals and fascinating facts tell the story of the Vikings in four short chapters. Included are a diagram of a Viking longship and wonderful photos of Viking reenactors.

Leif the Lucky

Ingri and Edgar Parin D’Aulaire. University of Minnesota Press, 2014.

A lushly illustrated biography of Leif Ericson, who sailed to Greenland with his father, Erik the Red, and later reached the shores of North America.

Viking

Susan Margeson. DK, 2009.

One in the Eyewitness series, illustrated with maps, reproductions, and color photographs of artifacts.

You Wouldn’t Want to Be a Viking Explorer!

Andrew Langley. Franklin Watts, 2013.

A catchy and informative story of the Viking voyages, with cartoonish illustrations.

FICTION

D'Aulaires' Book of Norse Myths

Ingri and Edgar Parin d'Aulaire. New York Review, 2005.

The beautifully illustrated stories of Odin the All-father, Thor and his hammer, Loki the trickster, Ragnarok, the great battle at the end of the world, and more.

Odd and the Frost Giants

Neil Gaiman. HarperCollins, 2016.

Odd, a fatherless Viking boy with a lame foot, meets a bear, an eagle, and a fox—Norse gods trapped in animal form by the evil frost giant who has conquered Asgard.

From my homeschool journal (Josh is 9; Ethan, 8; Caleb, 6):

The boys are currently hooked on Vikings. So today we located the Viking home countries on the world map and defined and identified fjords, a word which Caleb found simply hilarious. We read about Eric the Red and Leif (the Lucky), learned about Viking funerals and ship burials, drew pictures of Viking ships, and made a paper model of one from a kit, which didn't come out badly except for the sail, which kept falling over. We read Norse myths at lunch—especially popular: the Frost Giants—and made elaborate Viking-style brooches out of cardboard, using gold and silver markers and stick-on jewels. Everybody then donned brooches and capes and set off to reenact stories of Viking battles, Valkyries, and Valhalla.

4. The Age of Exploration.

Topics to cover include the exploits of the Spaniards in the American South and Southwest, and those of the French, Dutch, and British in Canada and the Northeast. Kids should know the names and accomplishments of

prominent explorers and be able to locate their discoveries on the map. They should also be aware of the impact of the explorers on the Native Americans.

See Betsy Maestro's *The Discovery of the Americas and Exploration and Conquest: The Americas After Columbus* ([this page](#)).

Around the World in 100 Years

Jean Fritz. Puffin, 1996.

If it's by Fritz, it's a great read. This is the story of the fifteenth-century explorers, from Prince Henry the Navigator to Ferdinand Magellan.

Explorers of the New World

Carla Mooney. Nomad, 2011.

The explorations of Vasco da Gama, Christopher Columbus, Ferdinand Magellan, Hernán Cortés, and more, with twenty-two hands-on projects.

Explorers Who Got Lost

Diane Sansevere-Dreher. Starscape, 2016.

Many famous explorers—from Bartolomeu Dias and Vasco da Gama to Magellan and Jacques Cartier—got lost. An interesting history, with a timeline and fact boxes.

I Discover Columbus

Robert Lawson. Little, Brown, 1991.

The story of Columbus and his famous voyage, as observed by his opinionated parrot, Aurelio.

Lives of the Explorers: Discoveries, Disasters (and What the Neighbors Thought)

Kathleen Krull. Houghton Mifflin Harcourt, 2018.

Short biographies of seventeen famous explorers, from Leif Ericson and Marco Polo to Sally Ride.

Primary Source Explorers

Various authors. Lerner, 2017.

Each 40-page book includes maps, a timeline, portraits and reproductions, and an informative text. Titles include *A Journey with Christopher Columbus*, *A Journey with Juan Ponce de León*, *A Journey with Hernán Cortés*, *A Journey with Sieur de la Salle*, *A Journey with Francisco Vázquez de Coronado*, and *A Journey with Henry Hudson*.

5. The Spaniards and the settlement of the Southwest.

Topics to cover include Ponce de León's search for the Fountain of Youth and the exploration of Florida, Hernando de Soto, the founding of St. Augustine, Coronado and the Seven Cities of Gold, and the establishment of the Spanish missions in Texas and California.

6. Canada and the search for the Northwest Passage.

Topics to cover include John Cabot and the exploration of Newfoundland, Samuel de Champlain and the settlement of New France, and the voyages of Henry Hudson.

7. Survey the original thirteen colonies.

Kids should know the names and geographic locations of the original thirteen colonies, the names and locations of important colonial cities (Boston, Philadelphia, New York, Charleston, Williamsburg), and the climatic differences among colonies that led to variations in lifestyles and agricultural practices. (Why, for example, did the South have plantations? And why all those stone walls in New England?)

See Joy Hakim's *A History of US: Making Thirteen Colonies* ([this page](#)).

True Books: The Thirteen Colonies

Kevin Cunningham. Scholastic, 2011.

A thirteen-book series, one 48-page book per original colony. Titles are *The Massachusetts Colony*, *The Virginia Colony*, *The*

Pennsylvania Colony, and so on. Each includes historical background, interesting facts, maps, timelines, and illustrations.

Colonial Days

David C. King. Jossey-Bass, 1997.

Spend a year with the Mayhew family in 1732 as they go about their daily lives. Included are seasonal activities: kids make a model weather vane, grow a pineapple, weave a potholder, churn butter, and make indigo (blue) and berry (red) ink.

Great Colonial American Projects You Can Build Yourself

Kris Bordessa. Nomad, 2006.

Kid-friendly background info and many hands-on projects, among them making dipped candles, a braided rug, marigold-dyed yarn, and a tricorne hat, as well as batches of your own apple cider and johnnycakes.

Also see *Explore Colonial America!* (Verna Fisher; Nomad, 2009), with twenty-five projects and activities.

You Wouldn't Want to Be an American Colonist!

Jacqueline Morley. Children's Press, 2015.

Humor and fascinating fact boxes make for a kid-appealing approach to history.

8. The Southern colonies: Virginia, Maryland, the Carolinas, and Georgia.

Topics to cover include Sir Walter Raleigh and the Lost Colony of Roanoke, the settlement of Jamestown, Pocahontas and John Smith, the rise of tobacco as a cash crop, the beginning of the slave trade, the growth of the plantations, Lord Baltimore and the Maryland colony, and James Oglethorpe and the Georgia colony.

The Double Life of Pocahontas

Jean Fritz. Puffin, 2002.

This short chapter book tells the story of Pocahontas and the uneasy divide between her Native American culture and the world of the white settlers.

A Lion to Guard Us

Clyde Robert Bulla. HarperCollins, 1989.

Amanda's father left England three years ago for the Jamestown Colony; now Amanda and her younger brother and sister are determined to join him, with only her father's little brass lion's head to help them along the way.

The Lost Colony of Roanoke

Jean Fritz. G. P. Putnam's Sons, 2004.

An illustrated account of the mysterious Virginia colony that was founded by Sir Walter Raleigh in 1585 and subsequently vanished, leaving behind only the word "Croatan" carved on a tree.

The World of Captain John Smith

Genevieve Foster. Beautiful Feet Books, 1999.

When John Smith was a boy, Ivan the Terrible was tsar of Russia; England defeated the Spanish Armada; Mary, Queen of Scots, was executed; and the Roanoke colony disappeared. When John Smith was a soldier, Akbar—whose grandson built the Taj Mahal—ruled India; Matteo Ricci had established a mission in China; Galileo was doing research in Italy; and Miguel Cervantes was writing *Don Quixote*. (See the World series, [this page](#).)

9. The New England colonies: Massachusetts, New Hampshire, Connecticut, and Rhode Island.

Topics to cover include the Pilgrims and the Plymouth Colony; the Mayflower Compact; the Puritans and the Massachusetts Bay Colony; Roger Williams, Anne Hutchinson, and religious tolerance; the establishment of Rhode Island; and the Salem witch trials.

The Adventurous Life of Myles Standish

Cheryl Harness. National Geographic, 2008.

Subtitled *The Amazing but True Survival Story of Plymouth Colony, Barbary Pirates, the Mayflower, the First Thanksgiving, and Much, Much More*, this is the story of Myles Standish—nicknamed “Captaine Shrimpe”—and the Pilgrims.

Dear America: A Journey to the New World

Kathryn Lasky. Scholastic, 2010.

The fictionalized diary of 12-year-old Remember Patience Whipple, who arrived in the New World on the *Mayflower*. One in the extensive Dear America series.

Eating the Plates

Lucille Recht Penner. Aladdin, 1997.

All about Pilgrim food, cooking, and manners.

The Landing of the Pilgrims

James Daugherty. Random House, 1981.

In the acclaimed Landmark Books series, this is an account of Pilgrim history beginning in the early 1600s through the flight to Holland and eventually the voyage to America, based on the Pilgrims' own journals and letters.

In the same series, see Shirley Jackson's *The Witchcraft of Salem Village* (1987).

10. The Middle Atlantic colonies: New York, New Jersey, Delaware, and Pennsylvania.

Topics to cover include the Dutch and New Netherland; the English conquest and the establishment of New York; and William Penn, the Quakers, and the settlement of Pennsylvania.

Benjamin West and His Cat Grimalkin

Marguerite Henry. Aladdin, 2014.

Young Benjamin West's Pennsylvania Quaker family disapproved of his desire to be an artist—so he learned to mix paints from the

Native Americans and made brushes with fur from his pet cat's tail.

Dear America: Standing in the Light

Mary Pope Osborne. Scholastic, 2011.

In Pennsylvania in 1763, Quaker Catharine Logan and her family have always had a good relationship with the local Delaware tribe. Then Catharine and her brother are taken captive by the Lenape.

Diary of Sally Wister: A Colonial Quaker Girl

Capstone, 2014.

In 1777, the Revolutionary War forced Sally and family to flee their home in Philadelphia.

World History

Third graders, taking up approximately where second grade left off, might cover the Renaissance through the mid-nineteenth century. Use a variety of materials and approaches: maps and timelines, historical fiction, age-appropriate biographies, videos, hands-on projects and activities, and relevant field trips.

1. The Renaissance.

Topics to cover include the meaning of the word *renaissance* (the “rebirth” of art and learning and the revival of Greek and Roman ideals); the rise of the Italian city-states as centers of trade; prominent Renaissance figures such as Giotto, Dante, Leonardo da Vinci, Michelangelo, and the Medicis; Renaissance values (including the concept of the “Renaissance man”—or, now, “Renaissance woman”); and everyday life in the Renaissance period.

Amazing Leonardo da Vinci Inventions You Can Build Yourself

Maxine Anderson. Nomad, 2006.

Instructions for making everything from a hydrometer to an ornithopter, parachute, and trebuchet, plus illustrated background info.

Also see the **Leonardo da Vinci Catapult** kit (Pathfinders), with which kids—with some help—can build a great wooden catapult, suitable for flinging pompoms at the cat.

Leonardo's Horse

Jean Fritz. G. P. Putnam's Sons, 2001.

A thoroughly entertaining illustrated introduction to the Renaissance and da Vinci. Leonardo's dream of creating a giant bronze horse statue never came to pass—until the twentieth century, when the project was revived by American Charles Dent.

Michelangelo for Kids

Simonetta Carr. Chicago Review Press, 2016.

Background information, a timeline, maps, photos, fact boxes, and twenty-one hands-on activities.

In the same format, see *Leonardo da Vinci for Kids* (Janis Herbert; Chicago Review Press, 1998).

Also see *Michelangelo*, *Leonardo da Vinci*, and *Botticelli* in Mike Venezia's Getting to Know the World's Greatest Artists series ([this page](#)), and Diane Stanley's picture-book biography *Michelangelo* (HarperCollins, 2003).

Neo Leo

Gene Barratta. Square Fish, 2016.

Leonardo da Vinci came up with the idea for many inventions that are with us today, from hang gliders to helicopters and contact lenses.

Pippo the Fool

Tracey E. Fern. Charlesbridge, 2011.

The picture-book story of Filippo Brunelleschi—nicknamed “Pippo the Fool”—and the contest to build a dome on top of the Cathedral of Santa Maria del Fiore in Florence.

Family challenge: build your own dome!

See the Instructables (www.instructables.com) for step-by-step instructions for making a playhouse-size geodesic dome out of cardboard. Research Buckminster Fuller.

Stone Giant

Jane Sutcliffe. Charlesbridge, 2014.

The picture-book story of the creation of Michelangelo's "David."

2. The northern Renaissance and the Reformation.

Topics to cover include Gutenberg and the invention of the printing press; Martin Luther and the beginning of Protestantism; the effects of the split between Protestants and Catholics on the politics of Europe; and the conflicts between science and the church, as exemplified by Copernicus and Galileo.

Book: My Autobiography

John Agard. Candlewick, 2015.

Chatty Book gives us the scoop on his life story, from the papyrus scrolls of Egypt through parchment, illuminated manuscripts, and the printing press to the ebook.

Galileo for Kids

Richard Panchyk. Chicago Review Press, 2000.

Historical information, fact boxes, maps and timelines, and twenty-five hands-on projects. (Play with a pendulum!)

Try painting with a pendulum. You can watch the process on YouTube—or check out "pendulum painting" online for instructions and suggestions.

Johann Gutenberg and the Amazing Printing Press

Bruce Koscielniak. Houghton Mifflin Harcourt, 2003.

A picture-book history of the invention of the printing press.

Starry Messenger

Peter Sis. Square Fish, 2000.

An exquisitely illustrated picture-book biography of Galileo.

3. England through the Age of Exploration.

Topics to cover include Henry VIII and the establishment of the Church of England, Elizabeth I and the Elizabethan Age, the rise of British sea power, the defeat of the Spanish Armada, and early exploration and colonization.

50 Things You Should Know About the Tudors

Rupert Matthews. QEB, 2016.

Covering the Tudors from 1485 to 1603, this creatively designed book is crammed with history and interesting facts. Included are timelines, photos, maps, and period reproductions.

Elizabeth I, the People's Queen

Kerrie Logan Hollihan. Chicago Review Press, 2011.

The story of her life and times, with a timeline, photos, period reproductions, and twenty-one activities. (Play Nine Men's Morris; make a pomander ball.)

Elizabeth I: Red Rose of the House of Tudor

Kathryn Lasky. Scholastic, 1999.

The fictional diary of 11-year-old Elizabeth, filled with details of sixteenth-century life. (She's forced to have six baths—in three months!) One of the Royal Diaries series.

In the same series, see Lasky's *Mary, Queen of Scots: Queen Without a Country* (2002).

The Player King

Avi. Atheneum, 2017.

The story of the kitchen boy Lambert Simnel, a royal look-alike, who claimed to be the rightful king of England—rather than that usurper King Henry VII.

You can't cover the Elizabethan Age without introducing Shakespeare. There are many resources available for all ages, including many kid-

friendly prose adaptations of the plays. Among these is Leon Garfield's prose adaptation *Shakespeare Stories* (NYR Children's Collection, 2015) which includes twenty-one of Shakespeare's most famous works; Charles and Mary Lamb's *Tales from Shakespeare*; and E. Nesbit's *Shakespeare's Stories for Young Readers*.

Tales from Shakespeare

Marcia Williams. Candlewick, 2004.

Seven Shakespearean plays presented in Williams's wonderful comic-strip style.

Also see Williams's *More Tales from Shakespeare* (2005), highlighting another seven plays.

4. The Age of Exploration.

Topics to cover include the importance of the spice trade and its impact on exploration; the voyages of the Portuguese (including Prince Henry the Navigator, Bartolomeu Dias and the Cape of Good Hope, Vasco da Gama and the route to India, and Pedro Cabral and the annexation of Brazil); and the voyages of the Spanish (including Columbus, the Treaty of Tordesillas, Magellan and the circumnavigation of the globe, and Balboa and the Pacific Ocean); the voyages of the English and French (including the search for the Northwest Passage, the colonization of North America and the West Indies, and the establishment of trading posts in India); and the voyages of the Dutch (including the annexation of Portuguese trading posts and colonies, the colonization of South Africa, and the establishment of New Netherland).

Christopher Columbus and the Age of Exploration for Kids

Ronald A. Reis. Chicago Review Press, 2013

"No matter what one may think of Columbus—hero, heel, or both," Reis writes, the significance of what he did is monumental. A timeline, maps, illustrations, and well-researched historical background, plus twenty-one hands-on activities, among them tying nautical knots, making a compass, a sundial, and an ancient-style globe, and baking a batch of hardtack.

Geography

As in other grades, geography studies should be linked to history and other academic subjects. Learning thrives on connections.

Maps and Geography

Ken Jennings. Little Simon, 2014.

A chatty overview of geography filled with memorable fun facts. One of the extensive Junior Genius Guide series—check out the many titles.

My America: A Poetry Atlas of the United States

Lee Bennett Hopkins. Simon & Schuster, 2000.

Seven regions of the United States explored through poems by forty different poets, among them Langston Hughes, Nikki Giovanni, Carl Sandburg, and Joaquin Miller. Illustrated with maps and paintings.

U.S. Geography Through Infographics

Nadia Higgins. Lerner, 2014.

World Geography Through Infographics

Karen Kenney. Lerner, 2014.

Charts, maps, and illustrations present key concepts about U.S. and world geography. A lot of fascinating facts and a great tie-in to math.

Supplement geography studies with fiction and nonfiction books, poetry, music and art projects. Try touring the world with art, music, food, architecture, and stories. Pair with a map.

Around the World in 50 Ways

Lonely Planet Kids, 2018.

In this cool interactive travel book, kids pick their own destinations, routes, and means of travel—from sleds and steamboats to tuk-tuks and hot-air balloons. See if you can get from here to there.

Atlas Obscura's Explorer's Guide for the World's Most Adventurous Kid

Dylan Thuras and Rosemary Mosco. Workman, 2018.

An expedition to a hundred of the weirdest places on earth, including the site of the Tunguska event in Siberia and Mexico's giant crystal caves.

Birthdays Around the World

Margriet Ruurs. Kids Can Press, 2017.

Not everybody blows out candles and sings "Happy Birthday." Find out how kids from seventeen different countries celebrate birthdays.

Charting the World

Richard Panchyk. Chicago Review Press, 2011.

A history of maps from cave paintings to GPS, with twenty-one hands-on projects.

Eat Your Way Around the World

Jamie Aramini. Geography Matters, 2008.

Recipes from six continents and many countries, with associated activities.

Every Month Is a New Year: Celebrations Around the World

Marilyn Singer. Lee & Low, 2018.

Poems celebrate sixteen New Year's festivals around the world.

Favorite Folktales from Around the World

Jane Yolen, ed. Pantheon, 1988.

More than 150 favorite folktales from around the world, categorized by theme.

Geography Through Art: International Art Projects for Kids

Sharon Jeffus and Jamie Aramini. Geography Matters, 2008.

A large collection of projects from six continents and twenty-five countries. Kids begin with a papier-mâché globe and a Pangea

puzzle, and move on to make everything from kente cloth (Ghana) to fish prints (Japan), stained-glass windows (France), Viking chessmen (Sweden), and many more.

In the Beginning

Virginia Hamilton. Houghton Mifflin Harcourt, 1991.
Creation stories from around the world.

If You Lived Here: Houses of the World

Giles Laroche. Houghton Mifflin Harcourt, 2011.
Houses around the globe, illustrated with bas-relief collages.

Math Games and Activities from Around the World

Claudia Zaslavsky. Chicago Review Press, 1998.
Dozens of games, puzzles, and projects from around the world, with instructions and materials lists.

The Same Sky: Poems from Around the World

Naomi Shihab Nye. Aladdin, 1996.
Read your way around the globe with 125 poems from 68 different countries.

A Year Full of Stories

Angela McAllister. Frances Lincoln Children's Books, 2016.
A beautifully designed collection of fifty-two stories from around the world, one for each week of the year. January, for example, features "Father Frost" from Russia, "The Magic Porridge Pot" from Germany, and "King of the Forest" from China.

Also by McAllister, see *A World Full of Animal Stories* (2017).

You might also try touring the world with movies. Try *Madagascar* (2005, PG), in which a quartet of animals from the Central Park Zoo end up on the island of Madagascar; *Moana* (2016, PG), set in Polynesia; *Mulan* (1998, G), set in China; *The Sound of Music* (1965, G), set in Austria; *The March of the Penguins* (2005, G) and *Happy Feet* (2006, G), both set in Antarctica; and *The Great Race* (1965, NR), the story of an automobile race

from New York to Paris (first heading westward across America and then across the Bering Strait to Russia).

Make your own geographical movie lists and follow along on the map.

1. Review and reinforce basic geographical concepts covered in previous studies.

Kids should continue to expand their geographical vocabulary. For example, they should be able to recognize and define *peninsula*, *strait*, *gulf*, *bay*, *isthmus*, and *plateau*.

They should use and read a variety of different map types, use map scales to measure distances between two locations, and find locations on an alphanumeric (grid-style) map.

2. Define and describe the major kinds of climate and relate these to geographical locations.

Kids should know the features and locations of the tropical, temperate, and polar zones, and how different climatic conditions affect living things: humans, plants, and animals.

Science Around the World

Janice VanCleave. Wiley, 2004.

Activities on biomes from pole to pole, including forests, grasslands, deserts, and tundra.

3. Survey the major rivers of the world.

The earliest civilizations of the world developed along rivers: the Tigris and Euphrates, the Nile, the Indus, and the Yangtze.

Kids should know the definitions of *source*, *mouth*, *delta*, *tributary*, and *drainage basin*. They should also be able to name, describe, and locate the major rivers of each continent on the world map.

Pair with fictional river books such as Holling Clancy Holling's *Paddle-to-the-Sea* (Houghton Mifflin Harcourt, 1980) and *Minn of the Mississippi* (1978); Elizabeth Foreman Lewis's *Young Fu of the Upper Yangtze* (Square

Fish, 2008); and Eva Ibbotson's *Journey to the River Sea* (Puffin, 2003). Also see the Great Illustrated Classics or Classic Starts versions of Mark Twain's *The Adventures of Huckleberry Finn*.

In the News

History is important—but it's also important for kids to know what's going on in the world today.

Dogo News

www.dogonews.com

With the motto "Fodder for young minds," this is a roundup of news stories of particular interest to kids. The aim is to engage kids with digital media in a safe social environment.

Scholastic News

scholasticnews.scholastic.com

Issues are categorized by grade (one through five/six). Each issue includes news stories and current nonfiction reading for kids, with included teacher's guides and quizzes. Paid subscription.

Smithsonian Tween Tribune

www.tweentribune.com

A free K–12 resource of daily news articles, with critical-thinking questions and weekly videos and lesson plans. Also available in Spanish.

Here There Everywhere News for Kids

htekidsnews.com

News stories for kids ages 7 and up, variously covering science, space, sports, nature, people, and world and U.S. current events. "By You" stories are written by kids.

News-O-Matic

www.newsomatic.org

A paid-subscription app available for iOS or Android. News stories for kids ages 7–10, plus games, puzzles, a map feature, and more.

NBC Learn

www.nbclearn.com

A curated K–12 resource featuring historic news reports, current events, primary source documents, and videos, aligned with academic subject areas. Paid subscription.

Newsela

newsela.com

A website/app aimed at promoting literacy through current nonfiction reading, available at reading levels appropriate for grades two through twelve. Free; additional materials available with a paid subscription.

Time for Kids

www.timeforkids.com

The website includes sample articles from each issue of the *Time for Kids* magazine (for grades K–1, 2, 3–4, and 5–6). The magazine is available by paid subscription.

Science

Physical Science

Awesome Physics Experiments for Kids

Erica I. Colón. Rockridge Press, 2019.

A collection of forty cool physical science experiments demonstrating concepts of force, electricity, magnetism, light, heat, and sound.

Junk Drawer Physics

Bobby Mercer. Chicago Review Press, 2014.

Fifty experiments with stuff from (mostly) the household junk drawer, all demonstrating physics principles.

Kids will need some adult help with all of the above.

1. Energy: Explore and understand the properties of light.

Topics to cover include light sources, the speed of light and its mode of travel (in straight lines), transparent and opaque objects, the behaviors of mirrors and lenses, the prism, and the visible and electromagnetic spectra.

Kids should know the differences among convex, concave, and plane mirrors and lenses; should be able to put a numerical value to the speed of light; should understand the principles of reflection and refraction; and should know that white sunlight is composed of many different colors of light, which can be separated by a prism. They should know the colors of the spectrum in order; be familiar with the acronym ROY G BIV; and know that our perception of color depends on the reflection of specific wavelengths of light and their interaction with eye and brain.

Be familiar with concepts of solar energy.

Try building your own periscopes and kaleidoscopes; experiment with lenses, mirrors, and prisms. Make your own ROY G BIV books, with examples of each color.

Explore Light and Optics!

Anita Yasuda. Nomad, 2016.

Scientific and historical background, interesting fact boxes, vocabulary words, and twenty-five experiments and activities.

Light Action! Amazing Experiments with Optics

Vicki Cobb and Josh Cobb. SPIE Publications, 2005.

Clear explanations and clever projects, including making your own ice lenses.

What's Faster Than a Speeding Cheetah?

Robert E. Wells. Albert Whitman & Company, 1997.

How fast can you run? You'll never beat an ostrich or a cheetah—much less reach the speed of light. A clever picture book on the concept of speed.

From my homeschool journal (Josh is 9; Ethan, 8; Caleb, 6):

We spent much of the morning playing with prisms and experimenting with mirrors angled in pans of water, throwing rainbows on the walls, the cats, and each other. Everybody then made rainbow pictures; and we read—by popular demand—The Rainbow Goblins (Ul De Rico; Thames & Hudson, 1978) and discussed various rainbow stories, including the rainbow bridge in Norse mythology; Iris, the Greek goddess of the rainbow; and leprechauns and their pots of gold.

All the boys were fascinated with the idea that color is basically all in the head. This branched unexpectedly into philosophy—if color isn't real, then how do you know that somebody else's red is the same as your red?

Ethan then veered off into the biology of color blindness. "How do I know that I'm not color-blind?"

We then looked up and took sample tests for color blindness—it doesn't look like anybody is—and talked about how color-blindness is inherited: "Why are more boys color-blind than girls?"

2. Energy: explore and understand the properties of heat.

Kids should know that heat is a form of energy and should know about geothermal, nuclear, and solar sources of heat. They should know that heat moves by conduction, convection, and radiation, and they should investigate the relationships among light, color, and heat absorption (for example, why do things get "red hot"?).

Burn: Michael Faraday's Candle

Darcy Pattison. Mims House, 2016.

Nineteenth-century scientist Michael Faraday was famed for his Christmas science lectures for kids—most notably an explanation of how a candle burns. Readers learn how, based on Faraday’s own “Chemical History of a Candle.”

Wildfires

Seymour Simon. HarperCollins, 2016.

All about wildfires and the science of fire, illustrated with stunning color photos.

Life Science

1. Understand the concept of the balance of nature, the elements of the food chain, and the definition of ecosystem.

Kids should understand that living things exist in complex interdependent arrangements called ecosystems. They should know about the interactions of producers, consumers, and decomposers and be able to discuss the impact of human lifestyles on natural environments. They should also understand the dangers of air and water pollution.

In the **Explore Your World** series (Nomad, 2018), see *Lakes and Ponds* (Johannah Haney), *Rivers and Streams* (Rebecca Siegel), *Marshes and Swamps* (J. K. O’Sullivan), and *Oceans and Seas* (Anita Yasuda). All include clear explanations, fact boxes, “Words to Know” lists, discussion questions, and hands-on projects.

Also see:

The Animals of Farthing Wood

Colin Dann. Egmont UK, 2016.

Farthing Wood is being bulldozed and there’s a drought, so the resident animals must set off in search of a new home.

Fuzzy Mud

Louis Sachar. Yearling, 2017.

A pair of kids stumble upon some fuzzy mud in the woods—which turns out to be a slime mold engineered by a nearby biotech firm, with potential for eco-disaster.

The Great Kapok Tree

Lynne Cherry. Houghton Mifflin Harcourt, 2000.

A woodcutter falls asleep beneath a great kapok tree in the Amazon rain forest and is visited by all the forest residents, telling him how important it is that he spare their home.

Hoot

Carl Hiaasen. Yearling, 2005.

Roy Eberhardt, struggling as the new kid at his school in Florida, becomes involved in saving burrowing owls from a fast-food franchise.

Me and Marvin Gardens

Amy Sarig King. Scholastic, 2019.

Obe Devlin, whose family farm has been taken over by developers, discovers a strange new animal that eats plastic and produces toxic scat.

Please Don't Paint Our Planet Pink

Gregg Kleiner. Cloudburst Creative, 2014.

Wilbur's geeky dad has invented a pair of goggles that allow wearers to see carbon dioxide as a pink gas.

The True Blue Scouts of Sugar Man Swamp

Kathi Appelt. Atheneum, 2014.

Bingo and J'miah, a pair of wonderful raccoons, and 12-year-old Chap Brayburn are collectively out to save Sugar Man Swamp from encroaching developers and feral hogs.

2. Continue studies of animal classification.

Kids should know the differences between cold- and warm-blooded animals and between vertebrates and invertebrates, and should be able to name examples of each. They should also know the distinguishing characteristics of the major classes of vertebrates: fish, amphibians, reptiles, birds, and mammals.

Bone by Bone: Comparing Animal Skeletons

Sara Levine. Scholastic, 2018.

What if you didn't have any bones? Or what if your vertebrae just kept on going? A fun and thought-provoking look at the different permutations of skeletons.

Also by Levine, see *Tooth by Tooth: Comparing Fangs, Tusks, and Chompers* (Millbrook, 2016).

Zoology for Kids

Josh and Bethanie Hestermann. Chicago Review Press, 2015.

The history and science of zoology, with fact boxes, color photos, and hands-on activities.

3. Concepts of evolution.

Where did we come from?

The Great Human Journey: Around the World in 22 Million Days

Ian Tattersall and Rob DeSalle. Bunker Hill, 2013.

From the first hominids to human migration across the planet, with the Museum Mice from the American Museum of Natural History.

Also by Tattersall, see *Bones, Brains and DNA: The Human Genome and Human Evolution* (2007).

4. Continue studies of human anatomy and physiology.

Expand knowledge of the systems of the human body. Kids should know the difference between voluntary and involuntary muscles, the basic components of the skeletal system and names of major bones, the means in which bones and muscles interact and interconnect, the basic components of

the nervous system, and the way the nervous system communicates with other body systems.

See David Macaulay's *The Way We Work* ([this page](#)) and DK's *Human Body!* ([this page](#)).

Plagues, Pox, and Pestilence

Richard Platt. Kingfisher, 2011.

What makes us sick? Find out, from the point of view of the germs and pests themselves.

Earth and Space Science

1. Define *fossil* and know how fossils are formed.

Barnum's Bones

Tracy Fern. Farrar, Straus & Giroux, 2012.

The picture-book story of how Barnum Brown discovered the first *Tyrannosaurus rex* skeleton.

Bone Sharps, Cowboys, and Thunder Lizards

Jim Ottaviani. G.T. Labs, 2005.

A graphic novel account of the nineteenth-century battle between Edwin Drinker Cope and Othniel Marsh over dinosaur bones—and the many famous figures who were involved along the way.

Fossil by Fossil: Comparing Dinosaur Bones

Sara C. Levine. Millbrook, 2018.

How are we like—and not like—the dinosaurs?

How the Earth Works

Michell O'Brien-Palmer. Chicago Review Press, 2002.

Scientific info along with sixty projects and activities—for example, make a plate tectonics model with graham crackers and molasses, grow crystals, and make your own fossils.

Mary Anning's Curiosity

Monica Kulling. Groundwood, 2017.

The story of fossil hunter Mary Anning, who made her first great discovery at age 12, when she found the skeleton of an ichthyosaurus.

Also see Catherine Brighton's picture book *The Fossil Girl* (Frances Lincoln, 2007).

Go fossil hunting! Check online for the best fossil hunting sites in your area or contact a local geologist for suggestions.

2. Know the difference between a rock and a mineral, and the characteristics of the three major groups of rocks: sedimentary, igneous, and metamorphic.

Geology Lab for Kids

Garret Romaine. Quarry Books, 2017.

Experiments and projects to explore crystals, volcanoes, rock types, earthquakes, geysers, fossils, space rocks, and more.

3. Know the names and order of the planets in our solar system; define *orbit*, *rotation*, and *revolution*.

Activities might include making solar system models, inventing a solar system game, and reading biographies of such famous astronomers as Galileo, William Herschel, and Clyde Tombaugh.

Astronomy

Simon Basher and Dan Green. Kingfisher, 2009.

Sun: "I'm a total star, the center of everything, baby!" Basher and Green's snarky, anthropomorphized astronomical characters give readers the scoop on the planets, stars, Local Group, deep space, and more.

Seven Wonders of the Solar System

David A. Aguilar. Viking, 2017.

Seven of the most amazing features of the solar system, from Olympus Mons (the sixteen-mile-high Martian volcano) to the mysterious Planet Nine.

The Solar System Through Infographics

Nadia Higgins. Lerner, 2013.

Fascinating data on the solar system using charts, maps, and illustrations. A great tie-in to math.

Other titles in the Super Science Infographics series include *Life Science Through Infographics* (2018), *Weather and Climate Through Infographics* (2013), *Energy and Waves Through Infographics* (2013), and *Forces and Motion Through Infographics* (2013).

4. Understand the Big Bang theory and be aware of the size and composition of the universe.

Bang! How We Came to Be

Michael Rubino. Prometheus, 2011.

A panoramic story of evolution beginning with a bang thirteen billion years ago, when the universe exploded into being.

Beyond the Solar System

Mary Kay Carson. Chicago Review Press, 2013.

An exploration of galaxies, black holes, alien planets, and more, with twenty-one hands-on activities.

A Black Hole Is Not a Hole

Carolyn Cinami DeCristofano. Charlesbridge, 2017.

A catchy and conversational explanation of black holes.

The Swamps of Sleethe

Jack Prelutsky. Knopf, 2009.

Poems from imaginary realms beyond the solar system.

This Is Rocket Science

Emma Vanstone. Page Street Kids, 2018.

Dozens of experiments designed to demonstrate gravity, friction, Newton's laws of motion, air resistance, thrust and trajectory, life in space, and the solar system, illustrated with color photos.

5. Define *gravity* and describe its effects.

6. Define and describe lunar and solar eclipses.

Demonstrate with models and diagrams. Best, of course, is to observe one.

7. Be familiar with the common constellations.

8. Survey the history of space exploration.

Exploring the Solar System

Mary Kay Carson. Chicago Review Press, 2008.

The history of space exploration from prehistory to the present day, with a timeline, a field guide to the solar system, and many projects, including modeling orbits and building a telescope.

Galaxy Girls: 50 Amazing Stories of Women in Space

Libby Jackson. Harper Design, 2018.

A collection of fifty short biographies of women in space exploration from the nineteenth century to the present.

How to Be a Space Explorer

Lonely Planet Kids, 2014.

Everything you need to know for exploring space, from a tour of the planets and their moons to space rocks, volcanoes, searching for alien life, deep space—and the return home. Included are stories of real-life exploration and more than three hundred photos.

Lost in Outer Space: The Incredible Journey of Apollo 13

Tod Olson. Scholastic, 2017.

The gripping story of Apollo 13, the mission that never made it to the moon. One of the exciting Lost series—a good bet for adventure-loving kids.

Movie: *Apollo 13* (1995) with Tom Hanks as astronaut Jim Lovell. Rated PG for language and emotional intensity.

Margaret and the Moon

Dean Robbins. Knopf, 2017.

The picture-book story of Margaret Hamilton, who wrote the code that allowed NASA to put a man on the moon.

Moonshot

Brian Floca. Richard Jackson Books, 2009.

A brilliantly illustrated account of the flight of Apollo 11.

Team Moon

Catherine Thimmesh. Houghton Mifflin Harcourt, 2015.

The story of how four hundred thousand people worked to land Apollo 11 on the moon—from seamstresses who stitched together twenty-two layers of fabric to make the space suits, to engineers, software experts, aerospace technicians, and the telescope crew.

You Choose: Apollo 11 Moon Landing

Thomas K. Adamson. Capstone, 2016.

An interactive space exploration adventure in which you're trying to beat the Russians to land a man on the moon. Make your choices and experience one of nine possible endings.

Foreign Language

Kids should read foreign language texts appropriate to their skill level; write sentences and short passages using correct grammar and vocabulary; and practice their chosen language in skits, recitations, and conversations.

Children's books and short stories are a great way for kids to build their foreign language skills. There are simple stories available online, and children's foreign language books can be obtained through bookstores. See Schoenhof's Foreign Books (www.schoenhofs.com) for children's books in French, German, Italian, Spanish, and Japanese.

Exploratory Latin Exam

www.etclassics.org

From Excellence Through Classics, the Exploratory Latin Exam is a national contest for beginning Latin students in grades three through six.

Also see resources, [this page](#), [this page](#).

The Arts

The arts encompass a multiplicity of disciplines, from the visual arts and music to drama, dance, ceramics, photography, and game design. Experiment! Sometimes you don't know what you'll like until you've tried it.

Visual Arts

Kids should continue to experiment with a wide range of art media and techniques to create original artworks. They should also continue to develop art appreciation skills and to expand upon their knowledge of historical and multicultural art.

Art Detective: Spot the Difference

Doris Kutschbach. Prestel, 2013.

Famous paintings paired with forgeries—can you spot the differences?

1. Review the color wheel; know primary, secondary, and intermediate colors. Define *value* as the lightness or darkness of a color.

2. Recognize foreground, middle ground, and background in works of art.

Recognize how the elements of an artwork, such as color, shape, line, and texture, are organized to create a focus or center of interest.

3. Identify balance and symmetry in works of art. Recognize patterns and differentiate between figure and ground.

4. Connect art to other academic disciplines across the curriculum.

In third grade, for example, in conjunction with history lessons, kids might study Native American arts and crafts, colonial art, and/or the art of the Renaissance.

American Folk Art

Richard Panchyk. Chicago Review Press, 2004.

An illustrated history of American folk art from the seventeenth century to the present, with colorful illustrations and twenty-one hands-on activities, including making a tin can sculpture, a stencil, a quilt pattern, and a sponge-painted stool.

The Boy Who Drew Birds

Jacqueline Davies. Houghton Mifflin Harcourt, 2004.

A beautifully illustrated picture-book biography of John James Audubon.

Great American Artists for Kids

MaryAnn F. Kohl and Kim Solga. Bright Ring, 2008.

Pictures of their works, portraits, and brief biographies of seventy-five American artists, from the colonial period on, with accompanying hands-on activities.

For a poetry connection, see:

World Make Way

Lee Bennett Hopkins, ed. Metropolitan Museum of Art, 2018.

A collection of poems inspired by and illustrated with works of art from the Metropolitan Museum.

5. Experiment with a variety of art media and techniques, including drawing, painting, sculpture, printmaking, pottery, and textile or fiber arts.

Music

1. Reinforce and expand upon musical concepts taught in earlier grades.

Kids should know the names of the notes and spaces of the treble clef and should recognize and understand symbols for bar line, double bar, measure, and repeat.

2. Recognize and understand symbols for whole, half, quarter, and eighth notes and whole, half, and quarter rests.

3. Recognize and understand 4/4, 2/4, and 3/4 time signatures, and the symbols *p*, *pp*, *f*, and *ff*.

A meter signature defines the tempo of a musical piece. In 2/4 time, for example, there are two beats per measure and a quarter note gets one beat. The *p* and *f* symbols indicate how softly or loudly a piece should be sung or played: *p* (piano) means “softly”; *pp* (pianissimo), “very softly”; *f* (forte), “loudly”; and *ff* (fortissimo)—always a favorite—“very loudly.”

4. Review the families of instruments in the orchestra and the individual instruments that make up each family.

5. Listen to a range of pieces by well-known composers and to a variety of multicultural selections.

Classical Kids

www.classicalkidsnfp.org

Variouly available on CD and DVD, the Classical Kids productions combine historical stories about famous composers with excerpts of their music. Titles include *Beethoven Lives Upstairs*, *Mozart's Magic Fantasy*, *Hallelujah Handel*, and *Mr. Bach Comes to Call*.

Drama

Role-playing games are great for a wide range of ages. We started playing *Dungeons and Dragons* as a family when our kids were young, which involved inventing characters, then taking them on an adventurous quest. As the boys grew older, this evolved into participation in independent role-playing gaming groups.

The ***Dungeons and Dragons Starter*** set (Wizards RPG, 2014) includes all the rules, plus assorted ready-to-go adventures.

Philosophy and Comparative Religion

Where did the first person come from? It's a question most kids ask sooner or later. Our secular and scientific family used this as a springboard to discussing evolution—but it's not always all that simple.

Yellow and Pink

William Steig. Square Fish, 1988.

A pair of differently colored puppets debate where they came from—did they just tumble downhill and fall into puddles of paint? A good discussion book.

Health and Physical Education

1. By the end of third grade, kids should usually be able to run, dodge, and change direction while running; throw and catch both small and large balls with reasonable accuracy; hit a volleyball; jump rope; dribble, pass, and shoot basketballs; and kick balls, as in soccer.

2. Know which physical activities are associated with cardiovascular strength, muscular strength and endurance, and flexibility.

3. Participate in age-appropriate indoor and outdoor athletic activities.

In a homeschool, this might encompass living room calisthenics, hiking, biking, active outdoor play, dancing, swimming, or gymnastics lessons, or participation on a school, community, or neighborhood sports team.

4. Understand the negative aspects of alcohol, tobacco, and other drugs.

5. Know basic first-aid practices.

Some basic skills young kids should know include applying pressure to a bleeding wound, putting cool water on a burn, and pinching the nose for ten minutes for a nosebleed.

Kids should know how to get help, if need be, and should know when and how to call for emergency assistance. They should also be familiar with basic primary assessment, sometimes abbreviated as DRAB:

Danger: Is it safe to approach an injured person? (If not, don't.)

Response: Can the injured person answer questions? The 911 operator will need to know.

Airway: If a person is unconscious, tip their head back to make sure their tongue is not blocking their airway. Practice.

Breathing: Is the injured person breathing? You'll need to know.

Life Skills

See [this page](#).

Computer and Technology Skills

Continue—or begin—practice in formal keyboarding. There are many free online typing programs for beginners as well as typing speed and accuracy tests.

1. Use the spell-check and thesaurus features.

2. Rename and move files.

3. Select and deselect text.

4. Cut, copy, and paste within a document.

5. Use the borders feature and drawing tools.

6. Insert graphics into a document from an outside source.

7. Third graders should be introduced to presentation software, such as PowerPoint.

They should be able to create and order slides, arrange objects on a slide, insert graphics, add animations and movie clips, and give a software-based presentation to an audience.

8. Conduct effective internet searches, accessing and retrieving information from multiple sources.

9. Continue coding investigations.

For resources, see [this page](#); also see:

Code.org

code.org

Programming courses for grades K–5, 6–12, and university-level students. Elementary students, for example, can learn to make their own games, art, stories, and animations.

Hour of Code

hourofcode.com

Tutorials and activities for ages 4–104.

Scratch

scratch.mit.edu

Scratch, a step up from ScratchJr ([this page](#)), is a free programming language from MIT for ages 8–16 that allows kids to create stories, games, and animations.

Wonder Workshop

www.makewonder.com

Makers of the programmable robots Dash, Dot, and Cue. Dash, a roly-poly turquoise bot, and Dot, which is green, are recommended for coders ages 6 and up; Cue for ages 11 and up. Various apps send them traveling on journeys around the house, playing songs, sketching, and more.

Engineering

Keep Building!

Junk Drawer Engineering

Bobby Mercer. Chicago Review Press, 2017.

Twenty-five engineering challenges that (pretty much) don't cost a thing. Kids make pasta bridges, build a marble roller coaster from recycled cardboard tubes, and invent a craft-stick catapult.

Out of the Box

Jemma Westing. DK, 2017.

Twenty-five great cardboard engineering projects, from dragons to race cars to an entire cardboard city.

Investigate Robots

Building Your Own Robots

Gordon McComb. For Dummies, 2016.

Make a Brushbot, build a robot from a toy car, build a mouse-bot, and more. Step-by-step photo-illustrated instructions.

Robotics

Kathy Ceceri. Nomad, 2012.

The history and science of robots, with twenty build-it-yourself projects.

See the **Lego Mindstorms** series (www.lego.com/en-us/themes/mindstorms) and other sources for robotics kits. For beginners, see the **4M robot** kits (available from toy and educational suppliers), which include a Soda Can Robug, a Brush Robot, a Tin Can Edge Detector, a Hover Racer, and more.

CHAPTER 9

Grade Four

An adventurous child, thanks to the gods.

—HORACE

Language Arts

By fourth grade, kids in public school classes are expected to be competent readers, using their expertise for a wide variety of literary and informational purposes. The truth of the matter, of course, is that due to developmental, motivational, or just plain whimsical differences, kids attain literary fluency at different ages.

Reading

The Junior Great Books program ([this page](#)) for grade four selections include “Thank You, Ma’am” by Langston Hughes, Ethiopian and Japanese folktales, “The Cello of Mr. O” by Jane Cutter, and “The No-Guitar Blues” by Gary Soto, all paired with discussion-promoting questions.

1. Read a wide range of grade-appropriate fiction and nonfiction materials.

Try a mix of classic and contemporary literature, nonfiction selections, poetry, magazine and newspaper articles.

Often recommended for grade four:

The Book of Three

Lloyd Alexander. Henry Holt, 2017.

This is the first of the five-volume Chronicles of Prydain, a fantasy series based on Welsh mythology, which follows the adventures of Taran, the Assistant Pigkeeper. Subsequent books are *The Black Cauldron*, *The Castle of Llyr*, *Taran Wanderer*, and *The High King*.

The Borrowers

Mary Norton. Houghton Mifflin Harcourt, 2003.

The story of the Clock family, Homily, Pod, and Arrietty, little people who live beneath the floor of an old English manor house.

Harry Potter and the Sorcerer's Stone

J. K. Rowling. Scholastic, 1998.

This is the first of a seven-book series in which Harry discovers that he's a wizard and sets off for the famous Hogwarts School of Witchcraft and Wizardry. A wonderful cast of characters and a frightening villain.

The Lightning Thief

Rick Riordan. Disney-Hyperion, 2006.

The first of the Percy Jackson and the Olympians books, a fantasy series based on Greek mythology, in which Percy, after some trouble at school, discovers that he's a demigod, the son of Poseidon.

The Lion, the Witch, and the Wardrobe

C. S. Lewis. HarperCollins, 1994.

The first of the seven-volume Chronicles of Narnia, in which four children go through the back of a wardrobe into the magical land of Narnia and help to defeat the evil White Witch.

My Side of the Mountain

Jean Craighead George. Puffin, 2004.

Who hasn't, at one time or another, dreamed of running away to the mountains and living in a tree? Young Sam Gibley does just that. Several sequels.

The Mysterious Benedict Society

Trenton Lee Stewart. Little, Brown, 2008.

Four children who respond to a strange ad in the newspaper —“Are you a gifted child looking for special opportunities?”—end up on a secret mission at the Learning Institute for the Very Enlightened. Several sequels.

The Penderwicks

Jeanne Birdsall. Yearling, 2007.

A wonderful story of an adventurous summer, featuring four sisters, two rabbits, and a very interesting boy. Several sequels.

Tintin

Hergé. Little, Brown.

This text-heavy graphic novel series stars Tintin the boy reporter, his faithful dog Snowy, and a cast of hilarious characters. Many titles.

Tuck Everlasting

Natalie Babbitt. Square Fish, 2007.

The Tuck family, after drinking from a magic spring, has the gift of eternal life. When 10-year-old Winnie Foster discovers their secret, the Tucks need to convince her that living forever isn't as wonderful as you might think.

The Westing Game

Ellen Raskin. Puffin, 2004.

Sixteen people gather for the reading of game-loving millionaire Samuel W. Westing's will. There follows a fascinating and convoluted mystery involving word games, aliases, and deceptions.

A Wrinkle in Time

Madeleine L'Engle. Square Fish, 2007.

Meg and Charles Wallace Murry and friend Calvin O'Keefe, with the help of the mysterious Mrs. Whatsit, Mrs. Who, and Mrs. Which, are transported across the universe by means of a tesseract to rescue Meg and Charles Wallace's missing scientist father.

2. Identify and analyze the main events of the plot, and discuss character traits and motivations.

3. Define elements of figurative language.

Kids should be able to recognize and define *simile*, *metaphor*, *onomatopoeia*, *hyperbole*, and *personification*. They should be exposed to a range of poetic forms, including *limericks*, *haiku*, *tanka*, *narrative poems*, *sonnets*, and *couplets*.

Paul B. Janeczko's *Poetry A to Z* (Simon & Schuster, 2012) and *A Kick in the Head: An Everyday Guide to Poetic Forms* (Candlewick, 2009) are both creative introductions to a wide range of poetic forms and possibilities.

4. Use a variety of sources to obtain information.

Kids should know how to obtain information on a given topic from a range of sources, including books, reference works, periodicals, and the internet; and be able to compare and contrast the results. They should also be able to differentiate between fact and opinion, and to analyze sources for reliability.

Fakers

H. P. Wood. Charlesbridge, 2018.

A history of cons and scams from the Trojan horse to “fake news,” with tips to help you tell the difference.

The Nantucket Sea Monster

Darcy Pattison. Mims House, 2017.

In 1937, a sea monster was spotted off the coast of Massachusetts—and soon the story had spread across the country and people were terrified. A good discussion source for what is—and is not—fake news.

Spooked!

Gail Jarrow. Calkins Creek, 2018.

The story of Orson Welles's 1938 radio broadcast of *The War of the Worlds*, which had many listeners convinced that the Martians were landing.

Two Truths and a Lie

Ammi-Joan Paquette. Walden Pond, 2018.

See if you can tell the factual from the fake.

Writing

Fourth graders are generally assumed to have mastered cursive writing. The aim for kids at this grade level is to write “fluidly and legibly.”

For a tie-in to art, try calligraphy.

Calligraphy for Kids

Eleanor Winters. Sterling, 2007.

All the basics, suggestions for supplies, and sample alphabets and borders. Pair with cool calligraphy pens or markers.

1. Write frequently, exploring a range of genres, including short stories, personal narratives, poems, essays, and research reports.

Encourage kids to maintain a daily journal, publish a family newsletter or literary magazine, write and make their own books, and correspond with a penpal. Experiment with tandem writing.

For Ethan, who wanted more science-based writing, we invented a nonfiction writing program. We copied interesting short pieces on Ethan's interests—anything from robots to rockets to jellyfish—from nonfiction sources, including *Discover* magazine, *Scientific American*, the *New Scientist*, *Science News*, and various internet sites, and added response questions and suggestions for expanded research and reports.

Rose, Where Did You Get That Red? Teaching Great Poetry to Children

Kenneth Koch. Vintage, 1990.

Many suggestions for how to introduce kids to classic poems, with wonderful examples of children's writing.

Also see Koch's *Wishes, Lies, and Dreams: Teaching Children to Write Poetry* (Harper Perennial, 1999).

From my homeschool journal (Josh is 11; Ethan, 9; Caleb, 7):

*We've been writing poetry, using Kenneth Koch's *Rose, Where Did You Get That Red?*, which is crammed with ideas for poetry projects based on such poems as William Blake's "The Tyger" and Wallace Stevens's "Thirteen Ways of Looking at a Blackbird." Today, since it's nearly Halloween, we read (selected) poems from Edgar Lee Masters's *Spoon River Anthology*, a collection based on the graveyard of a small town. The boys loved the idea and spent the whole morning designing tombstones and inventing tombstone poems of their own.*

Tomorrow we're going on a field trip to make gravestone rubbings.

2. Create multi-paragraph compositions.

Include introductory, supporting, and concluding paragraphs, each with proper indentation and topic sentences.

3. Differentiate between complete and incomplete sentences; identify and correct run-on sentences.

Kids should be able to identify the subject and predicate of a sentence and should recognize the four major sentence types: declarative, interrogative, imperative, and exclamatory.

4. Use capital letters correctly.

Kids should be familiar with previously covered usages of capitals, and should know that capital letters are also used for the names of magazines, newspapers, artwork, musical compositions, and organizations.

5. Use punctuation marks correctly.

Fourth graders should be familiar with the use of periods, question marks, exclamation points, commas, quotations marks, and apostrophes. They should know that book titles are underlined or italicized in written work and should understand the use of parentheses.

6. Acquire an expanding vocabulary of prefixes and suffixes.

Kids at this grade level should know the meanings of such prefixes as *im-*, *in-*, *non-*, *mis-*, *en-*, and *pre-*, and such suffixes as *-ily*, *-y*, *-ful*, *-able/-ible*, and *-ment*.

7. Recognize and identify the common parts of speech, including nouns, verbs, adjectives (including articles), adverbs, conjunctions, and interjections.

8. Expand upon previous spelling skills.

Fourth graders should have mastered the correct spelling and use of such homophones as *there/their/they're*, *you're/your*, *its/it's*, and *to/too/two*.

Listening and Speaking Skills

1. Make both narrative and informational oral presentations.

Kids should be able to tell personal stories or deliver informational reports in an organized and coherent manner.

2. Give oral summaries of books, stories, or articles.

3. Memorize and recite poems.

Suggestions for this age group include Emily Dickinson's "I'm Nobody," Robert Frost's "Nothing Gold Can Stay," Robert Service's "The Cremation of Sam McGee," Ogden Nash's "The Tale of Custard the Dragon," and Lewis Carroll's "Jabberwocky."

Study Skills

1. Become familiar with the practice of outlining.

Kids should be able to identify main topics and subtopics in a given nonfiction passage and list them in proper outline form. This is a useful skill: outlining helps any writer create a coherent and well-put-together narrative. It also makes writing a first draft easier, and helps you identify any gaping holes in your research.

Try creating outlines for research papers. Once you've decided on a topic, the next steps are:

- Brainstorm. List all ideas in no particular order.
- Group related ideas together.
- Put the major groups in logical order.
- Within groups, arrange ideas in order, from general to specific.
- For each group, create main headings and subheadings.

2. Expand upon previous library skills.

Kids should understand the Dewey Decimal Classification (DDC) system and be able to read call numbers and locate books on the library shelves.

Try a library scavenger hunt or have kids create their own “read your way through the Dewey Decimal system” book list.

Mathematics

Nobody around here—not even Ethan, who loved math—was taken with math exercise worksheets.

On the other hand, our kids were fascinated with numerical records of all kinds, and we got a lot of math mileage out of *Ripley’s Believe it or Not!* and the *Guinness Book of World Records*. How big is the world’s biggest tomato? As big as a bowling ball? What about the world’s biggest pumpkin? If we covered our entire house with seashells, how many shells would it take? What animal can jump the highest? How high could you jump if you were a flea? (Figure it out!)

They were interested in how explorers measured coastlines (how to measure Norway’s, with all those fjords?), the worth of gold doubloons, the meaning of *googol*, the escape velocity of rockets, the best way to get out of a maze, and how far the Leaning Tower of Pisa could lean before finally toppling over. They were enthralled with multilayered density columns and curious about measuring viscosity (“How do you tell which liquid is heavier? Or do you just pour and see what happens?”). They wanted to know how long it would take for a spaceship to reach Pluto, how big their wings would have to be for them to fly like birds, who was the richest person in the world and how much money did he/she have, whether the Hope diamond was worth more than our house (yes), and whether an apatosaurus was bigger than a blue whale. This is math, and this is the way kids become interested in math.

Given all the pressure from the public school curriculum, standardized test requirements, and the ever-looming issue of college admissions, it’s

hard to break away from repetitive worksheets. Which is a pity, because as Paul Lockhart ([this page](#)) says, we could all be having so much more fun.

Try these:

Animals by the Numbers

Steve Jenkins. Houghton Mifflin Harcourt, 2016.

A fascinating book of animal infographics. What's the fastest animal? Whose wings beat faster: a hummingbird's or a gnat's? How much would all the insects in the world weigh when combined?

Animal Records

Sarah Wassner and Kathy Furgang. National Geographic, 2015.

The fastest, the biggest, the smallest, the deadliest. Packed with facts and color photos.

The Book of Perfectly Perilous Math

Sean Connolly. Workman, 2012.

More fun than your average math. Kids tackle problems like "How many months would it take a single vampire to completely take over a town of 500,000 people?"

Figure This!

figurethis.nctm.org

Creative math challenges for kids and families. (What shape holds the most popcorn? Why are manhole covers round?)

It's Alive!

Marya Washington Tyler et al. Prufrock, 1996.

Math with cool connections such as crocodile attacks, pink flamingo lawn ornaments, and acres of pizza.

The Rabbit Problem

Emily Gravett. Simon & Schuster, 2010.

Learn about Fibonacci numbers through Lonely and Chalk Rabbit and their rapidly growing brood of bunnies in Fibonacci's Field.

Solve This!

Joan Marie Galat. National Geographic, 2018.

Wild, wacky, and fun challenges. (A vulture swoops down and snatches your sister's teddy, then drops it on the far side of a raging river. What to do?)

Number Theory

1. Know numbers through the millions; be able to write these in both numerals and words.

Everybody loves humongous numbers. Good resources here are David M. Schwartz's *How Much Is a Million?* (HarperCollins, 2004) and *On Beyond a Million* (Dragonfly, 2001); David A. Adler's *Millions, Billions, and Trillions* (Holiday House, 2014); and Andrew Clements's *A Million Dots* (Atheneum, 2006).

Billions, Trillions, Quadrillions

Lynn Huggins-Cooper. QEB Publishing, 2019.

Explanations and clever infographics help kids make sense of really enormous numbers. (If a billion kids stood on each other's shoulders, they would reach past the moon.)

Infinity and Me

Kate Hosford. Carolrhoda, 2012.

How do you even *think* about something as big as infinity? A fascinating and thoughtful picture-book approach.

The Megapenny Project

nanospace.molecularium.com/attractions/mega_penny/

Numbers, from the small to the mind-bogglingly enormous, illustrated with pennies.

2. Order and compare numbers to 999,999,999 using greater than (>), less than (<), and equals (=) signs.

3. Understand place value to 100 million.

4. Be able to round numbers to the nearest 10, 100, and 1,000.

5. Know the perfect squares and square roots through 144; recognize the square root sign.

6. Know Roman numerals to 1,000 (M).

Useful for translating movie dates, which are often listed in Roman numerals.

The History of Counting

Denise Schmandt-Besserat. HarperCollins, 1999.

A history of counting and the many creative ways in which ancient societies dealt with numbers.

7. Identify positive and negative numbers on a number line.

Probability and Statistics

1. Collect, organize, and interpret data using bar and line graphs.

2. Plot points on a coordinate grid.

Fractions and Decimals

1. Identify and compare fractions from $\frac{1}{2}$ to $\frac{1}{12}$.

Kids should know the meaning of numerator and denominator, should be able to compare fractions with like denominators, and should recognize equivalent fractions, such as $\frac{1}{2}$ and $\frac{5}{10}$.

2. Add and subtract fractions with like denominators.

3. Identify mixed numbers and improper fractions. Be able to convert mixed numbers to improper fractions and vice versa.

4. Read and write decimal numbers through the thousandths place.

Kids should also be able to read and write decimals as fractions ($.02 = \frac{2}{100}$) and should know the decimal equivalents for halves, quarters, eighths, and tenths.

5. Compare decimals using greater than ($>$), less than ($<$), and equals ($=$) signs.

6. Round decimals to the nearest tenth and hundredth.

7. Add and subtract decimals to two places.

Operations

1. Know basic multiplication facts through 10×10 and equivalent division facts.

Equate

Conceptual Math Media.

A board game for ages 8 and up. Basically, it's Scrabble with addition, subtraction, multiplication, and division instead of spelling.

2. Multiply multi-digit numbers by single whole numbers with regrouping.

3. Understand that multiplication and division are inverse operations. Identify dividend, divisor, and quotient.

Kids should know the three different ways of representing division problems, should understand that numbers cannot be divided by zero and why, and should know that any number divided by 1 remains the same.

4. Divide multi-digit numbers by single whole numbers, with and without remainders.

5. Estimate answers to multiplication and division problems.

Kids should be able to check multiplication problems by changing the order of the factors, and check division problems by multiplying (and adding the remainder).

6. Solve two-step word problems and numerical problems involving more than one operation.

The classic mnemonic for remembering the order of mathematical operations is Please Excuse My Dear Aunt Sally—that is, parentheses, exponents, multiplication, division, addition, subtraction.

7. Identify repeating patterns formed by multiples, factors, and powers of 10.

Money and Measurement

1. Solve money problems involving multiplication and division with single whole numbers.

2. Make change in amounts up to \$100.

3. Estimate and measure length, weight, and capacity/volume.

By now kids should be increasingly familiar with English and metric equivalencies.

4. Understand the concept of time zones.

Pair with Clotilde Perrin's *At the Same Moment Around the World* (Chronicle Books, 2014), a picture-book trip through twenty-four time zones.

Timekeeping

Linda Formichelli and W. Eric Martin. *Nomad*, 2012.

The history and science of timekeeping, from sundials to atomic clocks, with fifteen projects.

Geometry

1. Recognize and identify common two-dimensional figures (polygons).

Kids should know triangle, quadrilateral, pentagon, hexagon, octagon, parallelogram, trapezoid, rectangle, and square.

2. Identify and classify three-dimensional figures (solids or polyhedra) by vertices, edges, and face shapes.

If you play Dungeons and Dragons or other role-playing games, your kids will pick this up in a minute via polyhedral dice.

3. Recognize and identify horizontal, vertical, perpendicular, parallel, and intersecting lines.

Geometry students at this level should also be able to identify points, line segments, and rays; and right, obtuse, and acute angles.

4. Compare and contrast congruent and similar figures.

Identify congruent and similar figures regardless of position and recognize positional changes, such as flips, turns, and slides.

5. Calculate perimeters of polygons and areas of rectangles and squares.

6. Recognize and define the circumference, radius, and diameter of a circle.

History and Geography

History and geography continue to build and expand upon topics introduced in the earlier grades, using a wide range of varied resources. Possible topics of study include a continuing survey of American history, from the French and Indian War through the early nineteenth century; an overview of the modern era from the Scientific Revolution through World War II; and/or studies of Africa and Central and South America.

Just to keep in mind: history is best taught through stories (and hands-on projects are always a plus).

Diaries and journals give an immediate voice to history.

Young American Voices

Marissa Moss. Houghton Mifflin Harcourt.

Fictional hand-printed and illustrated journals of kids at various points in history. *Rachel's Journal*, for example, is the story of a girl traveling west on the Oregon Trail; *Emma's Journal* is the story of a colonial girl.

Dear America

Various authors. Scholastic.

Creative fictional diaries of girls from various periods in American history from colonial times through World War II. Titles include Kathryn Lasky's *A Journey to the New World: The Diary of Remember Patience Whipple* and Patricia C. McKissack's *A Picture of Freedom: The Diary of Clotee, a Slave Girl*.

My Name Is America

Various authors. Scholastic.

Targeted at boys ages 9–12. Titles include Barry Denenberg's *The Journal of William Thomas Emerson, A Revolutionary War Patriot* and Kathryn Lasky's *The Journal of Augustus Pelletier, The Lewis and Clark Expedition, 1804*.

First-Person Histories

Various authors. Capstone Press.

Each 32-page book includes maps, timelines, and firsthand accounts from diaries of children written at the time. Among the titles are *Diary of Sally Wister: A Colonial Quaker Girl*, *Diary of Sarah Gillespie: A Pioneer Farm Girl*, and *Diary of William Bircher: A Civil War Drummer*.

Royal Diaries

Various authors. Scholastic.

Fictional diaries of female royal figures from world history.

American History

Continue in sequence, following on previous studies.

A History of US

Joy Hakim. Oxford University Press, 2007.

Each book in Joy Hakim's ten-book American history series is crammed with maps, illustrations, period reproductions, and fact boxes, but the real selling point is the appealing and well-researched narrative text. Targeted at grades 5–9, but accessible for younger kids. Highly recommended. The titles in the series are:

The First Americans: Prehistory–1600

Making Thirteen Colonies: 1600–1740

From Colonies to Country: 1735–1791

The New Nation: 1789–1850

Liberty for All? 1820–1860

War, Terrible War: 1855–1865

Reconstructing America: 1865–1890

An Age of Extremes: 1880–1917

War, Peace, and All That Jazz: 1918–1945

All the People: Since 1945

The American Story

Jennifer Armstrong. Alfred A. Knopf, 2006.

This is an illustrated compendium of a hundred short true tales from American history, arranged in chronological order. Included are the stories of John Smith and Pocahontas, Paul Revere's midnight ride, the Donner Party, the Great Fire of Chicago, Johnny Appleseed, the Wright Brothers' famous flight, Typhoid Mary, and Neil Armstrong's giant first step on the moon.

Children's Encyclopedia of American History

DK, 2014.

A chronology of American history, crammed with photos, maps, and graphics.

Cobblestone

shop.cricketmedia.com

An American history magazine targeted at ages 9–14. Available by subscription (nine issues per year, print or digital); individual issues are also available for purchase or can be found at many public libraries. Each issue is devoted to a specific theme, such as “Salem Witches,” “The Transcontinental Railroad,” “Famous Speeches,” and “The United States and World War I.”

Nathan Hale's Hazardous Tales

Nathan Hale. Amulet Books.

This inventive graphic novel series, described as a mixture of textbook and slapstick, covers the major events of American history. Many titles.

1. The French and Indian War.

Topics to cover include causes of the war, major events, the land transfers that occurred at the end of the war, and the financial implications of the British victory. Kids should know that the French and Indian War was the North American theater of the Seven Years' War between Great Britain and France. Names to know include General Edward Braddock, William Pitt, William Johnson, Jeffrey Amherst, and Montcalm and Wolfe.

Calico Captive

Elizabeth George Speare. Houghton Mifflin, 1957.

Based on an actual diary, this is the story of young Miriam, who was captured by the Indians in 1754 and sold to the French; she eventually returned home.

The Matchlock Gun

Walter D. Edmonds. Puffin, 1998.

When young Edward's father is called away to fight in the French and Indian War, Edward is left to protect his mother and little sister with an old Spanish gun. Originally published in 1941, this now-classic book is a Newbery Medal winner.

2. Causes of the American Revolution.

Topics to cover include the Stamp Act, the Townshend Acts, the Intolerable Acts, Thomas Paine and *Common Sense*, the concept of taxation without representation, the Sons of Liberty, Loyalists versus Tories, the Boston Tea Party, and the Boston Massacre. Names to know include George III, Patrick Henry, Samuel Adams, Paul Revere, John Adams, Lord North, Thomas Hutchinson, and Crispus Attucks.

America's Tea Parties

Marissa Moss. Abrams, 2016.

Everybody's heard of the Boston Tea Party—but it wasn't the only one! An interesting account, with colorful archival images.

Colonial Voices: Hear Them Speak

Kay Winters. Puffin, 2015.

As Ethan, the printer's errand boy, hurries through the streets of Boston to deliver news about an important meeting, he hears differing opinions from the citizens of the town—the baker, the teacher, the tavern keeper, and more—about the pending Revolution.

Liberty! How the Revolutionary War Began

Lucille Recht Penner. Random House, 2002.

A short chapter book covering liberty trees, taxes, tarring and feathering, the Boston Massacre and Tea Party, and all the lead-ins to war, with great color illustrations.

FICTION

Early Thunder

Jean Fritz. Puffin, 1987.

In pre-Revolutionary War Salem, young Daniel—a dedicated Tory—begins to reexamine his loyalties.

The Fifth of March

Ann Rinaldi. Houghton Mifflin Harcourt, 2004.

The story of the Boston Massacre, as seen through the eyes of 14-year-old Rachel Marsh, indentured servant to John and Abigail Adams.

My Name Is America: The Journal of William Thomas Emerson

Barry Denenberg. Scholastic, 1998.

Set in 1774, this is the fictionalized diary of 12-year-old William, who—through a kind tavern keeper—becomes involved with a group of rebels working against the British. One of the My Name Is America series.

3. The Declaration of Independence.

Topics to cover include the Continental Congress, Thomas Jefferson and the writing of the Declaration, John Hancock's famous signature, major points of the Declaration, and the significance of July 4, 1776.

See Jean Fritz's *Will You Sign Here, John Hancock?* ([this page](#)).

The Declaration of Independence in Translation

Amie Jane Leavitt. Capstone, 2016.

Historical background information and an explanation of just what the Declaration means.

The Journey of the One and Only Declaration of Independence

Judith St. George. Puffin, 2014.

A catchy chronicle of the life and times of the Declaration, beginning when Thomas Jefferson first penned its words in 1776. It's had a surprisingly active life.

4. Main events of the American Revolution.

Topics to cover include Paul Revere's ride, the Battle of Lexington and Concord and the Battle of Bunker Hill, Ethan Allen and the capture of Fort Ticonderoga, the Battle of Saratoga, the winter at Valley Forge, the support of the French, John Paul Jones and the *Bonhomme Richard*, the Battle of Yorktown and the surrender of Lord Cornwallis, and famous men and women of the Revolution. Names to know include John and Abigail Adams, Benedict Arnold, Benjamin Franklin, Nathanael Greene, Nathan Hale, Henry Knox, the Marquis de Lafayette, John Paul Jones, Molly Pitcher, Betsy Ross, and the Baron Von Steuben.

NONFICTION

Amazing Ben Franklin Inventions You Can Build Yourself

Carmella Van Vleet. Nomad, 2007.

Learn all about the man who invented the lightning rod, bifocal glasses, and the post office—and make your own letter press, piggy bank, thermometer, kite, fur hat, and fire bucket.

Also see *The Ben Franklin Book of Easy and Incredible Experiments* (Franklin Institute Science Museum, 1995).

The American Revolution for Kids

Janis Herbert. Chicago Review Press, 2002.

Historical background info, a timeline, maps, fact boxes, capsule biographies, archival pictures, and twenty-one activities—among these making a batch of homemade root beer, a powder horn, and a tricorne hat.

George Washington: 25 Great Projects You Can Build Yourself

Carla Mooney. Nomad, 2010.

The life and times of George Washington, with a timeline, maps, fact boxes, sidebars, and chatty text. Projects include making a hornbook, a compass, and a surveyor's map.

If You Lived at the Time of the American Revolution

Kay Moore. Scholastic, 1998.

Written in an interactive question-and-answer format that encourages input and discussion, this book tackles such questions as “What started the Revolution?” “Did everyone in the colonies take sides?” “If your family sided with the Loyalists, how did you support the war?” “What words and expressions came from life during the American Revolution?”

Independent Dames

Laurie Halse Anderson. Simon & Schuster, 2008.

A lively and creatively illustrated account of the women and girls who contributed to the Revolution, among them Phillis Wheatley, Abigail Adams, Deborah Sampson, and Sybil Ludington.

Let It Begin Here!

Dennis Brindell Fradin. Bloomsbury, 2009.

April 18, 9:30 P.M.: Paul Revere learns that the British army is on the march. The story of the Battle of Lexington and Concord.

Traitor: The Case of Benedict Arnold

Jean Fritz. Puffin, 1997.

A biography of the superb soldier who turned to treason.

FICTION

Chains

Laurie Halse Anderson. Atheneum, 2010.

As the Revolutionary War begins, Isabel and her younger sister Ruth—though promised freedom in their owner's will—become the property of the Loyalist Locktons of New York City. There Isabel meets Curzon, a slave with ties to the Patriots, and begins to spy on her owners for the American cause. The first of a trilogy; sequels are *Forge* and *Ashes*.

Dear America: The Winter of Red Snow

Kristiana Gregory. Scholastic, 2010.

The fictionalized diary of Abigail Stewart, who tells of conflicts among family, friends, and neighbors during the harsh winter at Valley Forge.

Guns for General Washington

Seymour Reit. Houghton Mifflin Harcourt, 2001.

The fictionalized story of young Will Knox, who accompanied older brother Henry on a dangerous mission to transport cannons from Fort Ticonderoga to help George Washington defeat the British in Boston.

I Survived the American Revolution, 1776

Lauren Tarshis. Scholastic, 2017.

Young Nathaniel Fox finds himself embroiled in the battle in New York City. One of the I Survived series.

Johnny Tremain

Esther Forbes. Houghton Mifflin Harcourt, 2011.

Winner of the 1944 Newbery Medal, this is the now-classic story of the silversmith's apprentice who, after a tragic accident, becomes involved in the Revolution.

5. The Constitution.

Topics to cover include the Articles of Confederation, the Constitutional Convention, James Madison (the “Father of the Constitution”), the Preamble, and major features of the document, including the three branches of the federal government, the concept of checks and balances, and the Bill of Rights.

The Great Little Madison

Jean Fritz. Puffin, 1998.

A vivid biography of James Madison, the man who was instrumental in uniting the colonies and formulating the Constitution.

A Kids' Guide to America's Bill of Rights

Kathleen Krull. HarperCollins, 2015.

The first ten amendments to the Constitution have had a tremendous impact on American history and your daily life. Find out how in this appealing book.

A More Perfect Union

Betsy Maestro. HarperCollins, 2008.

A picture-book account of the creation of the Constitution.

Words That Built a Nation

Marilyn Miller et al. Rodale, 2018.

An attractively illustrated guide to the documents that built America, from the Mayflower Compact to the present.

6. The new nation.

Topics to cover include the first presidencies, the president's cabinet, the establishment of the national capital at Washington, D.C., George Washington's presidency and Farewell Address, the philosophical differences between Thomas Jefferson and Alexander Hamilton, John Adams, the Alien and Sedition Acts, early political parties, Jefferson as president, the Louisiana Purchase, and the Lewis and Clark expedition.

The Captain's Dog

Roland Smith. Houghton Mifflin Harcourt, 2008.

The story of the Lewis and Clark expedition through the eyes of Meriwether Lewis's Newfoundland dog, Seaman.

George Washington for Kids

Brandon Marie Miller. Chicago Review Press, 2007.

Washington's life and times, with a timeline, maps, period illustrations, and twenty-one activities—among them making and playing a game of quoits, making beeswax candles, and designing a bookplate.

In this same format, also see *Thomas Jefferson for Kids* (Brandon Marie Miller, 2011) and *Lewis and Clark for Kids* (Janis Herbert,

2000).

You Wouldn't Want to Explore with Lewis and Clark!

Jacqueline Morley. Franklin Watts, 2013.

Informative and interesting, with catchy sidebars, captions, and speech bubbles.

7. The War of 1812 and beyond.

Topics to cover include the Napoleonic Wars, the British blockade and the impressment of seamen, William Henry Harrison and Tecumseh, Oliver Hazard Perry and the Battle of Lake Erie, the Battle of Plattsburgh, the defeat of the HMS *Guerriere* by the USS *Constitution*, Fort McHenry and Francis Scott Key's "The Star-Spangled Banner," James and Dolley Madison and the burning of the White House, Stephen Decatur, Andrew Jackson and the Battle of New Orleans, and the Treaty of Ghent. Postwar topics to cover include James Monroe and the Monroe Doctrine, and the presidencies of John Quincy Adams and Andrew Jackson.

Salt

Helen Frost. Square Fish, 2015.

Set in the Indiana Territory during the War of 1812, this is the story of the friendship between James and Anikwa, a member of the Miami tribe, at a time when war is pulling their peoples apart.

Lives of the Presidents: Fame, Shame (and What the Neighbors Thought)

Kathleen Krull. Houghton Mifflin Harcourt, 2011.

Short biographies of all the presidents from Washington to Obama.

World History

Susan Wise Bauer's *The Story of the World* series (Well-Trained Mind Press, 2006) covers world history from ancient to modern times in four volumes, for ages 8–12. The books have a Western and religious slant but

are adaptable for secular programs and can certainly lead to discussions of historical interpretation and accuracy. (In Bauer’s first volume, for example, the “earliest nomads” date to 7,000 years ago.) The text uses a narrative style intended to appeal to kids, plus black-and-white maps and illustrations. If you’re more comfortable using a textbook for guideline purposes, this is a possible choice.

Volumes in The Story of the World series are *Ancient Times: From the Earliest Nomads to the Last Roman Emperor*, *The Middle Ages: From the Fall of Rome to the Rise of the Renaissance*, *Early Modern Times: From Elizabeth the First to the Forty-Niners*, and *The Modern Era: From the Victorian Empire to the Fall of the USSR*. Accompanying activity books are also available.

Another possibility—which is what we did—is to use a good-quality college-level text for reference purposes. (Some are so well written that even younger children are interested by selections read aloud.) See, for example, *Worlds Together, Worlds Apart* by Robert Tignor et al. (W. W. Norton, 2017), a two-volume text that covers world history from the origin of *Homo sapiens* (200,000 years ago) to the present. Also available is a more concise one-volume high-school-level text by Elizabeth Pollard et al.

This is well written, well organized, well designed, and interesting, with references to reputable science. Also, unlike many, it’s a broad-based rather than a Eurocentric view of global history. Included are maps, primary sources, color illustrations, and focus questions.

Also see *World History: Patterns of Interaction* by Roger B. Beck et al. (Holt McDougal, 2012), an attractive (and hefty—it’s over 1300 pages long) history from four million BCE to the present. Included are many maps, graphs and charts, case studies, alternative perspectives, and connections to art, science, and technology.

RESOURCES

Dig into History

Cricket Media.

A magazine for ages 9–14 that covers world history and archaeology topics. Each 60-page issue provides in-depth coverage of a single theme, such as “Vikings on the Move,” “Europe’s Eleanor of Aquitaine,” and “Beijing Through Time.” Print and digital subscriptions available, and back issues are available for purchase.

History News

Various authors. Candlewick.

What if ancient civilizations had had modern newspapers? This entertaining series is full of creatively presented information. *The Egyptian News* (Scott Steedman, 2009), for example, features an exclusive on “Boy King Murdered?” and an exciting article on hippo hunting. Front-page headline for *The Roman News* is “Caesar Stabbed!”

Horrible Histories

Terry Deary. Scholastic.

An engaging, irreverent, and sometimes icky take on history, aimed at enticing young readers. Each book includes timelines, well-researched information, and cartoons. Many titles, among them *Awesome Egyptians*, *Groovy Greeks*, *Ruthless Romans*, *Dark Knights and Dingy Castles*, *Cruel Kings and Mean Queens*, and *Frightful First World War*.

History Year by Year

DK, 2013.

A detailed visual timeline from the Stone Age to the present day, crammed with information, quotations, and images, divided by era.

Also see *The Kingfisher Atlas of World History* (Simon Adams; Kingfisher, 2016) and Philip Parker’s *World History* (DK, 2017), both comprehensive histories from prehistory to the digital age, lushly illustrated with photos, maps, paintings, and images of artifacts.

Possibilities for world history studies in fourth grade include a survey of the modern era (into which American history can be incorporated) and/or overviews of African and Central and South American history. Always a good idea: ask your kids what they're interested in learning and adapt.

1. The Scientific Revolution.

“The Scientific Revolution” is a term used by historians to describe the birth of modern science, generally said to have begun with the publication in 1543 of Nicolaus Copernicus’s book on the heliocentric solar system, *On the Revolutions of the Heavenly Spheres*.

Topics to cover include advances in astronomy, William Harvey and the circulation of the blood, Anton von Leewenhoek and the invention of the microscope, the discoveries of Isaac Newton, and Benjamin Franklin and electricity. Names to know include Galileo Galilei, Johannes Kepler, Robert Hooke, and Robert Boyle.

See Joy Hakim's **Story of Science** series (Smithsonian). Titles are *Aristotle Leads the Way* (2004), *Newton at the Center* (2005), and *Einstein Adds a New Dimension* (2007).

How Ben Franklin Stole the Lightning

Rosalyn Schanzer. HarperCollins, 2002.

A picture-book account of Franklin's many ideas and inventions, among them the lightning rod.

Also see Gene Barretta's *Now and Ben: The Modern Inventions of Benjamin Franklin* (Square Fish, 2008), which shows readers how Franklin's innovations are still around today.

Isaac the Alchemist

Mary Losure. Candlewick, 2018.

An illustrated account of the life and science of Isaac Newton.

Isaac Newton and Physics for Kids

Kerrie Logan Hollihan. Chicago Review Press.

The life and accomplishments of the brilliant and bizarre Isaac Newton, with twenty-one hands-on activities, among them making a prism and a crystal garden and baking a coffin pie.

In the same format, see *Benjamin Franklin, American Genius* (Brandon Marie Miller, 2009).

Maxine Kumin's poem "The Microscope" is a funny and clever celebration of Anton von Leewenhoek ("He says he's seen a housefly's brain! / He says the water that we drink / Is full of bugs! He's mad, we think!").

2. The Age of Revolution.

Just a few years after the American Revolution came the French Revolution.

Topics to cover include the causes of the Revolution, King Louis XVI and Marie Antoinette, the storming of the Bastille, the Declaration of the Rights of Man and of the Citizen, the French Republic, the Terror, the rise of Napoleon and the Napoleonic empire, the Napoleonic Wars, Wellington and the Battle of Waterloo, the banishment of Napoleon to St. Helena, and the restoration of the Bourbons.

The Court of the Stone Children

Eleanor Cameron. Puffin, 1990.

Nina meets Dominique in the French Museum—and discovers that she has come from Napoleon's time! Her father was executed as a traitor during the French Revolution, and Domi is determined to prove his innocence. But she needs Nina's help.

The Lacemaker and the Princess

Kimberly Brubaker Bradley. Margaret K. McElderry, 2009.

Eleven-year-old lacemaker Isabelle is given a new job as companion to Marie Antoinette's daughter. It seems like a fairy-tale life—but outside the palace, revolution is brewing.

Marie Antoinette, Princess of Versailles

Kathryn Lasky. Scholastic, 2000.

The fictionalized diary of Marie Antoinette, begun when she was thirteen and betrothed to the heir to the French throne. One of the Royal Diaries series.

You Wouldn't Want to Be an Aristocrat in the French Revolution!

Jim Pipe. Franklin Watts, 2007.

A clever kid-friendly account, peppered with illustrations, sidebars, and cartoon illustrations with conversation bubbles.

Movie: *The Scarlet Pimpernel* (1982, NR), based on Baroness Orczy's swashbuckling classic, starring Anthony Andrews and Jane Seymour, is the exciting story of the English nobleman who saves French aristocrats from the guillotine.

3. The Industrial Revolution and the Victorian Era.

Topics to cover include major advances in transportation and industry, including James Watt and the steam engine, James Hargreaves and the spinning jenny, Samuel Slater and the first American textile mill, Robert Fulton and John McAdam, the rise of factories, child labor, capitalism, Karl Marx and communism, and the Great Exhibition in London. Names to know include Eli Whitney, Cyrus McCormick, Samuel Morse, and Charles Goodyear.

Pair with an abridged version of Charles Dickens's *Oliver Twist*—or see the musical adaptation, *Oliver!* (1968, G).

The Industrial Revolution for Kids

Cheryl Mullenbach. Chicago Review Press, 2014.

Historical info, a timeline, fact boxes, photos, and twenty-one hands-on projects.

The Industrial Revolution with 25 Projects

Carla Mooney. Nomad, 2011.

In the Build It Yourself series, this is a chronological history from the first textile mills to the birth of labor unions and the rise of

captains of industry, with a timeline, “Words to Know” lists, fact boxes, and hands-on activities—for example, kids can make a knitting spool, loom, and water-powered wheel.

Kids at Work

Russell Freedman. Houghton Mifflin Harcourt, 1998.

A photobiography of Lewis Hine, whose searing pictures convinced Congress of the need for child labor laws.

Mill

David Macaulay. Houghton Mifflin Hartcourt, 1999.

The story of the planning, construction, and operation of a nineteenth-century New England mill, illustrated with wonderful detailed pen-and-ink drawings.

Train: The Definitive Visual History

DK, 2014.

From the first steam engines to the bullet train, with wonderful illustrations.

Also see John Colley’s *Train* (DK, 2009), one of the Eyewitness Books, which covers the history of trains from the steam engine and the first railroads to modern times.

Vile Victorians

Terry Deary. Scholastic, 2013.

One of Deary’s Horrible Histories series (see [this page](#)), subtitled *Splats, Hats, and Lots of Rats*. With cartoons and catchy prose, the book covers Queen Victoria and Victorian daily life, literature, food, and historical facts.

Victoria, May Blossom of Britannia

Anna Kirwan. Scholastic, 2001.

The fictionalized diary of the young Victoria. One of the Royal Diaries series.

You Wouldn’t Want to Be a Victorian Servant!

Fiona MacDonald. Book House, 2016.

The less-fun side of *Downton Abbey*, but a catchy and informative read. In the same series, see *You Wouldn't Want to Be a Victorian Schoolchild!* (John Malam, 2014).

FICTION

Charles Dickens and Friends

Marcia Williams. Candlewick, 2002.

Many of Dickens's classic tales are set at the height of the Industrial Revolution. Here, illustrated in Williams's wonderful comic-strip style, are simplified versions of *Great Expectations*, *Oliver Twist*, *A Christmas Carol*, *David Copperfield*, and *A Tale of Two Cities*.

Counting on Grace

Elizabeth Winthrop. Yearling, 2007.

Twelve-year-old Grace and her best friend, Arthur, are taken out of school to work in the mill—a struggle for left-handed Grace. Then activist photographer and reformer Lewis Hines arrives, collecting evidence for the Child Labor Board.

Lyddie

Katherine Paterson. Puffin, 1995.

To help pay off the family farm debts, young Lyddie becomes a mill girl in Lowell, Massachusetts.

Sweep

Jonathan Auxier. Amulet Books, 2018.

Set in Victorian London, this is the story of 11-year-old Nan Sparrow, a chimney sweep, who—with the help of Charlie, a mysterious monster made from coal dust—tries to save the abused climbing boys from their plight.

4. Central and South American independence movements.

Topics to cover include Toussaint L'Ouverture and the Haitian Revolution; Miguel Hidalgo and the Mexican Revolution; South American liberators Simón Bolívar, José de San Martín, and Bernardo O'Higgins; and Brazilian independence.

Sugar Changed the World

Marc Aronson and Marina Budhos. Houghton Mifflin Harcourt, 2017.

The history of sugar, where it came from, and how it spread across the world, driving the slave trade and eventually promoting revolution.

Toussaint L'Ouverture

Walter Dean Myers. Simon & Schuster, 1996.

The liberation of Haiti under Toussaint L'Ouverture, who became the leader of a slave army.

5. The growth of nations.

Topics to cover are the history of Russia including modernization under Peter the Great, Catherine the Great, Greece and the Ottoman Empire, the unification of Germany under Bismarck, and Garibaldi in Italy.

Catherine, The Great Journey: Russia, 1742

Kristiana Gregory. Scholastic, 2005.

The fictionalized diary of Prussian princess Sophia, en route to Russia to marry the heir to the throne.

Peter the Great

Diane Stanley. HarperCollins, 1999.

Crowned tsar of Russia at the age of 10, Peter wanted nothing so much as to bring Russia into the modern world. A picture-book biography.

6. The Age of Imperialism.

Topics to cover include Livingstone and Stanley in Africa, King Leopold and the Belgian Congo, the building of the Suez Canal, African colonization, Matthew Perry and Japan, the Boxer Rebellion, Kipling and empire, and the Spanish-American War.

Africa for Kids

Harvey Croze. Chicago Review Press, 2006.

An illustrated overview of the African continent, with hands-on projects and activities.

Bully for You, Teddy Roosevelt!

Jean Fritz. Puffin, 1997.

A catchy chapter biography of one of America's most colorful presidents.

Commodore Perry in the Land of the Shogun

Rhoda Blumberg. HarperCollins, 2003.

Japan was a feudal society under the shogunate until Commodore Matthew Perry arrived in the nineteenth century, bringing Western technology.

Shipwrecked!

Rhoda Blumberg. HarperCollins, 2003.

In early nineteenth-century Japan, the law was that any person who left the country and later returned would be put to death. So when 14-year-old Manjiro was shipwrecked and rescued by an American whaling ship, he decided to go to America. Based on a true story.

Theodore Roosevelt for Kids

Kerrie Logan Hollihan. Chicago Review Press, 2010.

Roosevelt's life and times, with fact boxes, photos, and hands-on activities.

7. Advances and innovations.

Topics to cover are Louis Pasteur, Robert Koch, Thomas Edison, Alexander Graham Bell, Andrew Carnegie, Gustave Eiffel, Henry Ford, Guglielmo Marconi, the Wright Brothers, and Teddy Roosevelt and the Panama Canal.

Inventions and Discovery

Various authors. Capstone.

Many titles, among them *Louis Pasteur and Pasteurization*, *Thomas Edison and the Lightbulb*, *Samuel Morse and the Telegraph*, and *The Wright Brothers and the Airplane*.

The Remarkable Rough-Riding Life of Theodore Roosevelt

Cheryl Harness. National Geographic, 2007.

An engaging biography that covers the rise of Empire America, national parks, the Panama Canal, and the Big Stick policy.

Thomas Edison for Kids

Laurie Carlson. Chicago Review Press, 2006.

Edison's life and works, with a timeline, illustrations, and hands-on activities—among them building electrical circuits, a telegraph, and a zoetrope.

In the same format, see *The Wright Brothers for Kids* (Mary Kay Carson, 2003) and *Alexander Graham Bell for Kids* (Mary Kay Carson, 2018).

Timeless Thomas: How Edison Changed Our Lives

Gene Barretta. Square Fish, 2017.

Where would we be without record players, batteries, movie cameras, and lightbulbs?

The Wright Brothers: How They Invented the Airplane

Russell Freedman. Holiday House, 1991.

Includes photos and diagrams taken from the Wright brothers' journals. A Newbery Honor book.

8. World War I and the Great Depression.

See Joy Hakim's *A History of US: War, Peace, and All That Jazz* ([this page](#)).

Topics to cover include the causes of World War I, major events of the war, the Russian Revolution, the Romanovs, Lenin and Stalin, women's suffrage and the Nineteenth Amendment, the Jazz Age, Charles Lindbergh, Alexander Fleming and penicillin, the Roaring Twenties, Black Tuesday, and the Great Depression.

WORLD WAR I

Archie's War

Marcia Williams. Candlewick, 2007.

The fictionalized World War I scrapbook of 10-year-old Archie, documenting the events of the war and their impact on daily life.

In Flanders Fields

Linda Granfield. FitzHenry and Whiteside, 2014.

A picture-book version of John McCrae's "In Flanders Fields," one of the best-known war poems ever written.

Treaties, Trenches, Mud, and Blood

Nathan Hale. Amulet, 2014.

World War I from Nathan Hale's Hazardous Tales, [this page](#).

Truce

Jim Murphy. Scholastic, 2009.

A short chapter history of World War I. The title refers to the Christmas truce in which the troops defied their commanding officers and briefly stopped fighting. Illustrated with archival photos.

War Horse

Michael Morpugo. Scholastic, 2010.

World War I as told by Joey, a horse sold to the army and sent to the Western Front.

Movie: *War Horse* (2011), based on the book, was directed by Steven Spielberg (rated PG-13 for scenes of war violence).

World War I for Kids

R. Kent Rasmussen. Chicago Review Press, 2014.

A history of the Great War, with maps; a timeline; fact boxes; capsule biographies of such key players as Kaiser Wilhelm, the Red Baron, and Edith Cavell; and hands-on activities such as making a periscope and writing a letter home as a soldier in the trenches.

THE GREAT DEPRESSION

The Great Depression for Kids

Cheryl Mullenbach. Chicago Review Press, 2015.

A timeline, historical background information, capsule biographies, period photos, and hands-on activities.

Children of the Great Depression

Russell Freedman. Houghton Mifflin Harcourt, 2010.

A photo essay based on memoirs, letters, and other firsthand accounts.

Ida Early Comes Over the Mountain

Robert Burch. Puffin, 1990.

A short chapter book set in rural Georgia during the Great Depression. The lives of the Sutton children take a turn for the better when Ida Early arrives.

A Long Way from Chicago

Richard Peck. Puffin, 2004.

During the Great Depression, Joey and Mary Alice are sent to live with their eccentric grandmother in rural Illinois. Told in short vignettes beginning when the kids are nine and seven, and ending when Joey's troop train passes through town in 1942.

Out of the Dust

Karen Hesse. Scholastic, 1999.

In this novel-in-verse, dust is devastating the family farm, and a horrible accident has killed Billie Jo's mother and injured her hands so that she can no longer play her beloved piano. The bleak story of a young survivor. A Newbery Medal winner.

Rose's Journal: The Story of a Girl in the Great Depression

Marissa Moss. Houghton Mifflin Harcourt, 2003.

A fictionalized diary, hand-printed and illustrated on notebook paper.

9. World War II.

Topics to cover include the causes of and major participants in the war, the rise of Hitler, the Nazi blitzkrieg, Winston Churchill and the British at war, Stalin and Russia, the Holocaust, Pearl Harbor and the United States at war, D-Day and victory in Europe, the Manhattan Project, the bombing of Hiroshima and Nagasaki, and V-J Day.

World War II for Kids

Richard Panchyk. Chicago Review Press, 2002.

A timeline, maps, historical background, anecdotes and letter excerpts, and related hands-on activities—among them breaking a code, planting a victory garden, and creating a radio adventure program.

Snow Treasure

Marie McSwigan. Puffin, 2006.

The story of how Norwegian children on sleds smuggled the nation's gold out of the country in the face of the Nazi occupation.

Twenty and Ten

Claire Huchet Bishop. Puffin, 1978.

During the German occupation of France, French schoolchildren and a Catholic nun hide ten Jewish refugee children.

The War That Saved My Life

Kimberly Brubaker Bradley. Puffin, 2016.

Ten-year-old Ada, who has a clubfoot, has never been let out of the family's one-room apartment, until she runs away to join her brother Jamie, who is being evacuated from London during World War II. Away from their vicious mother, the two find a new life.

When Hitler Stole Pink Rabbit

Judith Kerr. Puffin, 2009.

The semi-autobiographical novel of 9-year-old Anna and her Jewish family escaping from Nazi Germany in the 1930s.

10. After World War II.

Topics to cover include the Marshall Plan, the United Nations, Gandhi in India, the Cold War, the Berlin Wall, Mao Zedong in China, Jonas Salk and the polio vaccine, the computer revolution, the race to the moon, and the breakup of the Soviet Union.

Geography

David Jouris's **All Over the Map** books are, sad to say, out of print—but a great project for young geographers involves producing your own versions. Jouris's maps are simple themed maps of the United States, each showing—for example—all the towns named for animals (Alligator, Mississippi; Porcupine, South Dakota), women or men, gems and minerals, plants, colors, astronomical features, foreign countries, and many more. You'll need a few copies of a blank U.S. map, an atlas, and ingenuity.

Geo Bee

www.nationalgeographic.org/bee

The geography equivalent of the Scripps National Spelling Bee for grades four through eight, sponsored by National Geographic. See the website for practice quizzes and entry information.

1. Review and reinforce concepts covered in previous geography studies.

Kids should be familiar with a range of maps, including political, physical, population density, relief, and thematic maps. They should be able to use map scales to measure distances between locations, should know that latitude and longitude are measured in degrees, and should be able to find a location on a map given latitudinal and longitudinal coordinates. They should be able to define and locate the prime meridian and the international date line.

2. Survey the major mountain ranges of the world.

Kids should know the definitions of *ridge* and *valley*, and be familiar with the rain shadow effect. They should be able to name, locate, and describe the major mountain ranges and peaks of the world, including the Andes, Rockies, Appalachians, Himalayas, Urals, Atlas, and Alps.

How high are the highest mountains in each mountain range? Use the data to make graphs.

Everest: The Contest

Gordon Korman. Scholastic, 2012.

Seven teenagers compete to be chosen for a team to climb Mount Everest. Sequels are *The Climb* and *The Summit*.

Let's Explore...Mountains

Lonely Planet Kids, 2017.

Puzzles, stickers, coloring pages, and fascinating facts accompany Marco and Amelia as they explore famous mountains of the world. One of a series that includes *Let's Explore...Ocean*, *Let's Explore...Jungle*, and *Let's Explore...Desert*.

The Mountains of Tibet

Mordecai Gerstein. Barefoot Books, 2013.

A Tibetan woodcutter dies and is given a choice of another life, anywhere he likes. (Tie-in to philosophy.)

3. Relate studies in other disciplines to geographical concepts, features, and locations.

4. Learn the names of the states and their capitals.

By time-honored tradition, fourth grade is the year when kids memorize the names of the states and their capitals. This is useful in theory, but it seems a waste of time when you can so easily look them up. A more interesting project may be to investigate why state capitals are where and what they are. Why, for example, is Albany the capital of New York rather than New York City? Why Sacramento, California, rather than San Francisco or Los Angeles? Why Harrisburg, Pennsylvania, rather than Philadelphia?

The Scrambled States of America

Laurie Keller. Square Fish, 2002.

In this quirky picture book, dissatisfied states decide to swap places.

The 50 States

Gabrielle Balkan. Wide Eyed Editions, 2015.

Explore the states with fifty fact-filled maps.

Don't Know Much About the 50 States

Kenneth C. Davis. HarperCollins, 2004.

An illustrated guide to all fifty states, packed with fun facts. Find out which state has the highest waterfalls and the most tornadoes, and how many Rhode Islands could fit in Alaska.

True Books—My United States

Various authors. Children's Press.

One short, informative book for each of the fifty states, illustrated with color photos.

In the News

See [this page](#).

Science

Muse

shop.cricketmedia.com

An award-winning magazine of science, technology, and the arts for ages 9–14.

Frank Einstein Series

Jon Scieszka. Amulet, 2017.

In this fun series, kid genius Frank, with robots Klink and Klank, takes on science topics. Real information with a wacky sense of humor.

Lives of the Scientists: Experiments, Explosions (and What the Neighbors Thought)

Kathleen Krull. Houghton Mifflin Harcourt, 2016.

Short biographies of eighteen famous scientists, filled with information and fun facts. Included are Galileo, Isaac Newton, Charles Darwin, George Washington Carver, Marie Curie, Barbara McClintock, Rachel Carson, and more.

Max Axiom Series

Various authors. Capstone.

This series of action-packed graphic novels stars Max Axiom, Super Scientist, as he explores everything from atoms to ecosystems. Many titles.

Q Is for Quark

David M. Schwartz. Tricycle, 2009.

A science alphabet book, from atom, black hole, and clone to xylem and Y chromosome, with cartoon illustrations and

substantive explanations.

A Really Short History of Nearly Everything

Bill Bryson. Delacorte, 2009.

A kid-friendly Young Readers version of Bryson's popular adult science compendium, for ages 8–12.

You Wouldn't Want to Live Without Series

Various authors. Franklin Watts.

In the same format as the informative but zany You Wouldn't Want to Be series ([this page](#)), these cover the modern inventions and discoveries that we'd hate to do without. Sample titles are *You Wouldn't Want to Live Without Antibiotics*, *You Wouldn't Want to Live Without Clean Water*, and *You Wouldn't Want to Live Without Electricity*.

PAIR SCIENCE WITH POETRY!

Joyful Noise

Paul Fleischman. HarperCollins, 2005.

Poems for two voices about life in the insect world.

Also see Fleischman's *I Am Phoenix* (1989), in the same format, about the world of birds.

National Geographic Book of Nature Poetry

J. Patrick Lewis, ed. National Geographic, 2015.

Nature-themed poems selected by poets from a wide range of time periods and countries, illustrated with gorgeous color photographs.

The Poetry of Science

Sylvia Vardell and Janet Wong. Pomelo, 2015.

Science-themed poems by seventy-eight different poets.

Physical Science

Wile E. Coyote: Physical Science Genius

Various authors. Capstone.

In these short books, the hapless Roadrunner-chasing Wile E. Coyote introduces kids to a wide range of science concepts, from states of matter to simple machines, gravity, force and motion, and energy. Titles include *Thud!*, *Smash!*, *Whoosh!*, and *Splat!*

1. Explore and understand the properties of electricity and magnetism.

Topics to cover include current and static electricity; electrical circuits; electromagnets and their use in everyday devices; conductors and insulators; the conversion of electrical energy to heat, light, and motion; electrical safety precautions and electrical hazards; and the uses of electricity in daily life.

Electricity

Steve Parker. DK, 2013.

This Eyewitness book covers the history of electricity from the first discoveries to modern times, with gorgeous illustrations.

Energy

Kathleen M. Reilly. Nomad, 2009.

Why we need power and how we get it, from electricity to petroleum, nuclear power, wind power, hydropower, and more, with twenty-five hands-on projects.

MudWatt

www.magicalmicrobes.com

Build your own fuel cell that runs on muddy microbes. A great STEM project for young scientists and engineers.

2. Explore and understand the basic concepts of chemistry.

Topics to cover include concepts of mass and density, features of elements and compounds, the definition of *mixture* and *solution*, and the characteristics of dilute, concentrated, and saturated solutions. Kids should be aware of the various ways in which to separate the components of a solution, such as chromatography, distillation, and evaporation. They should also be able to define *solvent* and *solute*, and should experiment with a range of dilute, concentrated, and saturated solutions. (Try making rock candy!)

Kids should know what protons, neutrons, and electrons are, and should know that an object's mass is a measure of its actual amount of matter, while weight varies with gravity. They should also be able to calculate and compare densities.

They should know that elements, the basic units of matter, consist of only one kind of atom and that there are more than 110 known elements. They should also be able to name and describe assorted basic elements.

Amazing Kitchen Chemistry

Cynthia Light Brown. Nomad, 2008.

Covers atoms and molecules, mixtures, reactions, acids and bases, states of matter, and polymers with hands-on activities. Make an Alka-Seltzer rocket, marbled paper, and bubble solution.

Chemically Active

Vicki Cobb. HarperTrophy, 1993.

Out of print, but available in used copies and well worth tracking down. Clearly explained chemical principles and better-than-average hands-on experiments. Isolate and test oxygen and hydrogen; make a galvanometer; isolate chlorine from household bleach; experiment with chromatography and flame tests.

Explore Atoms and Molecules!

Janet Slingerland. Nomad, 2017.

An introduction to atoms, elements, molecules, and chemical reactions with twenty-five hands-on projects.

Mason Jar Science

Jonathan Adolph. Storey, 2018.

Cool activities in the fields of chemistry, earth science, botany, biology, and physics, all with Mason jars.

Marie Curie for Kids

Amy M. O'Quinn. Chicago Review Press, 2016.

Curie's life and scientific discoveries, with period photos, sidebars, and twenty-one hands-on activities.

MEL Science

melscience.com

A subscription service for ages 9–14, in which a hands-on chemistry kit containing reagents, equipment, and an instruction manual arrives each month. Expand on the service through a smartphone app and website links.

Chemistry Sets

Chemistry sets, since their heyday in the 1950s and 1960s, have devolved into flavorless kits with which kids can't do anything much. These are undeniably safer than the sets of yesteryear—no more uranium, for example, so you don't need to worry about kids creating a nuclear bomb in the basement—but scientists argue that we've become so ultra-cautious that kids now are deprived of substantive chemistry. Exceptions to the dismal rule are the Thames & Kosmos chemistry sets

(www.thamesandkosmos.com), generally recommended as the best of the bunch.

The Thames & Kosmos Kids First Chemistry Set for ages 8 and up, for example, has instructions and materials for twenty-seven different experiments, including chemical assays, acid-base reactions, crystallization, and chromatography. Chemistry C1000, for ages 10 and up, has materials and instructions for 125 experiments; and the top-of-the-line C3000, for ages 12 and up, has an impressive collection of chemicals and glassware, plus a tripod stand and an alcohol burner.

Life Science

1. Reinforce and expand upon earlier studies of ecosystems.

Kids should recognize and identify structural and behavioral adaptations that allow plants and animals to survive in specific environments. They should understand the relationship between available natural resources and population densities, and be able to define and cite examples of carnivores, herbivores, omnivores, and decomposers. They should also understand predator/prey relationships and be able to identify symbiotic relationships, including mutualism, commensalism, and parasitism.

Amazing Biome Projects You Can Build Yourself

Donna Latham. Nomad, 2009.

A catchy overview of nine different biomes, with maps, diagrams, and fact boxes. Sample projects: make a papier-mâché globe, a food chain flipbook, and recycled paper.

Who Would Win?

Jerry Pallotta. Scholastic.

Each of these short books pairs fearsome creatures in a duel, with background info and interesting facts. Who would win: whale or giant squid? Tarantula or scorpion? Many titles.

2. Concepts of evolution.

Billions of Years, Amazing Changes

Laurence Pringle. Boyds Mills, 2011.

A summary of the evidence for evolution from the fields of genetics, geology, paleontology, and medicine, with great color photos.

Charles Darwin and Evolution for Kids

Kristan Lawson. Chicago Review Press, 2003.

An overview of Darwin's life and work, with illustrations, fact boxes, and twenty-one hands-on activities.

Evolution: How We and All Living Things Came to Be

Daniel Loxton. Kids Can Press, 2010.

A history of evolution, from the discoveries of early fossil hunters to Darwin's concept of natural selection to evolutionary science in the present day.

The Evolution of Calpurnia Tate

Jacqueline Kelly. Square Fish, 2011.

Eleven-year-old Calpurnia Tate, growing up in Texas at the turn of the twentieth century, is fascinated by science and natural history. Encouraged by her grandfather, who gives her a copy of Darwin's *Origin of Species*, she still has an uphill battle against the conventions of the time.

Life on Earth

Steve Jenkins. Houghton Mifflin Harcourt, 2002.

A remarkable illustrated history of all the millions who have lived on earth.

3. Continue studies of human anatomy and physiology.

Kids should build upon existing knowledge of the human body and its systems, concentrating on the circulatory, respiratory, and endocrine systems. For the circulatory system, topics to cover include the structure and function of the heart, the major components of blood, types of blood vessels (arteries, veins, and capillaries), the blood clotting process, blood types and blood transfusions, and the causes and treatments of heart attacks. For the respiratory system, kids should know the components of the system, the structure and function of the lungs, and the relationship between smoking and lung disease. For the endocrine system, topics to cover include glands and hormones and their functions.

50 Things You Should Know About the Human Body

Angela Royston. QEB, 2015.

Each chapter creatively covers a different body system.

Brain Games

Jennifer Swanson. National Geographic, 2015.

The truly amazing science of the brain.

Brain Lab for Kids

Eric H. Chudler. Quarry Books, 2018.

Various chapters cover neurons, the brain, reflexes, taste, smell, vision, touch, hearing, sleep, and memory.

Also see Chudler's terrific Neuroscience for Kids website at faculty.washington.edu/chudler/neurok.html.

Human Body!

DK, 2017.

A visual encyclopedia of human anatomy and physiology with stunning 3-D imagery.

Earth/Space Science

1. Continue and expand upon studies of geology introduced in previous grades.

Topics to cover include the inner structure of the earth, earthquakes and volcanoes, Alfred Wegener and the theory of continental drift, plate tectonics, mountain formation, the contrast between rapid and slow geologic processes (for example, volcanic eruptions and earthquakes versus weathering and erosion), and the rock cycle and soil formation.

2. Paleontology.

Topics to cover include types of fossils and their formation, the fossil record and its use in reconstructing the past history of life on earth, and the four major eras of geologic time and their characteristics.

Dinosaur Empire!

Abby Howard. Amulet, 2017.

A graphic novel in which Ronnie and next-door neighbor Ms. Lernin, a retired paleontologist, go back in time to visit the three periods of the Mesozoic Era: the Triassic, Jurassic, and Cretaceous. Sequels include *Ocean Renegades!* (2018), in which Ronnie and Ms. Lernin visit the Paleozoic, and *Mammal Takeover!* (2019), in which the pair visit the Cenozoic.

3. Continue to expand upon studies of meteorology introduced in previous grades.

Topics to cover include the layers of the atmosphere, the cause of wind, air pressure, cold and warm fronts, clouds and cloud types, storms, and weather instruments and forecasting. For example, kids should be able to define *troposphere*, *stratosphere*, *mesosphere*, and *ionosphere*, and identify stratus, cumulus, and cirrus clouds. They should know that air pressure is measured with a barometer and understand the implications of barometric pressure changes. They should also understand the causes of thunder and lightning, and know the difference between weather and climate.

Check out online sources for building your own weather instruments.

Foreign Language

See [this page](#), [this page](#), [this page](#).

For a good supplement to foreign language programs, try foreign language stories, of which many are available, both in print and online. Many of the Dr. Seuss books, for example, are available in foreign editions, including Spanish, French, Japanese, and Hebrew; Hergé's Tintin books are available in French, Spanish, and German.

FOR LATIN LEARNERS

Artes Latinae

Bolchazy-Carducci Publishers.

www.bolchazy.com

A programmed, self-teaching Latin course designed to be used by multiple levels of students, each learning at their own pace. Also available from the website are storybooks and other resources in Latin.

The Arts

Pair a wide range of hands-on projects with fiction and nonfiction books, biographies of famous artists, and field trips.

Visual Art

1. Use knowledge of the basic elements of art and principles of design to discuss works by famous artists, and to create original artworks.

Encourage kids to make their own versions of classic artworks. There are many helpful lesson plans online, covering everything from Picasso portraits to Jackson Pollock splatters.

A Child's Introduction to Art

Heather Alexander. Black Dog & Leventhal, 2014.

An overview of famous painters, styles, and periods, through the works of forty prominent artists. Included are fun art projects, such as Q-tip pointillism and tissue-paper stained-glass windows. Illustrated with color photos of masterpieces.

A History of Pictures for Children

David Hockney and Martin Gayford. Harry N. Abrams, 2018.

From cave paintings to computer art, with interesting commentary and wonderful illustrations.

Vincent's Starry Night and Other Stories

Michael Bird. Laurence King, 2016.

An illustrated history of art told through stories, from the cave painters to the present day.

2. Experiment with a variety of art media and techniques, including drawing, painting, sculpture, printmaking, pottery, and fiber arts.

Drawing with Children

Mona Brookes. J. P. Tarcher, 1996.

A lesson-by-lesson approach for beginners of all ages. Learn with your kids.

Drawing on the Right Side of the Brain

Betty Edwards. Tarcher/Perigee, 2012.

A surprising take on drawing—especially for our largely left-brained family, with one impressively right-brained kid.

The Drawing Lesson

Mark Crilley. Watson-Guptill, 2016.

A graphic novel that teaches you how to draw—along with David, a hopeful young artist, who meets a mentor in the park.

3. Study art in conjunction with other academic disciplines across the curriculum.

Music

As in art, kids should pursue a multifaceted program, with instrumental and vocal activities, music appreciation, music theory, and music history. In public schools, fourth grade is often the year in which kids begin to play a band or orchestral instrument.

1. Reinforce and expand upon the musical concepts covered in earlier grades.

Kids should know the notes of the treble clef; recognize whole, half, quarter, and eighth notes, and whole, half, and quarter rests; and recognize and know the meanings of tied and dotted notes and sharps and flats. This comes with the territory if kids are learning to play a musical instrument.

2. Be able to recognize the orchestral families and their individual members by sight and sound.

Kids should also know the difference between an orchestra and a band.

The Story of the Orchestra

Robert Levine. Black Dog & Leventhal, 2000.

An illustrated introduction to music history with an accompanying seventy-minute CD.

Movies: *Mr. Holland's Opus* (1995), the story of an influential high school music teacher (PG); and *The Music Man* (1962), with Robert

Preston and Shirley Jones, the story of con artist Howard Hill, who, in spite of himself, creates a marching band (G).

3. Recognize and identify vocal ranges.

Kids should know the sounds of soprano, mezzo-soprano, alto, tenor, baritone, and bass voices.

Barefoot Book of Stories from the Opera

Shahrukh Husain. Barefoot Books, 2015.

The illustrated stories of seven famous operas.

Bravo! Brava! A Night at the Opera

Anne Siberell. Oxford University Press, 2002.

The story of opera for young readers, with history, production details, and synopses of famous opera plots.

Good operas for beginners are Mozart's *The Magic Flute*, a fairy-tale story about Prince Tamino, who is given a magic flute by Pamina, the Queen of the Night; and Gian Carlo Menotti's *Amahl and the Night Visitors*, a story of a disabled boy who can walk only with a crutch and the Three Wise Men. Available on both CD and DVD.

4. Listen and respond to a range of pieces by well-known composers and to folk and ethnic musical selections.

Kids should be able to identify repeating and contrasting phrases and simple formal structures in music. They should also be able to associate certain selections with the appropriate composer.

5. Participate in instrumental and vocal performances, group and solo.

Many music instructors arrange recitals for their students; also, homeschoolers can often participate in public school music groups, bands,

or orchestras. Check out community choirs, conservatories, and other musical organizations.

Drama

If you've got would-be actors, check out community opportunities such as community theaters, whose productions often have roles for kids.

SHAKESPEARE FOR KIDS

William Shakespeare and the Globe

Aliki. HarperTrophy, 2000.

Written in five "acts," this is a delightfully illustrated picture-book history of Shakespeare and his plays.

Bard of Avon

Diane Stanley. HarperCollins, 2015.

An award-winning picture-book biography, with illustrations by Peter Vennema.

Tales from Shakespeare

Charles and Mary Lamb. Puffin, 2010.

Classic retellings of Shakespeare's plays in short-story format.

There are many alternatives, including Geraldine McCaughrean's *Stories from Shakespeare* (Orion, 2017) and Leon Garfield's *Shakespeare Stories* (NYR Children's, 2015).

Shakespeare for Kids

www.folger.edu/shakespeare-kids

From the Folger Shakespeare Library, many resources including scripts for short excerpts from several of the plays.

FICTIONAL SHAKESPEARE

King of Shadows

Susan Cooper. Margaret K. McElderry, 2001.

Recently orphaned Nat travels to London to play the part of Puck in *A Midsummer Night's Dream*—and is transported back in time to the days of Shakespeare himself.

Secrets of Shakespeare's Grave

Deron R. Hicks. Houghton Mifflin Harcourt, 2013.

Twelve-year-old Colophon Letterford is on a race to discover the link between her family's literary legacy and Shakespeare's tomb. The first of the Shakespeare Mysteries series.

The Shakespeare Stealer

Gary Blackwood. Puffin, 2000.

Widge, an orphan, has been sent to the Globe Theater to steal Shakespeare's new play, *Hamlet*. Sequels are *Shakespeare's Scribe* and *Shakespeare's Spy*.

Shakespeare's Secret

Elise Broach. Square Fish, 2007.

Sixth grader Hero—who owes her Shakespearean name to her father, a Shakespeare scholar—is caught up in a quest for a hidden diamond, once part of an Elizabethan necklace, that may lead to the true identity of Shakespeare.

Philosophy and Comparative Religion

David White's *Philosophy for Kids: 40 Fun Questions That Help You Wonder About Everything* (Prufrock Press, 2001) is a great discussion promoter targeted at grades four through twelve. Kids wrestle with questions such as Are you a fair and just person? Can you lie to yourself? Are numbers and people equally real? Are you the same person that you were five years ago? If many people think something is true, is it true?

The Little Prince

Antoine de Saint-Exupéry. Mariner, 2000.

The Little Prince, who lives on a tiny asteroid, travels from planet to planet learning about human nature and eventually lands in the Sahara Desert, where he meets a pilot who was the victim of a plane crash. A thought-provoking book.

Health and Physical Education

For sports-loving kids, tie sports to other academic disciplines. There are many terrific fiction and nonfiction books for a wide range of ages featuring sports and athletes, as well as creative connections to history and math.

Also see *Sports Illustrated for Kids* (www.sikids.com), which features sports news, information, and games for ages 8–15. Print and digital editions available by subscription.

Becoming Kareem

Kareem Abdul-Jabbar. Little, Brown, 2017.

A thoughtful and eye-opening autobiography of the famous basketball star.

Casey at the Bat

Ernest L. Thayer. Chronicle Books, 2000.

Scrapbook-like illustrations of period newspaper clippings, baseball cards, and other memorabilia accompany Thayer's classic poem about a baseball disaster in Mudville.

Lives of the Athletes: Thrills, Spills (and What the Neighbors Thought)

Kathleen Krull. Houghton Mifflin Harcourt, 2013.

A collection of short, human-interest-crammed biographies of twenty famous athletes, including Babe Ruth, Jackie Robinson,

Johnny Weissmuller, Sonja Henie, Wilma Rudolph, and Babe Didrikson Zaharias.

Super Sports Infographics Series

Various authors. Lerner.

Engagingly presented facts and statistics. Titles include *Super Baseball Infographics*, *Super Football Infographics*, *Super Basketball Infographics*, and *Super Hockey Infographics*.

Women in Sports

Rachel Ignotofsky. Ten Speed Press, 2017.

Profiles of fifty fabulous female athletes.

1. Identify a range of activities associated with the major components of physical fitness: cardiovascular health, muscular strength and endurance, and flexibility.

2. Participate in a range of age-appropriate indoor and outdoor athletic activities.

Try individual, small-group, and team activities, such as gymnastics, dance, swimming, skating, hiking, skiing, and soccer.

3. Participate in a program of drug education.

Kids should understand the negative aspects of alcohol, tobacco, and illegal drug use, and should be aware of safe practices for the use of prescription and nonprescription drugs.

4. Understand the elements of good nutrition, and the relationships among diet, health, and energy.

5. Know basic first-aid practices.

Life Skills

Between the ages of 10 and 13, kids generally become capable of doing more and more on their own. For example, they should be able to do laundry, change their own beds, plan and prepare a multi-ingredient meal, use the oven, iron clothes, mow the lawn, watch younger siblings, work in the garden, and use basic hand tools.

Raddish

www.raddishkids.com

A subscription cooking club for kids. Participants get a monthly themed cooking class in a box with recipe guides, projects, and grocery lists. Appropriate for a wide range of ages (some with parental help).

ChopChop

www.chopchopmag.org/magazine

A magazine of varied healthy recipes, food facts, games, puzzles, and informational articles for young cooks and their families. Published quarterly.

Computer and Technology Skills

Continue keyboarding practice. We taught our kids to type by showing them where to put their fingers on the keyboard; they taught themselves from there. For those who want a better-organized approach, there are many software programs that teach typing, targeted at a range of ages, and many online keyboarding games and practice exercises.

Continue to build on existing computer skills.

1. Know shortcuts for performing various functions, such as saving and printing documents and creating hyperlinks.

2. Create folders to organize files; save documents to folders and access documents from folders.

3. Be aware of safety and privacy issues.

By fourth grade, kids are usually accessing the internet independently. Make sure they know never to reveal personal information online and are aware of the difference between in-person friends and online “friends.”

4. See coding resources, [this page](#), [this page](#).

TechRocket

www.techrocket.com

Coding and design courses for ages 7–19 in Python, iOS, Java, Minecraft, and more.

Video Games: Design and Code Your Own Adventure

Kathy Ceceri. Nomad, 2015.

Activities and information for young game-builders, plus help for making your own games with MIT's Scratch ([this page](#)).

Engineering

EXPERIMENT!

Electronics for Kids

Oyvind Nydat Dahi. No Starch Press, 2016.

Clear explanations and awesome projects. (For many, you need to be able to solder; kids will need adult help.)

The Robot Book

Bobby Mercer. Chicago Review Press, 2014.
Instructions for twenty easy-to-build bots.

LittleBits

www.littlebits.com

Easy-to-use color-coded electronic building blocks, suitable for making any number of inventions. Also see the LittleBits Invention kits.

Arduino

www.arduino.cc

Boards and modules that allow kids to do a wide range of electronic projects. The Starter Kit includes a book with fifteen step-by-step tutorials.

Raspberry Pi

www.raspberrypi.org

A tiny, affordable computer that can be used to learn programming.

Kano

kano.me

Build your own computer—and then learn how to code, with step-by-step creative challenges. Several kits, including one for building a Harry Potter–style coding wand.

CHAPTER 10

Grade Five

All men who have turned out worth anything have had the chief hand in their own education.

—SIR WALTER SCOTT

Language Arts

Literature

By fifth grade, kids should generally be competent and independent readers, pursuing their own interests through a wide variety of books and periodicals. A buzz phrase for such independent readers is “sustained silent reading,” which in practice means that kids should curl up on a bed, chair, or living room rug and read to themselves. Formal curricula recommend thirty minutes of this daily. This doesn’t mean that you should stop reading aloud as a family, which is always a plus.

The inquiry-based Junior Great Books program ([this page](#)) for grade five includes “Charles” by Shirley Jackson, “All Summer in a Day” by Ray Bradbury, and “Kaddo’s Wall,” a West African folktale.

1. Read a wide range of grade-appropriate fiction and nonfiction.

Often recommended for grade five:

Bridge to Terabithia

Katherine Paterson. HarperCollins, 2017.

Eleven-year-old Jess and Leslie, the new girl at school, form a fast friendship and invent the magical kingdom of Terabithia together in their local woods.

Brown Girl Dreaming

Jacqueline Woodson. Puffin, 2016.

Told in verse, the story of growing up as an African American in the 1960s and 1970s, alternating between the two worlds of New York and South Carolina.

The City of Ember

Jeanne DuPrau. Yearling, 2004.

The city of Ember is the last refuge of the human race, but now, after two hundred years, the city is beginning to fail. Several sequels.

Dear Mr. Henshaw

Beverly Cleary. HarperCollins, 2000.

Leigh's parents have divorced, and Leigh and his mother have moved to a new town. Struggling to deal with anger and isolation, Leigh is given a class assignment to write to a favorite author and forges a rewarding friendship with Mr. Henshaw.

The Giver

Lois Lowry. Houghton Mifflin Harcourt, 2014.

This Newbery Medal winner is the story of 12-year-old Jonas, growing up in a dystopian community, who is assigned a role as the group's Receiver of Memory—and begins to discover some hard truths about reality.

Island of the Blue Dolphins

Scott O'Dell. Houghton Mifflin Harcourt, 2010.

Another Newbery winner, this is the story of Karana, a Native American girl who spends eighteen years alone on an island off the California coast in the early 1800s.

Shiloh

Phyllis Reynolds Naylor. Atheneum, 2000.

Eleven-year-old Marty discovers Shiloh, a mistreated beagle puppy, and—set on saving him—steals him from his owner. A lot to talk about here about the nature of right and wrong.

Wonder

R. J. Palaccio. Knopf, 2012.

The story of 10-year-old Auggie Pullman, who suffers from severe facial malformations, and who is headed for public school for the first time. There he finds that acceptance isn't easy—but ultimately learns that what's really important is what you're like inside.

The Newbery Medal is an annual prize awarded to the author of “the most distinguished contribution to American literature for children.” For a complete list of winners from 1922 to the present, go to the American Library Association website (www.ala.org) and visit the Newbery Medal page.

2. Evaluate works of literature through discussion, debate, and written critique.

Kids should be familiar with such literary features as story development, author's purpose, narrative point of view, conflict and resolution, character motivation, and theme. They should be able to discuss main ideas presented in a written work, draw conclusions based on the text, and support these conclusions with evidence drawn from the text.

Pair books with biographies of writers.

Boy

Roald Dahl. Puffin, 2009.

Tales from Dahl's childhood, including an account of the dastardly Great Mouse Plot of 1924.

Lives of the Writers: Comedies, Tragedies (and What the Neighbors Thought)

Kathleen Krull. Houghton Mifflin Harcourt, 2014.

A catchy collection of short biographies filled with human interest and unusual facts. Included are Jane Austen, Mark Twain, Emily Dickinson, Zora Neale Hurston, and William Shakespeare.

See other titles by Krull, including *Lives of the Artists*, *Lives of the Musicians*, *Lives of the Scientists*, and more.

Some Writer!

Melissa Sweet. Houghton Mifflin Harcourt, 2016.

A creative and gorgeous biography of E. B. White.

3. In fifth grade, kids are often first introduced to full-text Shakespeare. Most programs recommend beginning with *A Midsummer Night's Dream*.

Literature programs vary as to the optimal time to introduce full-text Shakespeare to kids. Many parents may prefer to begin earlier with versions of Shakespearean plays tailored to younger readers, of which there are many available.

Best, of course, is to go see a play—or recruit friends and perform one of your own. An inspirational account of performing full-text Shakespeare with fifth graders can be found in Rafe Esquith's *Teach Like Your Hair's on Fire* (Viking, 2007). Reinforce studies of Shakespeare with supplementary reading materials, hands-on projects, and cross-curricular connections.

How to Teach Your Children Shakespeare

Ken Ludwig. Broadway Books, 2014.

Play-by-play suggestions from playwright and Shakespeare fanatic Ludwig, who began teaching his kids Shakespeare when they

were 6 years old.

Shakespeare for Kids

Colleen Aagesen. Chicago Review Press, 1999.

A biography, background information, fact boxes, a timeline, and twenty-one activities, which range from making a quill pen to staging a sword fight.

4. Read a varied range of poetic forms.

Kids should be able to identify and define *simile*, *metaphor*, *onomatopoeia*, *hyperbole*, *personification*, and *alliteration*.

Poetry for Young People Series

Various authors. Sterling Children's Books.

Each illustrated 48-page book features the works of a different poet. Titles include *Maya Angelou* (2013), *Robert Frost* (2008), *Emily Dickinson* (2008), *Carl Sandburg* (2008), *Walt Whitman* (2008), and many more.

Love That Dog

Sharon Creech. HarperCollins, 2001.

Jack, convinced he hates poetry, finds his voice with the help of multiple poets, a teacher, and a dog named Sky.

Talking to the Sun

Kenneth Koch, ed. Henry Holt, 1985.

A wonderful collection of poems, illustrated with artworks from the Metropolitan Museum of Art.

5. Understand and follow multiple-step written and oral directions.

Writing

1. Write frequently, producing a variety of works, including reports, essays, short stories, poems, narratives, journal entries, and letters.

Fifth graders should be able to use a multi-step writing process, involving pre-writing (brainstorming, researching, outlining), writing a first draft, revising, and editing. Kids should be able to obtain information from a variety of sources and incorporate their findings into well-organized nonfiction reports. At this level, reports should include a coherent multi-paragraph structure with a well-defined main idea, an introduction and conclusion, key points illustrated with relevant examples, and a simple bibliography.

Writing Magic

Gail Carson Levine. HarperCollins, 2014.

Helpful information about the writing process, and writing exercises. It begins with a list of first sentences that make you itch to write: "I have one green eye and one brown eye. The green eye sees truth, but the brown eye sees much, much more." "The first time I saw Stephen, he painted a hex sign on my right arm, and I couldn't move my fingers for three hours."

2. Identify and correct incomplete and run-on sentences.

Kids should be able to identify and use prepositional phrases, appositives, and independent and dependent clauses. If you've had to look up any of the above, this is because the average person—including the average adult writer—doesn't remember these either.

3. Use punctuation marks correctly.

Kids should be familiar with the use of the colon (before a list).

4. Continue to expand knowledge of prefixes and suffixes and the way in which these affect word

meaning.

Fifth graders should be familiar with the use and meaning of such prefixes as *anti-*, *co-*, *fore-*, *inter-*, *mid-*, *post-*, and *semi-*, and such suffixes as *-ist*, *-ish*, *-ness*, and *-tion/-sion*.

Prefix

Merriment, Inc.

A game in which players roll a die to select a prefix card (*pr-*, *bl-*, *ch-*, *rh-*, *sc-*...) and then, in a given time period, write words beginning with the featured prefix on the accompanying score sheet. Points are assigned based on number and length of words—and unusual words are a plus. For ages 8 and up.

5. Recognize and identify the common parts of speech, including nouns, pronouns, verbs, adjectives, articles, adverbs, conjunctions, and interjections.

Kids should know the proper use of such problematic verbs as *lie* and *lay*, *sit* and *set*, and *rise* and *raise*, and the correct use of nominative, objective, and possessive pronouns (that is, put the apostrophes in the right place and don't say "her and I").

6. Expand upon previous spelling and vocabulary skills.

Scrabble, Boggle, Prefix, Bananagrams, crossword puzzles, and other word games are great spelling boosts. Check out the dozens of word games available as apps for iPhone and Android.

Listening and Speaking Skills

1. Listen to and make narrative and informational oral presentations.

Kids should be able to make oral presentations in an organized and well-delivered fashion; conversely, they should be able to understand, draw conclusions, and ask appropriate questions based on oral presentations made by others. They should be able to analyze and critique oral presentations and media messages for bias, persuasive fallacies, opinion cited as fact, and unsupported generalities.

Listen to TED Talks (www.ted.com) or the evening news with your kids, and discuss.

2. Give oral summaries of books, stories, articles, or spoken presentations.

3. Memorize and recite poems.

Poems to Learn by Heart

Caroline Kennedy. Disney-Hyperion, 2013.

Great selections from a wide range of poets, illustrated with paintings.

Throw a Poetry or Storytelling Slam!

A poetry or storytelling slam is a competition in which participants read or recite their own works or the works of others aloud. Fun for all ages. All this takes is a performance space, sign-up sheets, and an MC; microphone optional. And a cheering audience!

Study Skills

1. Know how to use dictionaries, thesauri, atlases, almanacs, periodicals, and encyclopedias as sources of information. These are all accessible online.

2. Use electronic media to conduct research.

Be able to differentiate between reliable and unreliable sources.

3. Develop simple outlines from short written selections.

Outlining is useful, and it's good practice to take a written selection and turn it into an outline. Certain types of writing—notably nonfiction reports—are made easier by an ordered outline, listing major and subsidiary points. This helps a writer see that an article is proceeding in a logical sequence. (See [this page](#).)

4. Practice effective study techniques.

Among these are time management skills, note-taking and review, reading practices, and test preparation methods.

Visual note-taking—called mind mapping—has been shown to boost retention and enhance creativity. Great for kids who like to doodle.

Mind Maps for Kids

Tony Buzan. Thorsons, 2005.

How to visually organize information by making diagrams. Colored pencils help, but you don't need to be an artist.

Mathematics

Math, as progressive educators continue to reiterate, is best learned through projects, puzzles, challenges, and real-world activities and connections, rather than through problem worksheets.

For example, play with ditloids, a type of word puzzle in which a phrase, quotation, or fact must be deduced from the numbers and letters in the clue—for example, 60 M in an H (60 minutes in an hour), 3 B M (3 blind mice), or 12 D of C (12 days of Christmas). There are many ditloid quizzes online; it's also fun to invent your own.

Collect fantastic facts about numbers. One, for example, is the number of poos a sloth has in a week; the number of websites that existed in 1991 (today there are more than 850 million); the number of people who live in Monowi, Nebraska; and the number of seconds it takes the MIT Media Lab camera to snap one trillion pictures—that is, fast enough to capture the movement of light.

Play strategy games such as Mastermind (Hasbro), a code-making and -breaking game for ages 8 and up; Settlers of Catan (Mayfair Games), a resource-gathering game played on a board of hexagonal terrain blocks, in which players, ages 10 and up, try to dominate territory; or Risk (Hasbro), the game of global domination, in which players ages 10 and up use skill, strategy, and luck to conquer the planet.

Also see Clue (Hasbro), in which players use deductive reasoning to solve a murder mystery, for ages 8 and up; and 221B Baker Street (John N. Hanson), in which players ages 12 and up travel the streets of Victorian London collecting clues to help Sherlock Holmes solve the case.

Amazing Math Projects You Can Build Yourself

Lazlo C. Bardos. Nomad, 2010.

Chapters cover numbers and counting; angles, curves, and paths; shapes; and patterns. Make a Möbius strip, a geodesic dome, and some great string art.

This Is Not a Maths Book

Anna Weltman. Ivy Press, 2015.

An interactive mix of math and art. Kids experiment with parabolic curves, Pascal's triangle, tessellations, and 3-D drawings.

Calculation Nation

calculationnation.nctm.org

Math-based games for upper-elementary- and middle-school-level students with which kids can challenge themselves or play against others.

Hands-On Equations

www.borenson.com

An algebra program suitable for grades three through eight, in which kids model equations using number cubes and color-coded pawns on a laminated balance.

Number Theory

1. Know numbers through the billions. Be able to write these in both numerals and words.

2. Order and compare numbers to 999,999,999 using greater than ($>$), less than ($<$), and equals ($=$) signs.

3. Write numbers in expanded form.

That is, $896,432 = 800,000 + 90,000 + 6000 + 400 + 30 + 2$.

4. Reinforce concepts of place value.

5. Round numbers to the nearest ten, hundred, thousand, or ten thousand.

6. Compare and order negative numbers on a number line.

Kids should be able to define *integer*, and should know that the sum of any integer and its opposite is 0.

7. Study the concept of exponents.

Kids should know the perfect squares and square roots through 144; know the terms *squared*, *cubed*, and *to the n th power*; and understand the relationship between exponents and repeated multiplication. They should be able to identify powers of 10 through 10^6 .

A classic here is the Charles and Ray Eames 1977 film *Powers of Ten: The Relative Size of Things in the Universe*, which moves in exponential jumps from a picnic in a Chicago park to the limits of the universe and the inside of the atom. Available online.

Magnitude: The Scale of the Universe

Megan Watzke and Kimberly Arcand. Black Dog & Leventhal, 2017.

The scale of the universe and more; included are comparisons of distance, area, volume, mass, and speed. A fascinating journey through big and small numbers.

The Zoomable Universe

Caleb Scharf. Scientific American, 2017.

An epic tour from the limits of the observable universe to the inside of the atom, packed with photos and infographics.

8. Identify, create, and experiment with numerical patterns such as triangular numbers, square numbers, and arithmetic and geometric sequences.

Try Sudoku, a Japanese number game touted as one of the most popular puzzles of all time. The goal is to fill a 9×9 grid with numbers such that each column, row, and 3×3 square contains the numbers 1 to 9. Each puzzle begins with a handful of squares filled in; it's up to you to solve the rest. There are many Sudoku books available; and hundreds of free puzzles online.

9. Define prime and composite numbers to 100.

Probability and Statistics

1. Collect, organize, and interpret data using line, bar, and circle or pie graphs, tables, and stem-and-leaf scatter plots.

See the Super Science and Super Sports Infographics series ([this page](#), [this page](#)).

Pair with history: for example, try studying the demographics of local graveyards. Collect data on men, women, and children, their ages at death, and the years of their death, and create informational graphs. (Add art: make gravestone rubbings.)

2. Solve problems involving the interpretation of graphs and tables.

Good sources for real-life data include informational magazines and the daily newspaper.

Big Data

Carla Mooney. Nomad, 2018.

What's big data, and how do we store, manage, and analyze it? All about information in the digital world, with many activities for ages 10 and up.

3. Find the average (mean) of a set of numbers and understand what that means.

4. Perform simple probability experiments.

Use a variety of methods for generating random outcomes: flipped coins, dice, and spinners, for example. Experiment with Buffon's needle.

See Ron Marson's *Probability* (TOPS Learning Systems, 2019), a collection of twenty-eight task cards that teach probability with hands-on experiments and homemade equipment. (See topscience.org.)

By the Numbers

National Geographic Kids, 2015.

Packed with great infographics and intriguing statistics on a wide range of topics.

Statistics for Kids

Scott Chamberlin. Prufrock, 2013.

Interesting problems and data sets, swathed in a lot of education-speak.

In the same format, see *Probability for Kids* (2016).

5. Plot points on a coordinate grid.

Fractions and Decimals

1. Express relationships as simple ratios.

Introduction to ratios can be approached in simple hands-on fashion. Make drawings using scale measures; measure your foot and your height and calculate foot-to-height ratio. Measure friends and family. Be inventive.

If the World Were a Village

David J. Smith. Kids Can Press, 2011.

What if the world were a village of just a hundred people? How many would come from Africa? How many would speak Chinese?

2. Recognize equivalent fractions.

3. Determine the least common denominator of fractions with unlike denominators.

Kids at this grade level should also be able to reduce fractions to their lowest terms.

4. Compare fractions with like and unlike denominators using greater than ($>$), less than ($<$), and equals ($=$) signs.

5. Add, subtract, and multiply fractions with like and unlike denominators.

6. Identify mixed numbers and improper fractions. Change mixed numbers to improper fractions and vice versa.

Kids should be able to add, subtract, and multiply mixed numbers and improper fractions.

7. Round fractions to the nearest whole number.

8. Read, write, and order decimals to the ten-thousandths place.

9. Round decimals to the nearest tenth, hundredth, and thousandth.

10. Add and subtract decimals to four places.

11. Multiply and divide decimals by 10, 100, and 1,000; multiply decimals by whole numbers and by other decimal numbers.

12. Write fractions as decimals and vice versa.

Operations

1. Know the basic multiplication facts through 12×12 , and the equivalent basic division facts.

2. Define and understand the commutative and associative properties of addition and the commutative, associative, and distributive properties of multiplication.

3. Add, subtract, multiply, and divide numbers to four digits with and without regrouping.

4. Estimate answers to arithmetical problems.

5. Solve multi-step word problems and numerical problems involving more than one operation.

Money and Measurement

1. Solve money problems using all arithmetical operations.

Whatever Happened to Penny Candy?

Richard J. Maybury. Bluestocking Press, 2015.

Written as a series of letters to a young niece or nephew, this is an attention-grabbing explanation of money, investment cycles, inflation, bubbles, and get-rich-quick schemes.

2. Be familiar with English and metric measurements of length, volume, capacity, and weight/mass; measures of time; and measures of temperature in degrees Fahrenheit and Centigrade/Celsius.

Pair this with Steve Jenkins's *Actual Size* (Houghton Mifflin Harcourt, 2011) and *Prehistoric Actual Size* (Houghton Mifflin Harcourt, 2015), both illustrated with wonderful actual-size pictures of everything from a gorilla's hand and a squid's eye to a dinosaur smaller than a chicken. Calculate sizes in both English and metric measures. Add to the project with research: how much does the average Alaskan brown bear weigh? How long is an apatosaurus?

iF

David J. Smith. Kids Can Press, 2014.

Subtitled *A Mind-Bending New Way of Looking at Big Ideas and Numbers*, this is a terrific overview of measurement. Smith has come up with clever ways of scaling large numbers and concepts down to readily graspable form. (If the Milky Way galaxy were the size of a dinner plate, our solar system would be smaller than a speck of dust.) Fascinating for all.

3. Solve problems on elapsed time with and without regrouping.

Kids should be able to regroup, converting minutes to hours as necessary.

Geometry

1. Recognize and identify common polygons and polyhedrons.

Kids should know that regular polygons have sides of equal length and angles of equal measure.

2. Identify similar and congruent figures and symmetrical and asymmetrical figures.

3. Recognize right, acute, and obtuse angles.

Kids should be able to use a protractor to draw and measure angles. They should know that a right angle equals 90 degrees; an acute angle, less than 90 degrees; an obtuse angle, more than 90 degrees; and a straight angle, 180 degrees.

4. Calculate the perimeters of polygons and the areas of rectangles, squares, and right triangles.

5. Identify the various parts of a circle.

Kids at this level should be able to identify *circumference*, *diameter*, *radius*, *arc*, and *chord*. They should be able to draw circles of given radii or diameters, using a compass, and should calculate the circumference of a circle.

History and Geography

Kids should be encouraged to see history as an ongoing pursuit of truth, continually subject to analysis and reinterpretation. They should analyze and interpret primary historical sources, such as letters, journal excerpts, and newspaper articles, and should approach historical events from a range of perspectives, using a range of sources.

For a connection to literature, see the themed poetry collections edited by Lee Bennett Hopkins, among them *Lives: Poems About Famous Americans* (HarperCollins, 1999) and *America at War* (Margaret K. McElderry, 2008).

American History

1. Westward expansion.

See Joy Hakim's *A History of US: The New Nation*.

Topics to cover include Daniel Boone and the Wilderness Road; the Louisiana Purchase; the Lewis and Clark expedition; the mountain men and the fur trade; Zebulon Pike and Pike's Peak; the building of the Erie Canal; Andrew Jackson and the Indian Removal Act; the Cherokee and the Trail of Tears; the Santa Fe and Oregon Trails; the settlement of Utah by the Mormons; the Donner Party; and the California Gold Rush.

Names to know include Meriwether Lewis, William Clark, Sacajawea, Sequoyah, Zebulon Pike, Jim Bridger, Kit Carson, DeWitt Clinton, Joseph Smith, and Brigham Young.

Full Steam Ahead

Rhoda Blumberg. Scholastic, 2000.

A well-written history of the race to build the transcontinental railroad and the meeting at Promontory Point, Utah, in 1869.

Heading West

Pat McCarthy. Chicago Review Press, 2009.

Life with the pioneers, including stories of westward exploration and expansion and tales of pioneer men, women, and children, and Native Americans. Included are capsule biographies, fact boxes, and twenty-one related activities.

How to Get Rich on the Oregon Trail

Ted Olson. National Geographic, 2009.

History interwoven with a tongue-in-cheek story and terrific infographics and illustrations. Other titles in the series are *How to Get Rich on a Texas Cattle Drive* and *How to Get Rich in the California Gold Rush*.

Locomotive

Brian Floca. Atheneum, 2013.

Winner of the Caldecott Medal, this is the gorgeously illustrated story of travel cross-country on the transcontinental railroad.

The Oregon Trail

Karen Bush Gibson. Nomad, 2017.

A history of traveling west, from Lewis and Clark to the transcontinental railroad, with twenty-five hands-on projects.

In the same format, also see Rachel Dickinson's *Great Pioneer Projects You Can Build Yourself* (2007).

A Pioneer Sampler

Barbara Greenwood. Houghton Mifflin Harcourt, 1998.

The daily life of the Robertson family over the course of a year in 1840, with historical background information, recipes, games, and crafts.

FICTION

Across the Wide and Lonesome Prairie

Kristiana Gregory. Scholastic, 1997.

The fictionalized diary of Hattie Campbell, trekking from Missouri to Oregon with her family in 1847. One of the Dear America series.

Also by Gregory in the same series, see *Seeds of Hope* (2001), a fictionalized Gold Rush diary.

The Ballad of Lucy Whipple

Karen Cushman. Houghton Mifflin Harcourt, 2012.

Twelve-year-old Lucy is horrified when her mother moves the family from Massachusetts to California in 1849. (Chapter 1: "In which I come to California, fall down a hill, and vow to be miserable here.")

By the Great Horn Spoon!

Sid Fleischman. Little, Brown, 1988.

Twelve-year-old Jack heads to the California goldfields along with the family butler, Praiseworthy, to try to save the family from debt.

Caddie Woodlawn

Carol Ryrie Brink. Aladdin, 2006.

In this Newbery winner, adventurous Caddie and her younger brothers are growing up in Wisconsin in the 1860s. Stories include Caddie's friendship with the local Indians, a prairie fire, struggles at school, and a visit from ladylike Cousin Annabelle.

Little House on the Prairie

Laura Ingalls Wilder. HarperCollins, 2008.

Laura and family leave the Big Woods of Wisconsin and travel by covered wagon to Kansas. One of the nine-book Little House series.

May B.

Caroline Starr Rose. Yearling, 2014.

Young May B. is sent to work on a neighbor's Kansas homestead and ends up trapped on her own for the winter in a sod house.

On This Long Journey: The Journal of Jesse Smoke

Joseph Bruchac. Scholastic, 2014.

The fictionalized journal of a Cherokee boy, sent westward on the Trail of Tears in 1838. One of the My Name Is America series.

Sarah, Plain and Tall

Patricia MacLachlan. HarperCollins, 2015.

Anna and Caleb's widowed father puts an ad in the paper for a mail-order bride and finds Sarah, plain and tall, from the state of Maine.

Also see the 1991 movie version starring Glenn Close and Christopher Walken. Rated G.

2. The growth of a nation.

Topics to cover include the concept of Manifest Destiny, the Trail of Tears, American settlement of Texas, the Battle of the Alamo, the Mexican-American War, Henry David Thoreau and his essay “Civil Disobedience,” the Texas Republic, John C. Frémont and the California Republic, the Treaty of Guadalupe Hidalgo, the addition of more states to the Union, and the Gold Rush.

Names to know include William Travis, James Bowie, Davy Crockett, Antonio López de Santa Anna, Sam Houston, James K. Polk, and Zachary Taylor.

The movie *The Alamo* (1960), starring John Wayne (who else?) as Davy Crockett, may not be entirely historically accurate, but it’s exciting. Not rated.

California History for Kids

Katy S. Duffield. Chicago Review Press, 2012.

From Native Americans and Spanish missionaries to gold miners and movie moguls, with a timeline, maps, photos, fact boxes, and hands-on activities.

3. Prologue to the Civil War.

See Joy Hakim’s *A History of US: Liberty for All?* ([this page](#)).

A Child’s Introduction to African American History

Jabari Asim. Black Dog & Leventhal, 2018.

A fact-filled illustrated history encompassing the story of slavery from the Middle Passage through the abolitionist and civil rights movements, politics, activism, sports, and the arts.

Topics to cover include the Mason-Dixon Line, the conflict over states’ rights, slave life and slave rebellions, the abolitionist movement and the Underground Railroad, the Missouri Compromise of 1820, Harriet Beecher Stowe and *Uncle Tom’s Cabin*, the Kansas-Nebraska Act, the *Dred Scott* decision, the Lincoln-Douglas debates, Bleeding Kansas, John Brown and Harpers Ferry, and the election of Abraham Lincoln.

Names to know include John C. Calhoun, Henry Clay, Daniel Webster, Ralph Waldo Emerson, Dorothea Dix, William Lloyd Garrison, Eli Whitney, and Frederick Douglass.

Freedom over Me

Ashley Bryan. Atheneum, 2016.

Using original documents from slave auctions and plantations, Bryan creates moving first-person accounts of the lives of slaves.

The Journey of Little Charlie

Christopher Paul Curtis. Scholastic, 2018.

Twelve-year-old Charlie, whose sharecropper parents live on the Tanner plantation, is coerced by the Tanner overseer into traveling north with him to retrieve stolen property. When the property turns out to be fugitive slaves, including a boy of Charlie's age, the evils of slavery are brought home.

Also by Curtis, see *Elijah of Buxton* (Scholastic, 2009).

Many Thousand Gone

Virginia Hamilton. Knopf, 1995.

The story of slaves in America in their own voices.

Also see Hamilton's *The People Could Fly* (Knopf, 1993), a collection of traditional African American folktales.

The Underground Railroad for Kids

Mary Kay Carson. Chicago Review Press, 2005.

The story of all the many people who helped escaping slaves on the road to freedom, with capsule biographies, a map, timelines, and twenty-one hands-on activities.

4. The Civil War.

See Joy Hakim's *A History of US: War, Terrible War*.

Topics to cover include southern secession and the formation of the Confederacy, Fort Sumter, the First Battle of Bull Run, the *Monitor* and the *Merrimack*, the Battle of Antietam, the Emancipation Proclamation, the

Battle of Gettysburg and the Gettysburg Address, the Battle of Vicksburg, Sherman's march to the sea, Generals Grant and Lee, Lee's surrender at Appomattox, and Lincoln's assassination by John Wilkes Booth.

Names to know include Jefferson Davis, George McClellan, David Farragut, Robert E. Lee, James Longstreet, George Meade, Ulysses S. Grant, Frederick Douglass, William Sherman, Mathew Brady, and Andrew Johnson.

Abraham Lincoln for Kids

Janis Herbert. Chicago Review Press, 2007.

The story of Lincoln's life and times, with twenty-one hands-on activities, among them making a cardboard-box log cabin, a model Mississippi River flatboat, and a freedom quilt collage. Also included are maps, a timeline, and a list of Lincoln-related sites to visit.

The Civil War for Kids

Janis Herbert. Chicago Review Press, 1999.

An overview of the Civil War, illustrated with photos, maps, and timelines, along with capsule biographies of famous people and twenty-one hands-on activities—among them creating a cipher, baking a batch of hardtack, and making butternut dye.

Great Civil War Projects You Can Build Yourself

Maxine Anderson. Nomad Press, 2012.

Background information, Civil War slang, and the details of Civil War life on the battlefield and on the home front. Projects include making a regimental flag, a telegraph, a periscope, and handmade paper and berry ink.

You Wouldn't Want to Be a Civil War Soldier!

Thomas M. Ratliff. Franklin Watts, 2013.

A pseudo-humorous approach to the Civil War, with background information, a timeline, and details of famous battles. Advice for soldiers: try not to get captured.

FICTION

Across Five Aprils

Irene Hunt. Berkley, 2002.

The story of young Jethro Creighton, who comes of age over the five long years of the Civil War.

Bull Run

Paul Fleischman. HarperCollins, 1995.

The first Battle of Bull Run, told from the points of view of sixteen very different participants.

Iron Thunder

Avi. Disney-Hyperion, 2009.

The story of the battle between the *Monitor* and the *Merrimack*, from the point of view of 13-year-old Tom Carroll, an assistant at the ironworks where the *Monitor* is being made.

The Mostly True Adventures of Homer P. Figg

Rodman Philbrick. Scholastic, 2011.

Twelve-year-old orphaned Homer runs away from his home in Maine to find his older brother, who has been sold into the Union Army.

Rifles for Watie

Harold Keith. HarperTeen, 1987.

The Civil War through the eyes of 16-year-old Jeff Bussey, who ultimately ends up fighting for both the North and the South. There's a rich cast of characters from both sides.

5. Reconstruction.

Topics to cover include the postwar devastation of the South; the Radical Republicans and the impeachment of Andrew Johnson; carpetbaggers and scalawags; the Thirteenth, Fourteenth, and Fifteenth Amendments; the Black Codes and the Ku Klux Klan; and the Compromise of 1877.

Should My Kids Watch Gone with the Wind?

There's a lot of political incorrectness in classic literature and movies. A case in point is Margaret Mitchell's 1936 novel *Gone with the Wind* and the movie version of the same name (1939) starring Vivien Leigh and Clark Gable. It's an addictive and exciting read (and view), but there's also the suspect portrayal of slaves as happy and devoted, the glorification of the Ku Klux Klan, and the flaws of the scheming main character herself.

Gone with the Wind is only the tip of a vast iceberg. Rudyard Kipling's famous defense of "the white man's burden" and other jingoistic views are unacceptable today. Laura Ingalls Wilder's Little House books present a negative picture of Native Americans; so does *Peter Pan*. Roald Dahl's *The Witches* didn't do any favors to women. This is an issue that will come up time and again, causing no end of protest and argument.

A great value of reading (and viewing), however, is to expand our views of the world by encountering perspectives, values, and opinions other than our own. "It would be a poor sort of world," Neil Gaiman once said, "if one were only able to read authors who expressed points of view that one agreed with entirely. It would be a bland sort of world if we could not spend time with people who thought differently, and who saw the world from a different place." In other words, opportunities for debate and discussion are always far better than sweeping issues under the rug. Read and watch the classics—but discuss the

underlying issues with your children, and highlight how times have changed.

MORE FOOD FOR DISCUSSION

Americus

M. K. Reed. First Second, 2011.

In this graphic novel, shy Neal Barton is forced onto the public stage when a local Christian activist group tries to ban his favorite fantasy series.

The Landry News

Andrew Clements. Atheneum, 2000.

Fifth grader Cara Landry's newspaper is banned by the school principal, who also threatens to fire her eccentric classroom teacher, Mr. Larson. The book begins with the text of the First Amendment.

The Day They Came to Arrest the Book

Nat Hentoff. Laurel Leaf, 1983.

Barney Roth, editor of the school paper, protests when a group of students and parents want to ban *The Adventures of Huckleberry Finn*.

Ban This Book

Alan Gratz. Starscape, 2018.

Fourth grader Amy Anne is appalled when a parent has *From the Mixed-Up Files of Mrs. Basil E. Frankweiler* removed from the school library. In retaliation, she starts a banned-books library in her locker.

Memoirs of a Bookbat

Kathryn Lasky. Houghton Mifflin Harcourt, 1996.

When Harper Jessup's parents join a fundamentalist religious group that favors book censorship, Harper must keep her beloved books hidden.

6. Continued western expansion and the Indian Wars.

Students might begin by reviewing previous studies of Native American life and culture, and researching the history of conflicts between settlers and Native Americans. Topics to cover include Tecumseh, William Henry Harrison, and the Battle of Tippecanoe; the Northwest Ordinance; and Osceola and the Seminoles.

From the mid-nineteenth century, topics include the Homestead Act of 1862, the building of the transcontinental railroad, the extermination of the buffalo, the cowboy era and cattle drives, Wild West legends (Buffalo Bill, Annie Oakley, Billy the Kid), the buffalo soldiers, government policies toward Native Americans and the establishment of the Bureau of Indian Affairs, forced removal to reservations, the Battle of Little Bighorn, the Ghost Dance movement, the Wounded Knee Massacre, the purchase of Alaska from Russia, and the significance of the closing frontier.

Names to know include Crazy Horse, Chief Joseph, George Custer, Sitting Bull, and William Seward.

Custer's Last Battle

Paul Goble. *Wisdom Tales*, 2013.

Red Hawk's account of the Battle of the Little Bighorn, in which George Armstrong Custer was defeated by the Lakota, Cheyenne, and Arapaho tribes under Sitting Bull and Crazy Horse.

Also see Goble's *Red Cloud's War: Brave Eagle's Account of the Fetterman Fight* (2015).

Remember Little Bighorn

Paul Robert Walker. *National Geographic*, 2015.

Illustrated with photographs and drawings, with text drawn from a range of eyewitness accounts by Indians, soldiers, and scouts.

Thunder Rolling in the Mountains

Scott O'Dell. Houghton Mifflin Harcourt, 2010.

The story of the defeat of the Nez Perce Indians in 1877, as told by Chief Joseph's daughter.

Which Way to the Wild West?

Steve Sheinkin. Roaring Brook, 2015.

Subtitled *Everything Your Schoolbooks Didn't Tell You About Westward Expansion*, this covers events from the Louisiana Purchase to Wounded Knee.

Movie: *I Will Fight No More Forever* (1975), the story of Chief Joseph and the Nez Perce (NR).

World History

A good choice for fifth-grade world history may be to explore in greater depth the period from prehistory to the fall of Rome.

Useful resources include DK's *History Year by Year: The History of the World from the Stone Age to the Digital Age* (DK, 2013) and DK's *When on Earth?* (DK, 2015), which covers the ancient world to the twenty-first century with timelines and creative maps. Also see the Big History Project and other resources, [this page](#).

Wicked History

Various authors. Franklin Watts.

Each book centers on a historical "villain" and features quotations, maps, timelines, photos and reproductions, fact boxes, and a catchy text. Many titles, among them *Napoleon: Emperor and Conqueror* (Kimberly Burton Heuston, 2010), *Genghis Khan: 13th Century Mongolian Tyrant* (Enid A. Goldberg, 2008), and *Hannibal: Rome's Worst Nightmare* (Philip Brooks, 2015).

Don't underestimate the importance of historical fiction; kids often learn and retain more history from fiction books than from even the best of textbooks.

1. Prehistory to the beginning of civilization.

Topics to cover include early hominids and the first human beings; Stone Age hunter-gatherer culture; the evolution of tools and weapons; prehistoric art, language, and religion; the domestication of animals; the Agricultural Revolution; and the establishment of settled communities. Kids should know the difference between an anthropologist and an archaeologist.

Archaeology for Kids

Richard Panchyk. Chicago Review Press, 2001.

A survey of archaeological studies from the Stone Age on, with a timeline, photos, explanations of archaeological techniques, and hands-on activities, among them playing a stratigraphy game, making a Greek oil lamp, counting tree rings, and making fossil footprints.

Frozen Man

David Getz. Redfeather, 1996.

What we learned about the Ice Age from Ötzi the Iceman, a five-thousand-year-old body found in the Austrian Alps.

Maroo of the Winter Caves

Ann Turnbull. Clarion, 2004.

A Stone-Age survival story in which young Maroo and family are trapped by a blizzard and she and her brother are sent to find help.

Stig of the Dump

Clive King. Open Road Media, 2016.

Barney, visiting his grandparents, discovers Stig, living in a cave in a disused chalk pit—and later is transported back in time to Stig's Stone Age tribe.

The Wolf's Boy

Susan Williams Beckhorn. Disney-Hyperion, 2016.

Set in the Paleolithic era, this is the story of young Kai, born with a clubfoot and shunned by his tribe, who forms a bond with a motherless wolf cub.

2. The rise of cities and the first civilizations.

Topics to cover include cradle(s) of civilization (the Fertile Crescent, the Indus River, the Yellow River, and South and Central America); the cultures of Mesopotamia (Sumerians, Babylonians, and Assyrians); the developing use of metals; the invention of writing; and the significance of the Code of Hammurabi.

3. Ancient Egypt.

Topics to cover include the geography and culture of ancient Egypt; a survey of ancient Egyptian history through the Old, Middle, and New Kingdoms, including famous pharaohs and their accomplishments; hieroglyphic writing; art and architecture; religion; science; and everyday life. Other possible topics include Egyptologists from the nineteenth century through the present and their landmark discoveries, including the stories of Howard Carter and Tutankhamen's tomb, and Jean-François Champollion and the Rosetta Stone.

The 5000-Year-Old Puzzle

Claudia Logan. Farrar, Straus and Giroux, 2002.

Set in 1924, the mystery of an Egyptian tomb, seen through the eyes of young Will Hunt, is told through a creative mix of journal entries, funny postcards, and clever cartoons.

Cleopatra

Diane Stanley. HarperCollins, 1997.

An excellent picture-book biography.

Cleopatra and Ancient Egypt for Kids

Simonetta Carr. Chicago Review Press, 2018.

The life and times of Cleopatra, with a timeline, fact boxes, photos, and hands-on projects, among them making a writing tablet, a cartouche bookmark, a beaded necklace, and a model riverboat.

Egyptian Diary

Richard Platt. Candlewick, 2014.

The journal of 9-year-old Nakht, a young scribe who discovers a tomb-robbing plot and meets the pharaoh Hatshepsut.

Great Ancient Egypt Projects You Can Make Yourself

Carmella Van Vleet. Nomad, 2006.

A history of Egypt with maps, timelines, photos, fact boxes, and hands-on projects.

Hatshepsut: The Girl Who Became a Great Pharaoh

Ellen Galford. National Geographic, 2007.

An illustrated biography of the only female pharaoh.

Mara, Daughter of the Nile

Eloise Jarvis McGraw. Penguin, 2018.

Mara, a slave during the rule of Queen Hatshepsut, becomes embroiled in a plot to restore Thutmose III to the throne.

Also by McGraw, see *The Golden Goblet* (Puffin, 1986).

The Pharaohs of Ancient Egypt

Elizabeth Payne. Random House, 1981.

A superbly written chapter book, beginning with the discovery of the Rosetta Stone, then covering the first Egyptians through the warrior pharaoh Ramses II.

Pyramid

David Macaulay. Houghton Mifflin Harcourt, 1982.

Detailed black-and-white illustrations show how a pyramid was built, from planning to construction to finished monument.

Also see the animated movie *Pyramid* (PBS Home Video, 1988).

Secrets of the Sphinx

James Cross Giblin. Scholastic, 2004.

The story of the 4,500-year-old Great Sphinx, one of the largest sculptures in the world.

Also by Giblin, see *The Riddle of the Rosetta Stone* (HarperCollins, 1993).

You Wouldn't Want to Be a Pyramid Builder!

Jacqueline Morley. Franklin Watts, 2013.

One of a lively interactive series, with all the creepy details that kids love.

Also see *You Wouldn't Want to Be an Egyptian Mummy!* (David Stewart, 2012), *You Wouldn't Want to Be Cleopatra!* (Jim Pipe, 2017), and *You Wouldn't Want to Be Tutankhamen!* (David Stewart, 2017).

Movies: Classic movies set in ancient Egypt include Cecil B. DeMille's *The Ten Commandments* (1956), with Charlton Heston as Moses and Yul Brynner as the pharaoh Rameses (G); and Joseph L. Mankiewicz's *Cleopatra*, with Elizabeth Taylor as Cleopatra and Richard Burton as Mark Antony (G).

4. Ancient Greece.

Topics to cover include the rise of the Greek city-states and the origin of democratic government; Athens and Sparta; the Persian Wars; Pericles and the Golden Age of Athens; the Peloponnesian Wars; Greek art and architecture; Greek science; everyday life in ancient Greece; the Olympic games; the philosophy, life, and trial of Socrates; the philosophies of Plato and Aristotle; and the accomplishments of Alexander the Great.

The Arkadians

Lloyd Alexander. Puffin, 1998.

Described as part Greek myth, part *Canterbury Tales*, and part *Wizard of Oz*, this is the story of a boy on the run from a pair of murderous soothsayers, a girl of marvels and mysteries, and an enchanted poet who has been turned into a donkey.

Black Ships Before Troy

Rosemary Sutcliff. Laurel Leaf, 2005.

A prose retelling of *The Iliad*.

Also by Sutcliff, see *The Wanderings of Odysseus: The Story of the Odyssey* (2005).

Dateline: Troy

Paul Fleischman. Candlewick, 2006.

A masterly retelling of the Trojan War, juxtaposed with newspaper collages demonstrating the relevance of the war's issues to the present day.

The Golden Fleece and the Heroes Who Lived Before Achilles

Padraic Colum. Aladdin, 2004.

A dramatic prose retelling of the story of Jason and the Argonauts.

Also by Colum, see *The Children's Homer: The Adventures of Odysseus and the Tale of Troy*.

Tools of the Ancient Greeks

Kris Bordessa. Nomad, 2006.

Covers history, the origins of democracy, Greek daily life, the Olympics, arts, philosophy, architecture, science, math, and warfare, with timelines, fact boxes, and hands-on projects.

National Mythology Exam

www.etclassics.org

Do you know your gods and goddesses? For grades three through twelve.

There are many excellent mythology collections. See, for example, National Geographic's beautifully illustrated series by Donna Jo Napoli: *Treasury of Greek Mythology* (2011), *Treasury of Egyptian Mythology* (2013), and *Treasury of Norse Mythology* (2015).

For older kids, see Kenneth C. Davis's *Don't Know Much About Mythology* (HarperCollins, 2005), a chatty, reader-friendly explanation of everything from Mesopotamia's Gilgamesh to the myths of the Egyptians, Greeks, Celts, Norse, Chinese, Native Americans, and more.

5. Ancient Rome.

Topics to cover include the Etruscans, the founding of Rome, the Roman Republic, the structure of Roman society, the causes and events of the Punic Wars, the Roman Empire and its emperors, early Christianity in the Roman Empire, and the decline and fall of Rome. Kids should know the names and stories of famous Romans and be familiar with Roman myths and legends, art and architecture, and language and literature. They should also be familiar with the geography of the Roman Empire.

Asterix the Gaul

René Goscinny. Orion, 2004.

The first of the hilarious cartoon series, in which Asterix, his boar-eating pal Obelix, and the rest of the Gauls resist the invading Romans.

City

David Macaulay. Houghton Mifflin Harcourt, 1983.

A story of Roman planning and construction, illustrated with wonderfully detailed pen-and-ink drawings.

Detectives in Togas

Henry Winterfeld. Houghton Mifflin Harcourt, 2002.

Rufus may have written “Caius is a dumbbell” on his wax tablet, but he’s not guilty of all the other crimes he’s being blamed for—so his friends set out to find the real culprit.

Also see the sequel, *Mystery of the Roman Ransom*.

The Eagle of the Ninth

Rosemary Sutcliff. Square Fish, 2010.

The Ninth Legion, dispatched to northern Britain, vanished, never to be heard of again. Now young Marcus is determined to discover what happened to the legion and to his father, their commander. Sequels are *The Silver Branch* and *The Lantern Bearers*.

Roman Diary

Richard Platt. Candlewick, 2014.

The diary of Iliona, kidnapped by pirates while en route from Greece to Egypt and now a slave in Rome.

Survivor: Escape from Pompeii

Jim Eldridge. Scholastic, 2017.

An exciting short chapter book about a young boy fleeing the eruption of Mount Vesuvius.

The Thieves of Ostia

Caroline Lawrence. Orion, 2002.

Flavia Gemina, daughter of a ship’s captain living in Ostia in 79 CE, and friends Jonathan, a secret Christian, Nubia, a slave girl, and Lupus, a beggar boy, join forces to solve a mystery. One of the Roman Mysteries series.

Tools of the Ancient Romans

Rachel Dickinson. Nomad, 2006.

A survey of Roman history with timelines, fact boxes, capsule biographies, and hands-on activities.

Movie: *Ben-Hur* (1959), starring Charlton Heston, is the story of Ben-Hur, a Jewish nobleman betrayed and sold into slavery by a Roman friend. And there's a spectacular chariot race. Rated G.

6. Byzantium.

Topics to cover include the establishment of the Eastern Roman Empire, centered in Constantinople; Constantine, the first Christian emperor; and Justinian's code of law. Kids should also be familiar with the geography of the Byzantine empire and with Byzantine art, architecture, and culture.

Geography

A Child's Introduction to the World

Heather Alexander. Black Dog & Leventhal, 2010.

An illustrated introduction to world geography and cultures, from the Grand Canyon to the Great Wall of China.

1. Review and reinforce concepts covered in previous geographical studies.

Fifth graders should be familiar with different kinds of maps and should be able to locate points on maps and globes using coordinates of latitude and longitude. They should be able to locate and describe the major climatic zones (arctic, tropic, and temperate), should understand the concept of time zones, and should be able to locate the prime meridian and the International Date Line.

2. Survey the great lakes of the world.

Kids should be able to locate, for example, Asia's Caspian and Aral Seas (which may or may not be lakes; check it out), Africa's Lake Victoria, the

Great Lakes of North America, and South America's Lake Maracaibo and Lake Titicaca.

3. Geography should be linked to history topics.

In conjunction with suggested fifth-grade American history topics, for example, kids might trace the course of the Erie Canal, the path of the transcontinental railroad, and the Santa Fe and Oregon Trails; locate the Mason-Dixon Line; and identify the sites of major Civil War battles and events.

Also see Melanie Waldron's **Geography Matters in Ancient Civilizations** series (Heinemann, 2015). Photo-illustrated titles include *Geography Matters in Ancient Rome*, *Geography Matters in Ancient Greece*, *Geography Matters in Ancient Egypt*, and more.

4. Kids should also know the characteristics of the major regions of the United States: New England, Mid-Atlantic, South, Midwest, Great Plains, Southwest, Far West, and Pacific Northwest.

They should also know what the Gulf Stream is and be able to describe its effects on climate.

Science

Basher Science

Simon Basher and others. Kingfisher.

An informative series in which key science features explain themselves in snarky first-person terms. In *Biology*, for example, the cell announces, "I'm a slippery bag with a lot going on within. I buzz with activity, with around 100 million molecules whizzing around inside me." Many titles, including *Biology* (2008), *Chemistry*

(2010), *Physics* (2008), *Human Body* (2011), *Rocks and Minerals* (2009), and *Oceans* (2012).

Horrible Science

Nick Arnold. Scholastic.

Science: the funny bits, the fascinating bits, and the awful stuff kids love. Many titles, including *Microscopic Monsters* (2008), *Painful Poison* (2004), *Fatal Forces* (2008), and *Chemical Chaos* (2008).

Physical Science

1. Review and expand upon studies of atomic and molecular structure.

Topics to cover include the structure of the atom; major types of subatomic particles; the concept of electron shells and energy levels; the differences between atoms, molecules, and compounds; and the way in which atoms combine to form molecules and compounds. Kids should also know the composition of some common compounds, such as water, table salt, and sugar.

While you can make great molecular models with toothpicks and mini marshmallows, check out the wide range of molecular model kits online for a more comprehensive experience. The Thames & Kosmos Introduction to Atoms and Molecules kit, for example, has instructions for dozens of magnetic snap-together molecules (www.thamesandkosmos.com).

Molecules

Theodore Gray. Black Dog & Leventhal, 2014.

The world of molecules and compounds, covering everything from soap to stink bombs, illustrated with fabulous color photographs.

Also by Gray, see *Elements: A Visual Exploration of Every Known Atom in the Universe* (2011).

2. Survey the elements of the periodic table.

Topics to cover include the organization and use of the periodic table of elements; the definitions of *atomic symbol*, *number*, and *weight*; and the characteristics of metals and nonmetals.

For example, kids should know that elements consist of only one kind of atom and that the atoms of a given element are identified by their characteristic number of protons (the atomic number). They should know the atomic symbols for common elements, should know that about two-thirds of the known elements are metals, and should know the definition of *alloy*.

Basher Science: The Complete Periodic Table

Adrian Dingle and Simon Basher. Kingfisher, 2015.

A snappy introduction to the elements of the periodic table in which each, in the first person, tells a bit about itself (for cobalt: “Mysterious and attractive, I am the gremlin of the underworld”).

The Disappearing Spoon

Sam Kean. Little, Brown, 2018.

The Young Readers edition of the popular adult book, this is a great collection of catchy and fascinating tales based on the elements of the periodic table.

How to Make a Universe with 92 Ingredients

Adrian Dingle. Owlkids, 2013.

A guide to the periodic table and the elements, with many examples of how these appear in daily life: in human beings, ocean water, fast food, fireworks, and computers.

The Periodic Table

Sean Cattery. Scholastic, 2017.

A photographic tour of the periodic table.

Photographic Card Deck of the Elements

Theodore Gray. Black Dog & Leventhal, 2010.

A color photographic image of one element per card, with useful information on the back. Suitable for any number of projects and

games.

3. Chemical reactions.

Topics to cover include definitions and examples of physical and chemical changes; the ways in which chemists use chemical and physical properties to explore the composition of matter; and an overview of new compounds generated by chemical research, such as plastics, Teflon, and Kevlar.

Kids should understand what happens during chemical reactions and how reaction rates are affected by outside conditions, should know the definition of a catalyst, and should be able to write simple chemical equations. They should also be able to use the pH scale to determine whether a solution is acidic or basic.

Cool Chemistry Concoctions

Joe Rhatigan and Veronika Gunter. Lark Books, 2007.

Fifty formulas that fizz, foam, splatter, and ooze—most made with ordinary household materials.

Reactions

Theodore Gray. Black Dog & Leventhal, 2017.

Great color photos and a snappy text introduce readers to a wide range of chemical reactions, from the boring (watching paint dry) to the spectacular.

For chemistry sets, see [this page](#).

4. Review and reinforce studies of force and motion.

Topics to cover include potential and kinetic energy; Newton's laws of motion; and concepts of distance, rate, speed, acceleration, and gravity.

Kids should experiment with force and motion using simple materials such as balls and toy cars, and they should be able to define *potential energy*, *kinetic energy*, *force*, *velocity*, and *inertia*. They should be familiar with distance, rate, and time interrelationships and should, for example, be able to calculate the time it would take to travel a given distance at a given speed.

Resources include Jennifer Swanson's *Explore Forces and Motion! With 25 Great Projects* (Nomad Press, 2016) and TOPScience's *Motion* (topscience.org), which includes instructions and thirty-six creative task cards for teaching substantive concepts with simple homemade equipment.

Rockets

There's nothing cooler for studies of force and motion than a rocket.

Good for younger kids is the **William Mark Air Burst Rocket**, which comes with a snap-together launcher and lightweight rockets; to launch, you need a bicycle pump.

For older rocketeers, a prime source for model rockets and supplies is **Estes Rockets** (www.estesrockets.com).

Make: Rockets

Mike Westerfield. Maker Media, 2014.

Step-by-step instructions for many types of rockets (including the ever-popular egg lofter).

U.S. Space Camp

www.spacecamp.com

Space Camp, in Huntsville, Alabama, offers a range of programs for kids, adults, and families in the fields of space, aviation, robotics, and cybertechnology. Great way to spend a summer.

Homer Hickam's *Rocket Boys* (Delta, 2000), a memoir of aspiring rocket scientists growing up in a West Virginia mining town, is for teens and

adults, but the accompanying movie *October Sky* (1999, PG) is accessible for younger kids.

Life Science

Classically, life science—aka biology—involves dissection.

Our kids were fascinated by the process, so by the time they were of upper elementary age, all had dissection kits and had experimented with everything from owl pellets to cow's eyes to whole preserved frogs.

Carolina Biological Supply Company

www.carolina.com

A good source for dissection tools, manuals, and all kinds of specimens—along with a wealth of other science supplies.

Dissection, however, isn't everybody's cup of tea, and for those kids who'd rather not, there are plenty of innovative alternatives.

The Biology Corner

www.biologycorner.com

Biology lesson plans, worksheets, and a long list of virtual dissections.

The Science Bank

thesciencebank.org

A free lending library of "humane science products," including models, dissection software, and links to virtual dissections.

The Zoology Coloring Book

Laurence M. Elson. Collins Reference, 1982.

Color your way through the structure and function of the major animal groups. Pencils, not scalpels.

1. Enlarge and expand upon earlier studies of plant and animal classification.

Topics to cover include the definition of *taxonomy*, an overview of the five kingdoms of living things (plants, animals, fungi, protists, and monerans), taxonomic subdivisions (kingdom, phylum, class, order, family, genus, and species), binomial nomenclature, and a review of the major classes of vertebrates and their characteristics.

2. Enlarge and expand upon previous studies of cell biology.

Topics to cover include cell theory; comparison of plant, animal, and bacterial cells; major cellular organelles and their functions; cell differentiation; the organization of cells into tissues, organs, and systems; and the process of cell division.

Amazing Bacteria Science Kit

Evviva Sciences

Pre-poured agar plates, swabs, and a project guide.

Hidden Worlds

Stephen Kramer. Houghton Mifflin Harcourt, 2003.

A fascinating array of photomicrographs by photographer Dennis Kunkel—everything from the scales of a butterfly wing to pollen grains and pond organisms.

Microbes: Discover an Unseen World

Christine Burillo-Kirch. Nomad, 2015.

A colorful cartoon-illustrated overview of microbiology, with twenty-five hands-on experiments.

The Ultimate Guide to Your Microscope

Shar Levine and Leslie Johnstone. Sterling, 2008.

All about the microscope, how to use one, and how to prepare samples for viewing.

How to Buy a Microscope

Good microscopes are pricey; if your current model only cost \$20, either you got the deal of the century or you've got a piece of junk. It's not hard to tell the difference. A good microscope, to begin with, is made of metal, and the heavier the better. Plastic microscopes, the tempting standbys of toy catalogs, cannot support the precision optics necessary for serious microscopy, and they're so lightweight that viewing of any kind is difficult. If you can pick your microscope up with two fingers, it's too insubstantial for practical purposes; every thump on the table will throw it out of whack.

Most student microscopes are monocular, which means that they have a single eyepiece. In lower-grade microscopes, the eyepiece is positioned straight up and down, which makes viewing uncomfortable from a sitting position unless you have an unusually long and flexible neck. Better, especially for shorter microscopists, is an eyepiece set at a 45-degree angle. Ideally, only the eyepiece should slant. The microscope stage—the flat platform that the microscope slides sit on—should remain firmly horizontal. Some microscopes are jointed at the base and can be tilted back to whatever angle suits the viewer. This sounds user-friendly but can be awkward in practice, because in such models the stage tilts in company with the eyepiece. This is manageable if you're examining immobile prepared specimens but can be disastrous when studying something sloshy like pond water.

Total magnification obtainable through a microscope is calculated by multiplying the magnification of the eyepiece by that of the objective lens. The standard eyepiece is 10×; most student microscopes come with three objective lenses, commonly 5×, 15×, and 30×. The highest magnification possible with such a microscope is thus 300× (10× times 30×), and this is what suppliers mean when they advertise a “300× microscope.”

A magnification of 300× will give users a good view of plant and animal cells. For studying bacteria or intracellular structures, you need a magnification of 1,000×, which requires a 100× oil-immersion objective. The 100× objective is used with a special synthetic oil, obtainable from scientific supply companies: a drop of this stuff is placed on top of the coverslip on the microscope slide, such that the objective lens, when positioned for viewing, is immersed in the oil. This allows for maximum light to pass through the lens, for optimal resolution at high magnification. Some microscopes have interchangeable objectives—the lenses screw out of their casings—so that users can employ extras at different magnifications.

Good student microscopes have both coarse and fine focus adjustments, and some have adjustable stops, a desirable feature that keeps users from blithely focusing too far downward and grinding the objective lens into the slide on the stage. (One should, of course, start low and focus *up*, but excited beginners often find that a hard rule to follow.) Good microscopes are also parfocal, which means that once a specimen is in focus, you should be able to change magnifications by switching objective lenses without having to refocus each time.

Starter microscopes are usually equipped with a concave mirror beneath the stage, which can be tilted to angle maximum light through the specimen, objective, and eyepiece to the waiting human eye. Such a mirror, all by itself, cannot provide enough light for detailed viewing. Higher-quality microscopes have built-in illuminators beneath the viewing stage; for lesser models, outside illuminators—you set them up in front of the microscope and direct the light right at the little mirror—can be purchased separately.

If you've got an interested science-minded kid—or one who is serious about pursuing the biological sciences—hands-on familiarity with a microscope is an important skill. There are virtual microscope experiences available online, but they lack the immediacy and thrill of the real thing. (Also see Microslide Viewer, [this page](#).)

Recommended for kids are the Omano Monocular Compound Microscope (40× to 400×) and the My First Lab Duo-Scope Microscope, which is cheaper but still reasonably sturdy.

3. Enlarge and expand upon previous studies of botany.

Topics to cover include comparisons of vascular and nonvascular plants, the process of photosynthesis, vegetative and sexual reproduction, the anatomy of flowers, seed and fruit production, and plant adaptations.

Kids should be able to describe the characteristics of nonvascular plants (such as algae) and vascular plants, which use xylem and phloem to transport water and nutrients. They should understand the process of photosynthesis, including the functions of chloroplasts and chlorophyll. They should be able to describe and cite examples of vegetative

reproduction in plants and should experiment: for example, try sprouting potato eyes, ivy cuttings, or carrot tops.

They should be able to compare and contrast reproduction in spore-bearing plants such as ferns, nonflowering vascular plants (conifers), and flowering vascular plants. They should understand the functions of sepals, petals, stamens, anthers, pistils, ovaries, and the various modes of pollination. Kids might collect and classify evergreen cones, dissect flowers, examine samples of pollen under a microscope, and germinate and cultivate seeds.

Wisconsin Fast Plants

fastplants.org

It takes just forty days for Fast Plants to sprout, flower, and produce harvestable seeds. See the website to order seeds and for lessons and investigations for K–12.

The Story of Seeds

Nancy Castaldo. Houghton Mifflin Harcourt, 2016.

A powerful plea for more biodiversity and an end to monocultural agriculture, along with information about seed banks and seed researchers, from Luther Burbank on.

4. Reproduction in plants and animals.

Topics to cover include asexual reproduction (such as bacterial fission, sporulation, budding, and cloning) and sexual reproduction in plants and animals.

Kids should be able to define *gamete*, *testis*, and *ovary*, and they should understand the process of fertilization and the developmental sequence from zygote to embryo to fetus to newborn.

5. Continue studies of human anatomy and physiology.

Start Exploring: Gray's Anatomy: A Fact-Filled Coloring Book

Freddy Stark. Running Press, 2011.

Clear, reader-friendly explanations of all parts of the human body, with labeled diagrams to color. Add colored pencils.

In public school curricula, it is often suggested that fifth grade is an appropriate time to prepare kids for the onset of adolescence. Thus, parents/teachers might want to discuss bodily changes accompanying puberty: growth spurts, hair growth, voice changes, breast development, and menstruation. (Then again, depending on the needs and responses of your kids, maybe not.)

Topics to cover include duct and ductless glands; the definition of *hormone* and examples; the pituitary, adrenal, and thyroid glands and their functions; the pancreas; and the male and female reproductive systems.

Earth and Space Science

1. Review and reinforce geological studies covered in previous grades.

Topics to cover might include the definition of *minerals* and their basic characteristics; the six crystal systems; the characteristics and sources of metamorphic, sedimentary, and igneous rocks and common examples of each; the varied processes of erosion; volcanoes and earthquakes; and rocks from space (asteroids, meteorites, and impact craters).

2. Study oceanography.

Topics to cover include the topography of the ocean floor; currents, waves, and tides; properties of salt and fresh water; marine ecosystems; the influence of the ocean on weather; and water pollution and other threats to life in the oceans.

Kids should know about continental shelves, slope, rise, abyssal plains, mid-ocean ridges, and trenches. They should understand the causes and effects of the Gulf Stream and El Niño, the reasons for daily and seasonal high and low tides, the causes and characteristics of waves, and the causes of tsunamis. They should also be familiar with oceanic life zones and their

inhabitants, including the pelagic and benthic zones, and should understand the essential role plankton plays in marine ecosystems.

Pair this with a field trip to an aquarium, or—if you're lucky enough to live near one—a trip to the ocean.

See Seymour Simon's *Oceans* (HarperCollins, 2006) and *Coral Reefs* (2013).

Marine Science for Kids

Bethanie and Josh Hestermann. Chicago Review Press, 2017.

An overview of marine science, touching on geology, chemistry, and biology, with twenty-one activities.

Ocean: A Visual Encyclopedia

DK, 2015.

Stunning photos, fascinating facts, and background information on all aspects of the world's oceans.

Foreign Language

See [this page](#), [this page](#), [this page](#).

The Arts

Remember that the arts incorporate a wide range of disciplines not necessarily covered in the public school curricula. Take classes on ceramics or dance, build reproductions of famous buildings with Lego bricks, go on local architecture walks, learn origami, make tie-dye T-shirts, or organize a community Sidewalk Chalk Day. Host a homeschool art show. Collaborate on an installation sculpture fest.

Visual Art

As in previous grades, a good art program should incorporate hands-on activities, art theory, art appreciation, and art history. Kids should experiment with a wide range of art techniques and media.

- 1. Use previously acquired knowledge of art elements and principles of design to analyze the artwork of others and to produce a wide range of creative projects.**
- 2. Study art in conjunction with other academic subjects across the curriculum.**

Music

If your child is learning a musical instrument, many of the technical concepts listed in public school music curricula—notably those related to music theory—will come with the territory. If your child isn't, he/she might prefer to concentrate on music appreciation and music history.

- 1. Reinforce and expand upon the musical concepts covered in earlier grades.**

Formal curricula suggest that kids should be familiar with the terms *accelerando*, *ritardando*, *crescendo*, *decrescendo*, *legato*, and *staccato*. They should understand basic musical notation, including the notes of the treble clef, the significance of sharps and flats, and the meaning of meter signature.

- 2. Describe musical compositions in terms of melody, harmony, dynamics, rhythm, timbre, and texture.**

Kids should be able to identify major and minor tonalities and identify themes, variations, and repeating patterns. One possibility: practice with

movie soundtracks. What do you hear when?

3. Identify the major orchestral families and their individual instruments by sight and sound.

Kids might also enjoy learning about ethnic, folk, acoustic, electronic, and historical instruments. Grow gourds and make your own gourd instruments. Research the oldest flute in the world.

4. Listen and respond to a range of pieces by well-known composers and to folk and ethnic musical selections.

5. Participate in instrumental and vocal performances, group and solo.

Drama

Creative drama activities include plays, puppet shows, choral speaking, and oral storytelling.

Drama

Raina Telgemeier. Graphix, 2012.

In this graphic novel, Callie, who loves theater, is determined to create the best set ever for the middle school's production of *Moon over Mississippi*. But, of course, there are complications.

No More Dead Dogs

Gordon Korman. Disney-Hyperion, 2017.

Wallace, suspended from the football team for his untactful book report on *Old Shep, My Pal*, instead becomes involved in a theater production of the book—and ends up creatively rewriting the play.

Replay

Sharon Creech. HarperCollins, 2013.

Leo, an imaginative daydreamer who rewrites scenes of daily life, lands the part of an old crone in the school play. Funny, philosophical, and uplifting.

Also for imaginative daydreamers, see James Thurber's classic *The Secret Life of Walter Mitty* (Penguin, 2016).

Short

Holly Goldberg Sloan. Puffin, 2018.

Julie, short for her age, is cast as a Munchkin in a performance of *The Wizard of Oz*—and, with the help of new friends in the theater, begins to see herself in a different way.

Surviving the Applewhites

Stephanie S. Tolan. HarperCollins, 2012.

“Problem kid” Jake Semple is sent to live with the homeschooling Applewhites, a chaotic family of artists and performers, and becomes involved in a production of *The Sound of Music*.

Theater Shoes

Noel Streatfeild. Yearling, 1994.

Set during World War II, orphans Sorrel, Mark, and Holly are sent to a theater school by their grandmother, a famous actress. One of a series; other titles are *Ballet Shoes* and *Dancing Shoes*.

Philosophy and Comparative Religion

Reading Thoreau's original works can be heavy going for younger readers—depending on your kids, it might be best to save *Walden* and “Civil Disobedience” for high school—but if you've been studying the early nineteenth century, this might be a good time to tie in Thoreau and the transcendentalists.

Henry Builds a Cabin

D. B. Johnson. Houghton Mifflin Harcourt, 2002.

In this picture book, Henry—a bear based on Henry David Thoreau—builds a cabin in the woods. Subsequent titles include *Henry Hikes to Fitchburg* and *Henry Climbs a Mountain*.

Henry David Thoreau for Kids

Corinne Hosfeld Smith. Chicago Review Press, 2016.

An overview of Thoreau's life, times, and ideas, with illustrations, fact boxes (“What is Transcendentalism?”), and related activities, including making a journal, conducting a plant inventory, and writing a protest letter to an official or editor.

If You Spent a Day with Thoreau at Walden Pond

Robert Burleigh. Henry Holt, 2012.

A lovely picture-book account of what it might be like to spend a day with Thoreau, illustrated with paintings by Wendell Minor.

The Night Thoreau Spent in Jail

Jerome Lawrence and Robert E. Lee. Hill and Wang, 2001.

A classic American play examining Thoreau's philosophy and issues of civil disobedience.

Health and Physical Education

Tie sports to science.

The Book of Wildly Spectacular Sports Science

Sean Connolly. Workman, 2016.

Dozens of activities and experiments on everything from knuckleballs to bike gears and karate chops.

Sports Science

Jim Wiese. Wiley, 2002.

Forty sports-related projects and experiments. Learn how ice skates work and how boats can sail into the wind.

Also see Super Sports Infographics, [this page](#).

1. Participate in a range of age-appropriate indoor and outdoor athletic activities designed to provide a well-rounded program of physical fitness.

2. Participate in a program of drug education.

3. Understand the distinction between communicable and noncommunicable diseases.

Kids at this grade level should have a basic understanding of how the immune system works and know basic methods for preventing the spread of communicable diseases. They should also understand the science behind vaccination.

4. Be familiar with the elements of good nutrition and personal hygiene.

Kids should be able to design a good dietary program based on the food pyramid and USDA dietary guidelines. (See www.choosemyplate.gov.) They should know the functions and sources of the six major nutrients (carbohydrates, proteins, fats, vitamins, minerals, and water) and should understand the health problems associated with dietary deficiencies.

Food: 25 Amazing Projects Investigate the History and Science of What We Eat

Kathleen M. Reilly. Nomad, 2010.

From the first farms to the present in short illustrated chapters, with projects that include making ancient Mexican hot chocolate and your own marshmallows. Great connections to a range of disciplines.

5. Depending on ages and stages of kids, prepare for adolescence and puberty.

It's Perfectly Normal

Robie H. Harris. Candlewick, 2014.

A well-done guide on changing bodies, growing up, sex, and sexual health.

6. Know basic first-aid procedures for common injuries.

Life Skills

See [this page](#).

Computer and Technology Skills

Continue to enhance and develop computer skills.

1. Increase keyboarding speed and accuracy, using proper finger positions.

2. Expand knowledge of formatting functions, including page numbering, page breaks, indents, margins, and columns.

3. Use effective internet research skills.

4. Continue to develop coding skills.

Python for Kids

Jason R. Briggs. No Starch Press, 2012.

Step-by-step instructions for programming in Python using examples of ravenous monsters, secret agents, and thieving ravens.

Also from No Starch Press, see *Javascript for Kids* (Nick Morgan, 2014), *Coding iPhone Apps for Kids* (Gloria Winquist and Matt McCarthy, 2017), and *Scratch Programming Playground* (Al Sweigart, 2016). All recommended for ages 10 and up.

Engineering

The Big Book of Makerspace Projects

Colleen Graves. McGraw-Hill, 2016.

Make scribble bots, hovercraft, LED origami, programmable robots, and much more.

Building Big

David Macaulay. Houghton Mifflin Harcourt, 2004.

A marvelously illustrated account of the design and construction of bridges, tunnels, skyscrapers, domes, and dams.

Also see the five-part TV series (PBS, 2000) based on the book, and the accompanying website (www.pbs.org/wgbh/buildingbig), which features related information, challenges, and online labs.

Engineered!

Shannon Hunt. Kids Can Press, 2017.

How do you land a rover on Mars or shrink a computer to the size of your hand? A great account of engineering design at work, filled with colorful cartoon illustrations.

Rube Goldberg Machines

Cartoonist Rube Goldberg was known for inventing complicated and wacky devices for performing simple tasks. (Check out some great videos on YouTube!)

Mouse Trap

Hasbro

A board game in which players first build a Rube Goldberg-like mouse trap, then race around the board collecting cheese and trying not to get caught. For ages 6 and up.

Build Your Own Chain Reaction Machines

Paul Long. Quarry Books, 2018.

Step-by-step instructions for making wacky machines with everyday objects.

KEVA Contraptions

Mindware

A set of fifty wooden planks that can be stacked and arranged to build six or more Rube Goldberg-like contraptions. Comes with two balls and an idea book.

Also see the Lego Chain Reactions Kit (Klutz), with which kids can building amazing moving machines with Lego bricks.

The Way Things Go

This 1987 documentary by Peter Fischli and David Weiss (Icarus Films; available on Amazon) is a thirty-minute view of a phenomenal building-size Rube Goldberg machine.

Rube Goldberg Machine Contest

www.rubegoldberg.com

An annual contest in which teams build their own Rube Goldberg machines and compete either in person or online. Various divisions for ages 8 and up. Drawback: There's a hefty registration fee; it's recommended that teams recruit community sponsors.

Rubber Band Engineer

Lance Akiyama. Rockport, 2016.

Make slingshot rockets, catapults, hydraulic pumps, and more with common household items and many rubber bands.

Also by Akiyama, see *Duct Tape Engineer* (2017), a collection of epic duct tape projects.

Smithsonian Maker Lab

DK, 2016.

Instructions and explanations for twenty-eight cool projects, from slime and invisible ink to a balloon rocket car, a waterwheel, and a soap-powered boat.

The Way Things Work Now

David Macaulay. Houghton Mifflin Harcourt, 2016.

How everything works, from an inclined plane and a can opener to a jumbo jet, with superb diagrams, drawings, and the help of a woolly mammoth. One of Ethan's all-time favorites.

CHAPTER 11

Grade Six

*It is no matter what you teach them first, any more
than what leg you shall put into your breeches first.*

—SAMUEL JOHNSON

The transition to sixth grade isn't as much of an issue for homeschooled kids as it is for public school students, where it may involve a move to middle school and a sudden switch from being the oldest kid at the top of the heap to being the youngest kid at the bottom.

Language Arts

See the inquiry-based Great Books series ([this page](#)) for grades six through eight. Selections include short stories by William Saroyan, Ray Bradbury, Shirley Jackson, Kurt Vonnegut, Anton Chekhov, and Eudora Welty, and poems by Billy Collins, Sylvia Plath, Langston Hughes, and Robert Frost, along with challenging discussion questions.

Reading

Just because they're getting older doesn't mean you have to stop reading aloud. Judy Richardson's *Read It Aloud* (International Reading Association, 2000) is filled with examples of teachers reading to older kids, variously presenting everything from *The Odyssey* to the Declaration of Independence to soldiers' letters home from Vietnam. Reading aloud provides opportunities for explanations, questions, discussion, and the sharing of opinions and ideas.

1. Read a wide range of age-appropriate fiction and nonfiction materials.

13: Thirteen Stories That Capture the Agony and Ecstasy of Being 13

James Howe, ed. Atheneum, 2006.

Twelve stories and one poem by popular writers of contemporary teen fiction.

Little Worlds

Peter Guthrie and Mary Page, eds. Wayside Publishing, 1985.

A collection of classic short stories recommended for middle school readers, among them Edgar Allan Poe's "Masque of the Red Death," Shirley Jackson's "The Lottery," and Jack London's "To Build a Fire."

Read All About It!

Jim Trelease, ed. Penguin, 1993.

A great collection of excerpts and articles for preteens and teens by a wide range of authors, among them Jerry Spinelli, Harper Lee, Langston Hughes, Roald Dahl, Rudyard Kipling, and Ray Bradbury.

Shelf Life: Stories by the Book

Gary Paulsen, ed. Simon & Schuster, 2003.

Ten stories by well-known authors, each revolving around a book.
For grades five through ten.

2. Evaluate works of literature through discussion, debate, and written critique.

Kids should be familiar with such literary elements and techniques as plot, setting, theme, characters, conflict, figurative language, and point of view.

3. Expand upon knowledge of the classics.

Suggestions for kids at this grade level include Shakespeare's *Julius Caesar* and Homer's *The Iliad* and *The Odyssey*.

How to Read Literature Like a Professor for Kids

Thomas C. Foster. HarperCollins, 2013.

Clear and witty explanations of the layers of meaning in literature, including symbolism, metaphor, characterization, setting, plot, and more.

4. Read a varied range of poetic forms.

Kids should be familiar with imagery, simile, metaphor, onomatopoeia, and personification. They should be able to analyze rhyme and rhythm schemes, define *meter* and *iamb*, and understand the meaning of free verse.

Because I Could Not Stop My Bike and Other Poems

Karen Jo Shapiro. Charlesbridge, 2005.

Hilarious poems that are take-offs on famous works by Shakespeare, Tennyson, Dickinson, and others. (Pair with the originals.)

I'm Just No Good at Rhyming

Chris Harris. Little, Brown, 2017.

This witty collection will even win over determined poetry-haters.

Old Possum's Book of Practical Cats

T. S. Eliot. Houghton Mifflin Harcourt, 1982.

Wonderful cat poems, with illustrations by Edward Gorey.

Poetry 180

Billy Collins, ed. Random House, 2003.

Inspired by Collins's poem-a-day program with the Library of Congress, this is an anthology of contemporary poets. Also see *180 More* (2005).

5. Play with words.

What are the best, the worst, the longest? Vocabulary is wonderful stuff—imagine where we'd be without it.

Ella Minnow Pea

Mark Dunn. Anchor, 2002.

Ella lives on the island of Nollop, named for the inventor of the phrase "the quick brown fox jumps over the lazy dog," which uses all of the letters in the alphabet. When letters start falling off Nollop's statue, the island's council bans the lost letters from use.

The Wonderful O

James Thurber. Penguin, 2017.

Thurber's beloved fairy tale about an island robbed of the letter O by a pirate.

Word Play

Gyles Brandreth. Coronet, 2016.

A marvelous compendium of word weirdnesses presented in alphabetical order.

Writing

The best way to learn to write is to write. And if your kid should grow up to be a writer, a solid knowledge of correct grammar and a large vocabulary

will enable him/her to argue more effectively with editors. A useful tool here is a style manual.

Recommended are William Strunk and E. B. White's *The Elements of Style* (Pearson, 1999), Karen Elizabeth Gordon's *The Deluxe Transitive Vampire* (Pantheon, 1993, subtitled *The Ultimate Handbook of Grammar for the Innocent, the Eager, and the Doomed*), and Benjamin Dreyer's absolutely delightful *Dreyer's English* (Random House, 2019).

Discovering Voice

Nancy Dean. Maupin House, 2013.

How to create a distinctive writer's voice, with examples and discussion questions based on excerpts from a range of authors. Covers concepts of detail, figurative language, imagery, syntax, and tone.

Also see the sequel, *Voice Lessons*.

1. Write frequently, producing a variety of works including reports, essays, short stories, poems, narratives, journal entries, and letters.

Kids should be familiar with a multi-step writing process, involving pre-writing, drafting, revising, editing, proofreading, and publishing a finished piece. They should know how to write an effective multi-paragraph essay: defining a main purpose or thesis, supporting the thesis with evidence and examples, distinguishing unsubstantiated opinion from proven fact, using relevant quotes from attributed sources, and providing a bibliography.

2. Recognize and use correct sentence structure.

Kids should know the four major types of sentences (declarative, interrogative, imperative, and exclamatory); should recognize and identify simple, compound, complex, and compound-complex sentences; and should be able to use all of these effectively in written work. They should also be able to identify and correct incomplete and run-on sentences, and should recognize and identify the principal parts of sentences: subject, predicate, object, and modifiers.

Sister Bernadette's Barking Dog: The Quirky History and Lost Art of Diagramming Sentences

Kitty Burns Florey. Mariner Books, 2007.

The practice of diagramming sentences has gone the way of the dodo, but Florey argues that it provides a graphic tool that allows students to parse the structure of sentences. Interesting exercise in grammatical puzzle-solving.

3. Use punctuation marks correctly.

Reinforce and expand upon knowledge acquired in earlier grades. By this grade level, kids should be familiar with the uses of the colon and semicolon.

4. Recognize and identify common parts of speech, including nouns, pronouns, verbs, adjectives and articles, adverbs, conjunctions, and interjections.

Kids should be able to distinguish between verbs in the active and passive voice, should understand subject-verb and pronoun-antecedent agreement, and should know the correct use of adjectives and adverbs. In other words, use correct grammar.

5. Expand upon previous spelling and vocabulary skills.

By sixth grade, most kids should be reasonably competent spellers. Kids should be aware of the proper usage of such common bugbears as *good* and *well*, *between* and *among*, *bring* and *take*, *accept* and *except*, *affect* and *effect*, *who* and *whom*, *capital* and *capitol*, *principle* and *principal*, and *like* and *as*.

6. Know the meaning of foreign words commonly used in English and the meaning of Greek and Latin words that form common English word roots.

Examples of the former include *fiesta* and *nom de plume*. Examples of the latter include *bios* (life), as in *biology*; *phone* (sound), as in *telephone*; *post* (after), as in *posthumous*; and *pre* (before), as in *prepare* and *predict*.

7. Write business letters in correct format.

Listening and Speaking Skills

1. Listen to and make narrative and informational oral presentations.

2. Memorize and recite poems.

Conventional dogma holds that memorization of poetry enhances one's facility with language, broadens the mind, touches the heart, and provides nearly endless amusement for times when one is trapped in elevators or traffic jams. But then, as Ethan (not a poetry fan) pointed out, other things do too.

Study Skills

1. Know how to obtain information from common print and electronic sources.

2. Be able to take effective notes and develop outlines from written selections.

A popular format for taking and organizing notes is known as the **Cornell method**, originally developed in the 1940s by an education professor at Cornell University. This involves dividing one's paper into two columns, a narrower one on the left for listing questions and key words and a wider one on the right for detailed notes, plus a space at the bottom for a summary to

be added following after-lecture review. Many examples and templates for the Cornell method of note-taking are available online.

See mind maps, [this page](#).

Mathematics

From my homeschool journal (Josh is 13):

Josh spent most of the day reading The Brothers Karamazov by Fyodor Dostoyevsky, emerging from literature long enough to argue that, as a future writer, it is a waste of his time to study math. “Look at Dostoyevsky. Do you think he needed math?”

I sent Josh to research Dostoyevsky. Josh returned, gleeful, and announced that Dostoyevsky spent three years in engineering school, hated every minute of it, and spent all his time there reading.

I should have made him look up Lewis Carroll.

Why do so many kids hate math? Theories abound: math is perceived as intimidating; kids lack adequate self-confidence and therefore shy away from it; kids see no practical purpose for it; and much of the math kids get is boring. Do we really need all this stuff? Or is this just a dog-and-pony show, funneling kids toward standardized tests? And why do you need so much of it if you’re bent on being an English major?

WHAT MOST OF US REALLY NEED IN THE WAY OF MATH

1. Basic arithmetic facts, including the multiplication tables. Such calculations come up repeatedly in the course of everyday life, and you’ll save yourself a lot of time and trouble if you don’t need to grope for a calculator to solve such quickies as $9 + 6$ or 8×7 .
2. Ratios and percents are so ubiquitous in the public domain that we need to know what they are and what they mean. What about the extortionate interest rates levied by some credit cards? What does a

widening gender ratio mean for China? What about the pay ratio between company CEOs and workers? And there's always the tricky question of how much to tip the waitstaff or the cabdriver.

3. Basic probability and statistics are perhaps the most important mathematical skills that all people need to acquire, since so many public decisions depend on these. Just for starters, think of political polls, medical efficacy studies, educational assessments, weather prediction, and insurance actuarial tables. Should you buy a lottery ticket? How effective are flu shots? Do you need a mammogram? Is preschool beneficial? How dangerous are airplanes?
4. It's also important to be able to interpret and assess a graph. Graphic representations of data are powerful tools, but they can also be deceptive. Know what you're looking at. Just because a graph looks impressive on the nighttime news doesn't mean that it is.
5. Most people need enough geometry to figure out how to carpet the living room, tile the bathroom floor, shingle the roof, or buy enough topsoil to fill the raised beds in the garden.
6. Most people—unless aiming for a technological career such as engineering or physics—are perfectly capable of learning what math they need when they need it or on the job.

Math Doesn't Suck: How to Survive Middle School Math Without Losing Your Mind or Breaking a Nail

Danica McKellar. Plume, 2008.

McKellar's catchy math book—targeted at girls—includes such chapters as “How to Make a Killing on eBay” and “How to Entertain Yourself While Babysitting a Devil Child.”

Other titles by McKellar include *Kiss My Math: Showing Pre-Algebra Who's Boss* (2009), *Hot X: Algebra Exposed!* (2011), and *Girls Get Curves: Geometry Takes Shape* (2013).

READING THE MATH

For kids who really meltdown-hate math, try a math reading list.

Chasing Vermeer

Blue Balliett. Scholastic, 2005.

Friends Calder and Petra solve the mystery of a missing Vermeer painting using problem-solving skills and Pentominos.

Counting on Frank

Rod Clement. Gareth Stevens, 1991.

A kid who collects cool facts—for example, there's enough ink in the average ballpoint pen to draw a line seven thousand feet long—does a lot of creative math with his dog, Frank.

Lawn Boy

Gary Paulsen. Yearling, 2009.

In this short and funny novel, a 12-year-old gets a used lawnmower for his birthday and—with some help from Arnold the stockbroker—turns it into a booming business. Sample chapter title: "The Law of Increasing Product Demand Versus Flat Production Capacity."

Math Curse

Jon Scieszka. Viking, 1995.

The appalled narrator wakes up to discover that everything in his life has turned into a math problem. Great illustrations by Lane Smith (and answers in the back).

The Number Devil

Hans Magnus Enzensberger. Picador, 2000.

Robert, who loathes math, meets the Number Devil, who takes him on a tour of weird and wonderful numbers.

One Grain of Rice

Demi. Scholastic, 1997.

A clever village girl confounds a greedy rajah by asking for just one grain of rice—to be doubled every day for thirty days.

The Phantom Tollbooth

Norton Juster. Bullseye, 1988.

Milo goes through a mysterious tollbooth and lands in the Kingdom of Wisdom, where he travels from Expectations to Dictionopolis, Digitopolis, and the Mountains of Ignorance, eventually rescuing the princesses Rhyme and Reason. A tour de force of word- and math-play.

POETRY AND MATH

Betsy Franco's *Math Poetry* (Good Year Books, 2006) has dozens of creative ideas for using poetry to teach math, with many student examples.

Also see:

Edgar Allan Poe's Pie

J. Patrick Lewis. Houghton Mifflin Harcourt, 2015.

Classic poems by such poets as Edgar Allan Poe, Emily Dickinson, and Langston Hughes turned into math riddles.

Math Talk

Theoni Pappas. Wide World Publishing, 1993.

Mathematical poems for two voices on everything from circles to Möbius strips to infinity.

Number Theory

1. Read and write numbers through the trillions in both numerals and words.

2. Reinforce concepts of place value; recognize place value through the billions.

3. Round numbers to the nearest ten, hundred, thousand, ten thousand, hundred thousand, and million.

4. Reinforce the concept of exponents introduced in previous grades.

5. Determine whether a given number is prime or composite.

6. Determine the greatest common factor (GCF) and least common multiple (LCM) of given numbers.

7. Explore a variety of alternative number systems, including ancient systems and alternative bases.

Ratio and Percent

1. Determine and express simple ratios.

Kids should be able to use ratios and proportions to interpret map scales and scale drawings and to create accurate scale drawings of their own.

2. Solve problems involving ratios.

For example, kids should be able to use ratios to determine the lengths of the sides of similar triangles.

3. Define and model percents.

Kids should recognize the percent sign (%) and know that *percent* means “per hundred.” Use grids or manipulatives to demonstrate percents.

4. Translate among fractions, decimals, and percents.

Kids should be able to determine, for example, that $\frac{1}{10} = 0.1 = 10\%$ and should know that $\frac{1}{4} = 25\%$, $\frac{1}{2} = 50\%$, and $\frac{3}{4} = 75\%$.

5. Solve problems using percents.

Fractions and Decimals

1. Identify the reciprocal of a given fraction.

Kids should also know that the product of a fraction and its reciprocal is 1.

2. Add, subtract, multiply, and divide fractions and mixed numbers with like and unlike denominators.

3. Compare and order fractions and decimals on a number line.

4. Add, subtract, multiply, and divide decimals.

Kids should also know how to move the decimal point when multiplying or dividing by tens.

Operations

1. Define and understand the commutative and associative properties of addition and the commutative, associative, and distributive properties of multiplication.

2. Add, subtract, multiply, and divide multi-digit numbers with and without a calculator.

While there are many books on the secrets of mental math, one interesting resource is *The Trachtenberg Speed System of Basic Mathematics* (Jakow Trachtenberg; Ishi Press, 2011), which consists of a set of easily memorized operations that—once internalized—allow users to perform arithmetical

calculations very quickly in their heads. Trachtenberg tested his system on children who were doing poorly in arithmetic; it has been found to be successful with kids as young as 8.

3. Solve word problems with multiple steps and numerical problems involving more than one operation according to the order of operations. (See [this page](#).)

Measurement

1. Compare and convert units of measurement within the English and metric measurement systems.

2. Define *precision* and *accuracy* in measurement.

Accuracy indicates how close a measurement is to its true value; precision refers to the reproducibility of the measured value (that is, if you take the measurement three times, how closely will the results agree?).

Probability and Statistics

1. Collect, organize, and interpret data using graphs, charts, plots, and tables.

Kids should create their own graphic representations of data and should solve problems that require the interpretation of graphs and tables. They should experiment with the use of computer spreadsheets to display and categorize data.

2. Determine range and measures of central tendency of a given set of numbers.

Kids should be able to calculate mean, median, and mode and should know the appropriate use of each.

3. Understand statistical sampling.

Kids should understand the use of samples for making predictions and mathematical inferences. (How accurate are polls?)

4. Plot points on a coordinate grid using ordered pairs of positive and negative whole numbers.

Kids should be familiar with the four quadrants of a coordinate grid and be able to locate the origin, x -axis, and y -axis.

5. Conduct simple probability experiments and express the results in decimals and percents.

Geometry

Play with string figures. Anne Akers Johnson's *Cat's Cradle: A Book of String Figures* (Klutz) includes instructions and a loop of string; there are also many string games and demos available online.

In Blue Balliett's novels—such as *Chasing Vermeer* (Scholastic, 2005)—main characters Petra and Calder use pentominoes to solve clues. Pentominoes (Learning Resources) are polygons made of five equal-sized squares that can be assembled in many ways. Pair these with the Balliett mysteries; many puzzles and challenges are also available online.

1. Recognize, measure, and construct angles.

Kids should be able to measure angles using a protractor; classify angles as acute, obtuse, or right; and construct angles of a given degree. They should also be able to classify angles as interior, exterior, complementary, or supplementary.

2. Calculate the perimeters and areas of plane figures.

Kids should know the formulas for calculating the areas of rectangles, squares, triangles, and parallelograms. They should also be able to determine the areas of irregular polygons by dividing them into regular figures.

Play with tiles and tessellations. Pair with the art of M. C. Escher.

The Original Area Mazes

Naoki Inaba. The Experiment, 2017.

Addictive puzzles, requiring simple math and logic. Think Sudoku crossed with geometry.

3. Calculate the circumferences and areas of circles.

Kids should be able to construct circles of a given radius or diameter using a compass, and should be able to calculate circumference and area using the appropriate formulas.

4. Know the triangle sum theorem.

That is, kids should know that the sum of the three angles of a triangle always equals 180 degrees, and should be able to solve problems to find missing angles.

5. Identify and construct different kinds of triangles.

Kids should be able to identify right, isosceles, equilateral, and scalene triangles and construct examples of each using protractors and rulers.

6. Identify similar, congruent, and symmetrical figures.

Kids should be familiar with the results of transformational geometry: translations, reflections, and rotations.

Pre-algebra

1. Recognize variables and solve simple equations containing variables.

For example, kids should be able to solve equations such as $x + 5 = 11$ and should be able to determine the value of an expression when given the replacement value of the variable. That is, they should be able to figure out the value of $8 - x$ given that $x = 2.5$. (See Hands-On Equations, [this page](#).)

2. Write and solve simple equations for word problems.

History and Geography

The Cartoon History of the Universe

Larry Gonick. Doubleday, 1997.

Volume 1 runs from the Big Bang to Alexander the Great, Volume 2 from the springtime of China to the fall of Rome, and Volume 3 from the rise of Arabia to the Renaissance. The follow-up is *The Cartoon History of the Modern World* (2006), with Part 1 covering Columbus to the U.S. Constitution and Part 2 running from the Bastille to Baghdad.

These are funny, appealing, informative, and thorough. The books are generally recommended for high-school-level kids, but our children loved them at a much younger age. Take a look!

The Greatest Stories Never Told

Rick Beyer. HarperResource, 2003.

Short illustrated stories, all with surprising revelations about the small things that have changed the course of history.

Other titles by Beyer include *The Greatest Science Stories Never Told*, *The Greatest Presidential Stories Never Told*, and *The Greatest*

War Stories Never Told.

American History

See Joy Hakim's *A History of US: An Age of Extremes* (see [this page](#)).

1. Immigration.

Topics to cover include the many different groups of immigrants and their countries of origin; Ellis Island, famous immigrants, and immigrant contributions to American society; the concept of the “melting pot”; changing population demographics; and national resistance to immigration. Should America accept refugees? What to do about illegal immigration?

A Different Mirror for Young People

Ronald Takaki. Triangle Square, 2012.

A kids' version of Takaki's *A Different Mirror* (2008), a multicultural history of America. Topics include Native Americans, slavery, the Irish potato famine, the Mexican War, Chinese railroad workers, the expulsion of Jews from Russia, the migration of African Americans to northern cities, and more.

Dragonwings

Laurence Yep. HarperCollins, 2001.

At the turn of the twentieth century, 8-year-old Moon Shadow sails from China to join the father he has never met in San Francisco's Chinatown. There he dreams of building a flying machine.

Inside Out and Back Again

Thanhha Lai. HarperCollins, 2013.

A novel in verse based on the author's childhood experience fleeing Vietnam after the fall of Saigon.

Refugee

Alan Gratz. Scholastic, 2017.

The stories of three young refugees: Josef escaping Nazi Germany in the 1930s, Isabel fleeing Cuba on a raft in 1994, and Mahmoud fleeing Syria in 2015.

2. The United States as a nineteenth-century world power.

Topics to cover include the annexation of Hawaii, the Spanish-American War, the building of the Panama Canal, and Theodore Roosevelt's Big Stick policy.

Silver People

Margarita Engle. Houghton Mifflin Harcourt, 2016.

A novel in verse that, in multiple voices, tells the stories of the people who built the Panama Canal.

3. Big business and machine politics.

Topics to cover include post-Civil War industrialization and urbanization, political corruption and the rise of "machine politics" in major cities, labor conditions and the formation of the unions, big business and the robber barons, Theodore Roosevelt and trust-busting, and increasing government regulation of business.

Names to know include Boss Tweed, Cornelius Vanderbilt, Jay Cooke, Andrew Carnegie, John D. Rockefeller, J. P. Morgan, Samuel Gompers, Mother Jones, Robert La Follette, and John L. Lewis.

Ashes of Roses

M. J. Auch, Square Fish, 2016.

The story of 16-year-old Rose, an Irish immigrant, struggling to survive in the sweatshops of New York City. Then she and her younger sister rent a room from the family of a union organizer and Rose gets a job at the infamous Triangle Shirtwaist Factory.

A Family Apart

Joan Lowery Nixon. Delacorte, 2013.

The six Kelly children's widowed mother can no longer support them in mid-nineteenth-century New York City, so she sends them west on an orphan train to be adopted by farm families.

Subsequent titles in the Orphan Train series are *Caught in the Act*, *In the Face of Danger*, and *A Place to Belong*.

4. Populism, progressives, and reform.

Topics to cover include populism, the muckrakers, Jane Addams and the settlement houses, Jacob Riis and city ghettos, fighters for the rights of black Americans, women's suffrage, and socialism.

Names to know include Nelly Bly, Lincoln Steffens, Ida Tarbell, Upton Sinclair, Ida B. Wells, Booker T. Washington, W. E. B. Du Bois, Susan B. Anthony, Elizabeth Cady Stanton, Lucy Stone, Victoria Woodhull, Carrie Chapman Catt, and Eugene Debs.

Bread and Roses, Too

Katherine Paterson. Houghton Mifflin Harcourt, 2008.

The story of the Bread and Roses Strike of 1912 as seen through the eyes of young Rosa, sent away to Vermont in the children's exodus while her mother and older sister march against corrupt mill owners.

Fifty Cents and a Dream

Jabari Asim. Little, Brown, 2012.

A picture-book biography of young Booker T. Washington, his struggle to get to school, and his legacy as an educator.

The House That Jane Built

Tanya Lee Stone. Henry Holt, 2015.

A picture-book biography of social worker and activist Jane Addams.

Also see Suzanne Slade's *Dangerous Jane* (Peachtree Publishing, 2017).

Not for Ourselves Alone

From PBS, this excellent Ken Burns film tells the story of Elizabeth Cady Stanton and Susan B. Anthony. See www.pbs.org/stantonanthony for associated resources and information.

Also see *Suffragette* (2015), directed by Sarah Gavron. Rated PG-13.

Rightfully Ours: How Women Won the Vote

Kerrie Logan Hollihan. Chicago Review Press, 2012.

The story of the long struggle for women's suffrage, with historical background information, period photos, capsule biographies, and twenty-one hands-on activities, including making soap, hosting a Victorian tea, and finding out what it was like to wear a corset.

Ten Days a Madwoman

Deborah Noyes. Puffin, 2017.

The exciting story of Nellie Bly, the nineteenth-century reporter who feigned insanity to infiltrate the notorious asylum on Blackwell's Island and who circled the world in just seventy-two days.

Wheels of Change

Sue Macy. National Geographic, 2017.

A history of the bicycle and how it furthered women's suffrage, illustrated with period photos, ads, and cartoons.

World History

One choice for sixth graders is to explore in greater depth the Dark Ages, the Middle Ages, feudal society, and the Crusades.

Popular textbooks include *World History: Ancient Civilizations* (McDougal Little, 2006), *World History: Ancient Civilizations Through the Renaissance* (Holt McDougal, 2012), and *Discovering Our Past: A History of the World* (Jackson Spielvogel; McGraw Hill, 2013). These are all hefty

(600+ pages) and are most valuable when used as general guides and references. History is best approached through a wide variety of sources.

1. The Dark Ages.

The first three centuries after the fall of Rome (500–800 CE) are generally referred to as the Dark Ages. Topics to cover include the sack of Rome by the barbarians; Attila and the Huns; and the histories of the barbarians, such as the Vandals, Franks, Angles, and Saxons.

Attila the Hun: Leader of the Barbarian Hordes

Sean Stewart Price. Franklin Watts, 2015.

See Wicked History series, [this page](#).

Barbarians!

Steven Kroll. Dutton, 2009.

The lives and times of the barbarians, including the Goths, Huns, Vikings, and Mongols.

Barbarians

BBC, 2006.

Were the barbarians really that barbaric? See the alternative side of history in Terry Jones's four-part documentary: "The Primitive Celts," "The Savage Goths," "The Brainy Barbarians," and "The End of the World."

2. The rise of Christianity.

Topics to cover include the increasing power of the Roman Catholic Church and the pope, Benedict of Nursia and the monasteries, the split between Roman and Greek Orthodox churches, Charlemagne, the Carolingian Renaissance, and the Holy Roman Empire.

3. Feudal society.

Topics to cover include castles and manors; everyday life in the medieval period; medieval social structures, including the relationships between lords

and vassals; knighthood and the code of chivalry; towns as centers of trade and commerce; medieval guilds; and art and architecture of the period.

Adam of the Road

Elizabeth Janet Gray. Puffin, 2006.

Eleven-year-old Adam travels the roads of thirteenth-century England searching for his lost minstrel father.

Archers, Alchemists, and 98 Other Medieval Jobs

Priscilla Galloway. Annick, 2003.

An annotated timeline, clever cartoon illustrations, and a catchy overview of careers in the Middle Ages. What would you have been: a monk, a squire, or a witch hunter?

Catherine, Called Birdy

Karen Cushman. Houghton Mifflin Harcourt, 2012.

The fictional diary of Catherine, a bright and rebellious 14-year-old in the year 1290.

Also by Cushman set in the medieval period: *Alchemy and Meggy Swann* (2011), *The Midwife's Apprentice* (2012), *Matilda Bone* (2014), and *Will Sparrow's Road* (2014).

Crispin

Avi. Hyperion, 2002.

In this Newbery winner set in fourteenth-century England, young Crispin, declared an outlaw, sets off on a quest in search of his true identity.

Defending Your Castle

William Gurstelle. Chicago Review Press, 2014.

For young medieval engineers. Historical background information and instructions for building catapults, crossbows, and a Mongol Smoke Monster.

Good Masters! Sweet Ladies! Voices from a Medieval Village

Laura Amy Schlitz. Candlewick, 2011.

A picture of medieval life told from many different standpoints, including that of Hugo, the lord's nephew; Taggot, the blacksmith's daughter; Barbary, the mud slinger; and more. A Newbery Medal winner.

The Inquisitor's Tale

Adam Gidwitz. Puffin, 2018.

One night in 1242, travelers gather at an inn in France to hear the tales of three magical children. A richly researched adventure.

4. England in the Middle Ages.

Topics to cover include the Norman Conquest, Henry II and Eleanor of Aquitaine, Richard the Lionheart and John I, the Magna Carta and its importance, Parliament and the beginning of representative government, the Hundred Years' War, the Black Death, and the Wars of the Roses. Check out the Bayeux Tapestry; read the stories of Robin Hood and of King Arthur and the knights of the Round Table.

Great Tales from English History

Robert Lacey. Back Bay, 2007.

A large chronological collection of short historical pieces, beginning with Cheddar Man and running through Winston Churchill and Watson and Crick. For adults, but the short selections make for good group read-alouds.

A Proud Taste for Scarlet and Miniver

E. L. Konigsburg. Atheneum, 2001.

Eleanor of Aquitaine, waiting in heaven to be reunited with her husband, Henry II, reminisces with friends about her life and times.

When Plague Strikes

James Cross Giblin. HarperCollins, 1997.

The stories of three diseases that changed the course of history: the Black Death, smallpox, and AIDS.

Yvain: The Knight of the Lion

M. T. Anderson. Candlewick, 2017.

A gorgeous graphic novel set in the days of King Arthur.

Movies: *The Lion in Winter* (1968) is a story of Eleanor of Aquitaine, Henry II, and their grown sons, starring Katharine Hepburn and Peter O'Toole (PG); O'Toole also plays Henry II in *Becket* (1964), opposite Richard Burton in the title role (PG-13). The musical *Camelot* (1967) is the story of Arthur, Guinevere, Lancelot, and the Round Table, starring Richard Harris and Vanessa Redgrave (G).

5. The rise of Islam.

Topics to cover include Muhammad and the basic tenets of Islam; the conquest of North Africa and Spain by the Moors; and Arab contributions to civilization in the fields of science, medicine, mathematics, and the arts.

The Genius of Islam: How Muslims Made the Modern World

Bryn Barnard. Knopf, 2011.

An attractively illustrated overview of the many cultural and scientific advances we owe to the Muslims.

The Amazing Travels of Ibn Battuta

Fatima Sharafeddine. Groundwood, 2014.

The picture-book story of the fabulous traveler who set out in 1325 on a pilgrimage to Mecca and returned thirty years later, having toured much of the world.

Also see James Rumford's *Traveling Man: The Journey of Ibn Battuta 1325–1354* (Houghton Mifflin Harcourt, 2004).

Ibn al-Haytham: The Man Who Discovered How We See

Libby Romero. National Geographic, 2016.

A short biography of the brilliant tenth-century scholar who founded the study of optics and invented an early version of the camera.

Mosque

David Macaulay. Houghton Mifflin Harcourt, 2008.

Illustrated with exquisitely detailed drawings, this traces the planning and construction of a mosque in sixteenth-century Turkey.

Movies: *El Cid* (1961), the story of the Spanish hero who defended Christian Spain against the Moors (NR), and *When the Moors Ruled in Europe* (2005), a documentary on the Islamic society that entered Spain from North Africa in the eighth century and ruled there for seven hundred years (NR).

6. Medieval Europe and the East; the Crusades.

Topics to cover include the causes and major events of the Crusades and the far-reaching effects of the ensuing cultural exchange between Europe and the East.

Crusades

Laura Scandiffio. Annick Press, 2009.

What if kids had kept blogs at different periods in history? Read this one by 12-year-old Hans, growing up in the Holy Roman Empire. A great project: invent some historical blogs of your own.

Marco Polo for Kids

Janis Herbert. Chicago Review Press, 2001.

The story of Marco Polo's fabulous journey to China in the thirteenth century along the Silk Road. Included are maps, a timeline, fact boxes, capsule biographies, and twenty-one hands-on activities, including making a mythical map, a mosaic, and a wall hanging.

The Ramsay Scallop

Frances Temple. HarperCollins, 1995.

It's 1299; Elenor is 14 and betrothed to Thomas, newly returned, broken and disillusioned, from the Crusades. Neither wants to

marry—so the wise village priest sends them on a pilgrimage.

Movie: In *Ivanhoe* (1982), the title character returns from the Crusades to find England ruled by Prince John and in the throes of a struggle for the throne (NR).

Geography

1. Review and reinforce concepts covered in previous geographical studies.

Kids should be familiar with the use and content of maps and globes, including names and locations of continents, major oceans, states and countries, climate and time zones, the prime meridian and International Date Line, the Tropics of Cancer and Capricorn, and the Arctic and Antarctic Circles.

2. Survey deserts of the world.

Kids should know the characteristic features of deserts and be able to locate and discuss such major deserts as the Sahara, Kalahari, Gobi, Mojave, Sonoran, Patagonian, and the Great Victoria Desert of Australia.

Discover the Desert

Kathryn Ceceri. *Nomad*, 2009.

A fact-filled overview of the driest places on earth, with maps, fact boxes, “Words to Know” lists, and hands-on activities, among them making a sand design bottle, growing salt crystals, and planting a cactus terrarium.

3. Link geography studies to history topics.

In the News

See [this page](#).

Science

Science Journal for Kids

www.sciencejournalforkids.org

Peer-reviewed scientific research adapted for young readers. Articles include lists of key terms and scientific methods, discussion questions, and related videos.

Physical Science

Cool Physics

Sarah Hutton. Pavilion, 2017.

An enjoyable guide to physics, combining essential physical principles with ten experiments.

Physics: Why Matter Matters!

Dan Green and Simon Basher. Kingfisher, 2010.

Snarky first-person characters introduce physical principles, including heat, light, atomic structure, and electricity.

The Way Things Work Now

David Macaulay. HMH, 2016.

Sections include “The Mechanics of Movement,” “Harnessing the Elements,” “Working with Waves,” “Electricity and Automation,” “The Digital Domain,” and “The Invention of Machines.” Great illustrations and diagrams, with occasional help from a cartoon woolly mammoth.

1. The science of heat.

Kids should be able to correlate heat to atomic and molecular activity. They should know the three ways that heat can be transferred (conduction,

convection, and radiation) and should understand that heat transfer always proceeds from hotter to colder until equilibrium is reached.

2. Survey states of matter in terms of energy transfer.

Kids should know that phase changes occur when energy is added or subtracted from a system, and should be able to explain the molecular basis for expansion or contraction in response to changes in temperature.

3. Understand boiling and freezing points, and the principle of distillation.

Kids should know that each substance has a characteristic boiling and freezing point, and should be able to state the boiling and freezing points of water in both degrees Fahrenheit and Centigrade. They should be able to define and explain the process of distillation—that is, the separation of liquid mixtures based on differences in boiling point.

Tie to moonshine, rum-running, and Prohibition.

4. The science of light.

Kids should be able to define *reflection*, *refraction*, and *absorption*. They should understand how a prism works (play with one) and should be able to discuss and cite examples of how light energy can be transformed into heat, chemical, electrical, or mechanical energies.

Catch the Wind, Harness the Sun

Michael J. Caduto. Storey Publishing, 2011.

Background information, fact boxes, and twenty-two projects on renewable energy.

Renewable Energy

Joshua Sneiderman et al. Nomad, 2016.

An overview of solar, wind, hydro, geothermal, and biofuel energy resources, with twenty related hands-on projects.

5. Understand the law of the conservation of energy.

Energy can be neither created nor destroyed, but it can be changed from one form to another.

Life Science

1. Explore concepts of energy transfer within ecosystems.

Kids should be able to trace the transfer of energy through ecosystems, from light energy (sunlight) to chemical energy (photosynthesis) to stored energy (plant sugars), and then from one organism to another through terrestrial and aquatic food webs.

2. Describe and discuss interactions of organisms and their environment within ecosystems.

Kids should be able to compare and contrast coexistence, cooperation, and competition. They should be able to define and cite examples of symbiosis, and should understand the impact of limiting factors on ecosystems and the results of external disruption of food webs.

Research, for example, the effects of cats on ecosystems and the impact of rabbits on Australia.

3. Continue studies of human anatomy and physiology.

Kids should briefly review body systems covered in previous grades. Topics to emphasize this year might include the major components of the circulatory and lymphatic systems, antigens and antibodies, bacteria and viruses, bacterial diseases (including tetanus, typhoid, diphtheria, and tuberculosis), the discovery and mechanism of action of antibiotics, viral diseases (including the common cold, influenza, rabies, polio, and AIDS), epidemics, and the biological basis of vaccination.

Field Guide to Germs

Wayne Biddle. Anchor, 2002.

An alphabetized list from adenoviruses to Zika fever, with a short, interesting story and background info for each.

Microbe Hunters

Paul de Kruif. Mariner, 2002.

A classic history of bacteriologists and human disease, from Leeuwenhoek and Pasteur through Paul Ehrlich and the “magic bullet.”

Outbreak

Bryn Barnard. Dragonfly, 2015.

The story of the plagues that changed history, from the Black Death to cholera, yellow fever, smallpox, and tuberculosis.

The Way We Work

David Macaulay. Houghton Mifflin Harcourt, 2008.

Seven sections cover all the major body systems, with Macaulay’s detailed and clever illustrations.

Earth and Space Science

1. Investigate and explore the concept of plate tectonics.

Topics to cover include Alfred Wegener and the theory of plate tectonics, the causes and effects of earthquakes, the Richter scale, and geologic hot spots and the formation of volcanoes and island chains.

2. Reinforce and expand upon studies of astronomy.

Topics to cover include Newton’s universal law of gravitation; kinds and classification of stars and galaxies; Hertzsprung-Russell diagrams; the life history of stars; novas and supernovas; pulsars and quasars; black holes; astronomical instruments, including reflecting, refracting, and catadioptric telescopes; and the measurement of astronomical distances.

Exploring the Night Sky

Terence Dickinson. Firefly, 1987.

An informational astronomy guide for beginners, in incremental leaps through the universe, starting with our nearest neighbor, the moon, just 1.3 light-seconds from Earth.

Rocket Science for the Rest of Us

Ben Gilliland. DK, 2015.

An illustrated guide to black holes, antimatter, physics, and space exploration.

Space, Stars, and the Beginning of Time

Elaine Scott. Clarion, 2011.

Discoveries from the Hubble telescope, illustrated with dazzling photos.

Startalk

Neil deGrasse Tyson. National Geographic, 2016.

Subtitled *Everything You Ever Need to Know About Space Travel, Sci-Fi, the Human Race, the Universe, and Beyond*, this covers a lot of ground, with great color illustrations. There's also an abbreviated Young Readers Edition.

Foreign Language

Babbel

www.babbel.com

A language app and e-learning platform that offers 8,500 hours of content in fourteen different languages, designed to promote vocabulary memory and recognition with real-life conversations. Phrases and dialogues are recorded by native speakers. By subscription.

DuoLingo

www.duolingo.com

Available online or as an iPhone or Android app. Each lesson is divided into bite-sized chunks that are played like games, for which participants accrue points.

Rosetta Stone

www.rosettastone.com

Uses a dynamic immersion method that encourages real-world conversations. Online, downloadable audio lessons in thirty languages, plus a story component that allows participants to read along with native speakers. Included is a Rosetta Stone homeschool curriculum appropriate for ages 6 and up. By subscription.

Recommended for middle-grade Latin students are the *Cambridge Latin Course* (Cambridge University Press, 2001) and the *Oxford Latin Course* (Maurice Balme and James Morwood; Oxford University Press, 1999).

National Latin Exam

www.nle.org

Sponsored by the American Classical League and the National Junior Classical League, this is an annual test for kids in Latin I through Latin VI (usually middle and high school students). Sample tests, a Latin syllabus, and Latin resources are found on the website.

The Arts

The bottom line: give kids the materials and freedom to experiment in a wide range of genres—and to experience the works of professional artists. Visit museums and art galleries; go to plays and concerts. Join a community

theater or arts council. Start a crafts workshop series at the local library or a weekend painting group in a local park.

1. Use knowledge of art elements and principles of design to produce a wide range of creative artworks.

2. Use knowledge of art elements and principles of design to analyze and critique a variety of works by well-known artists and others.

An Eye for Art

National Gallery of Art, 2013.

An introduction to more than fifty famous artists and their works in themed chapters, variously covering nature, places, portraits, telling stories, everyday life, and questioning tradition. Included are a timeline, wonderful illustrations, and forty hands-on activities.

3. Study art in conjunction with other academic subjects across the curriculum.

4. Survey art history from the classical period to the nineteenth century.

One possible approach to art studies involves a structured concentration on art history. Topics to cover include features and concepts of classical, Gothic, Renaissance, baroque, rococo, neoclassical, romantic, and realistic art. Kids should view, classify, and compare representative artworks from each period. They might also create art timelines and supplement art studies with a range of print materials including fiction and nonfiction books and biographies of artists.

The Annotated Mona Lisa

Carol Strickland. Andrews McMeel, 2018.

Subtitled *A Crash Course in Art History from Prehistoric to Present*, this creative approach includes short essays, sidebars, factoids, and many photographs.

Art in Story

Marianne Saccardi. Libraries Unlimited, 2006.

An art curriculum, adaptable for a range of ages, that variously covers prehistoric art; the art of the Middle East, ancient Greece, ancient Rome, Asia and Africa, the Middle Ages and the Renaissance; European Old Masters, Impressionists and Post-Impressionists; and the art of the Americas. Included are background information, stories, journal-writing suggestions, activities, and cross-curriculum connections.

The History of Art for Young People

Anthony F. Janson. Prentice Hall, 1997.

A classic packed with information and illustrations.

Music

1. Reinforce and expand upon musical concepts introduced in earlier grades.

Music theory is most appropriate for kids pursuing voice or musical instruments. Kids should know the meaning of such frequently used musical terms as *grave*, *largo*, *adagio*, *andante*, *moderato*, *allegro*, and *presto*. They should be familiar with major and minor scales and with keys up to three sharps or flats.

At this grade level, kids should be introduced to the notes of the bass clef and to the basics of chords.

2. Recognize and identify the major orchestral families and their individual instruments, historical

instruments, and ethnic instruments by sight and sound.

3. Recognize and identify the major vocal ranges.

4. Survey music history from the baroque to the romantic period.

Topics to cover include the music and prominent composers of the baroque period, including Johann Sebastian Bach and George Frideric Handel; the classical period, including Wolfgang Amadeus Mozart, Franz Joseph Haydn, and Ludwig van Beethoven; and the Romantic period, including Franz Schubert and Frédéric Chopin. Kids should be able to identify and define *counterpoint*, *fugue*, *oratorio*, *symphony*, *concerto*, and *chamber music*.

Try listening to representative musical pieces from the surveyed historical periods, reading biographies of famous composers, creating music-based timelines, and associating musical developments with other historical trends and events.

5. Listen and respond to a wide range of musical pieces.

6. Participate in instrumental and vocal performances, group and solo.

7. Create and play original musical compositions.

Check online for printable blank music paper.

8. Study music in conjunction with other academic subjects across the curriculum.

Drama

Recommended reading for this age group: Thornton Wilder's *Our Town*, Lorraine Hansberry's *A Raisin in the Sun*, William Inge's *Picnic*, Carson McCullers's *The Member of the Wedding*, and Jerome Lawrence and Robert E. Lee's *Inherit the Wind*.

Philosophy and Comparative Religion

Cool Philosophy

Daniel Tatarsky. Pavilion, 2016.

A catchy history of philosophy from the pre-Socratics through Wittgenstein, Heidegger, and Popper, with periodic "Philosophy Workout" discussion topics.

What do you believe? It's a lifelong question.

Are You There God? It's Me, Margaret

Judy Blume. Atheneum, 2014.

Sixth-grade Margaret has grown up without a religion due to her parents' interfaith marriage. The book covers her quest for religious affiliation, along with all the challenges of adolescence.

Godless

Pete Hautman. Simon & Schuster, 2005.

Jason Bock, 16, rebelling against traditional Catholicism, decides to invent his own religion, worshipping the town water tower. It begins as a joke, but things get out of hand.

How Do You Spell God?

Marc Gellman and Thomas Hartman. HarperCollins, 1995.

Written by a rabbi and a Catholic priest, this conversational and commonsensical book shows how the world's major religions

tackle big questions. Each chapter begins with a question: “How are religions the same?” “How are religions different?” “Why does bad stuff happen to good folks?” “What happens after we die?”

Maybe Yes, Maybe No

Dan Barker. Prometheus, 1990.

A guide to skepticism and critical thinking for young readers.

Octavia Boone’s Big Questions About Life, the Universe, and Everything

Rebecca Rupp. Candlewick, 2010.

Octavia’s family is thrown for a loop when her mother joins a fundamentalist sect. Octavia ultimately finds her own way, with help from sometimes surprising friends and a quote from Thoreau: “The universe is wider than our views of it.”

The Screwtape Letters

C. S. Lewis. HarperOne, 2015.

Written as a series of letters between senior demon Screwtape and his nephew, Wormwood, who was sent on a mission to secure the damnation of a Christian convert referred to as “the Patient.”

Health and Physical Education

1. Participate in a range of age-appropriate indoor and outdoor athletic activities designed to provide a well-rounded program of physical fitness.

Kids should participate in physical activity that sustains a target heart rate for a minimum of twenty minutes daily. (Run!)

2. Participate in a program of drug education.

3. Understand the nature of sexually transmitted diseases and methods of prevention.

See sex education resources on [this page](#).

4. Be familiar with the elements of good nutrition and personal hygiene.

5. Know basic first-aid procedures for common injuries.

Life Skills

By grade six, kids should be taking on more responsibility for their behavior and personal decisions. They should be able to discuss their concerns, and should be aware of the perils of peer pressure.

Depending on your kid and situation, many sources agree that kids by this age should be able to manage public transportation on their own.

Computer and Technology Skills

Continue to build upon previous skills.

Depending on your kids' interests, there are numerous books and online aids for animation and game programming.

Animation Lab for Kids

Laura Bellmont and Emily Brink. Quarry Books, 2016.

From flip books to Claymation and stop-motion moviemaking.

The LEGO Animation Book

David Pagano. No Starch Press, 2016.

Bring your own LEGO models to life with stop-motion animation.

Animoto

animoto.com

An online video maker with a range of available templates.

Movies: See Nick Park's *Wallace and Gromit* Claymation comedies and *The LEGO Movie* (2014) and sequels.

Engineering

See [this page](#), [this page](#).

CHAPTER 12

Grade Seven

We teachers can only help the work going on, as servants wait upon a master.

—MARIA MONTESSORI

Most kids turn thirteen in seventh grade—a landmark for everybody—and teenager-hood, no matter where or how you’re educated, brings with it a battery of physical and emotional changes and new challenges. It’s never too early (or late) to think about where you’re going, but the teen years are certainly a prime time to think about goals, plans, and passions. Try making a Life List—“100 Things I Want to Do in My Life”—which is fun, fascinating, and revelatory. (If you need inspiration, there are many examples online.)

Also recommended for teenagers is Sean Covey’s *The 7 Habits of Highly Effective Teens* (Touchstone, 2014), a popular guide for helping kids plan for the future and maximize their chances of getting where they want to go.

The Seven Habits

Take responsibility for your life.

Define your mission and goals in life.

Prioritize, and do the most important things first.

Have an “everyone can win” attitude.

Listen to people sincerely.

Work together to achieve more.

Renew yourself regularly.

Language Arts

Literature

See the Junior Great Books program ([this page](#)) for grades six through eight.

1. Read a wide range of age-appropriate fiction and nonfiction materials.

Often recommended for grade seven:

The Catcher in the Rye

J. D. Salinger. Back Bay Books, 2001.

A now-classic tale of teen angst and alienation starring Holden Caulfield, recently expelled from his posh prep school in Pennsylvania.

David Copperfield

Charles Dickens. Many editions.

Often considered to be a fictionalized biography of Dickens himself. David Copperfield leads a reasonably happy life until his widowed mother marries the brutal Edward Murdstone, who makes David's life miserable.

Frankenstein

Mary Shelley. Many editions.

Written when Shelley was just twenty and often called the first science fiction novel, this is the story of brilliant scientist Victor Frankenstein, who creates a living creature/monster.

The Good Earth

Pearl S. Buck. Many editions.

Influential in winning Buck the Nobel Prize for Literature in 1938, this is the fraught story of a family struggling to survive in a Chinese village in the years before World War I.

The Great Gatsby

F. Scott Fitzgerald. Scribner, 2004.

Set in the 1920s, this is the story of mysterious millionaire Jay Gatsby, whose love for his beautiful but shallow neighbor Daisy Buchanan has tragic results.

Lord of the Flies

William Golding. Penguin Books, 2003.

British schoolboys, stranded on a desert island, revert to savagery.

Of Mice and Men

John Steinbeck. Penguin Books, 1993.

The story of migrant farmworkers during the Great Depression: Lennie, a mentally disabled young man, and his companion, George, who acts as his friend and protector.

The Old Man and the Sea

Ernest Hemingway. Scribner, 1995.

The story of Santiago, an old Cuban fisherman, who—after a long unlucky streak at fishing—heads into the Gulf Stream and battles a gigantic marlin.

One Flew over the Cuckoo's Nest

Ken Kesey. Penguin Books, 2007.

Set in a psychiatric hospital, this pits obstreperous Randle McMurphy—who has faked mental illness to avoid a prison

sentence—against the vicious Nurse Ratched.

The Time Machine

H. G. Wells. Many editions.

The main character, known only as the Time Traveller, travels to the distant future, where he meets the cheerful, childlike Eloi and the menacing, cave-dwelling Morlocks.

Treasure Island

Robert Louis Stevenson. Many editions.

Pirates, peglegs, a mysterious map, and buried treasure.

A Tree Grows in Brooklyn

Betty Smith. Harper Perennial, 2006.

The story of bright and imaginative Frannie, growing up with her impoverished extended family in Brooklyn, New York City, in the early twentieth century.

Watership Down

Richard Adams. Scribner, 2005.

An adventure story featuring brilliantly anthropomorphized rabbits complete with rabbit culture, language, legends, and religion.

2. Evaluate works of literature through discussion, debate, and written critique.

Seventh graders should be able to discuss such literary elements as plot and subplot, setting, major and minor characters, theme, conflict, suspense, climax, and point of view. They should be able to identify events that advance the plot and determine how each explains past actions or foreshadows future events. They should be able to analyze characterization through an individual character's thoughts, words, or actions, or through outside descriptions and opinions; identify recurring themes within and among texts; and determine whether the narrative point of view is omniscient or limited, subjective or objective, or presented in the first or third person.

A good possibility here for homeschoolers is a middle-grade/teen book club in which all of the above can be done.

The Kids' Book Club Book

Judy Gelman and Vicki Levy Krupp. Tarcher/Perigee, 2007.

Organizational suggestions, book lists, and recipes.

3. Expand upon knowledge of the classics.

Suggestions for kids at this grade level include Edmond Rostand's *Cyrano de Bergerac* and Charles Dickens's *A Tale of Two Cities*.

4. Read and respond to a varied range of poetic forms.

For example, kids should be familiar with ballads, sonnets, narrative and lyric poems, limericks, and haikus, and should be able to define *meter*, *iamb*, and *rhyme scheme*.

Discussion-promoting poems for this age group include David Berman's "Snow," Robert Frost's "Fire and Ice," Maya Angelou's "Still I Rise," and Sylvia Plath's "Daddy."

Writing

1. Write frequently, producing a variety of works including reports, essays, short stories, poems, narratives, journal entries, and letters.

At this grade level, kids should be able to write a well-organized research essay. Necessary skills include gathering data, taking notes, defining a thesis (main idea), organizing an outline, integrating appropriate quotations, acknowledging sources, and appending a bibliography.

2. Identify and analyze the parts of a sentence.

By now kids should have a good grasp of English grammar. For example, they should be able to classify sentences as simple, compound, complex, or

compound-complex, and should be able to identify subject, predicate, prepositional phrases, direct and indirect objects, independent and dependent clauses, gerunds and gerund phrases, and infinitives and infinitive phrases. (See style manuals, [this page](#).)

3. Use punctuation marks correctly.

By now, kids should understand the use of hyphens, dashes, brackets, and semicolons.

4. Identify common parts of speech, including nouns, pronouns, verbs, adjectives and articles, adverbs, conjunctions, and interjections.

Kids should also know the rules for correct subject/verb agreement in sentences with compound subjects, compound subjects joined by *or*, and indefinite pronouns as subjects.

Being able to write grammatically and coherently is a highly useful skill. Being able to define *compound-complex sentence* and *gerund phrase*, however, probably isn't, and research indicates that concentrating on the technicalities of grammar often backfires if the aim is to encourage kids to love language, literature, and writing.

5. Expand upon previous spelling and vocabulary skills.

At this grade level, spelling might emphasize commonly misspelled words. (Spell-check isn't infallible, no matter what Ethan says.) Kids should also be able to define and use idioms and analogies and distinguish between literal and figurative modes of speech.

Listening and Speaking Skills

1. Listen to and make narrative and informational oral presentations.

For example, kids might participate in storytelling sessions, debates, group discussions, dramatic presentations, or give short oral reports on a nonfiction topic or summaries of books or articles.

Start a group at your local library; create YouTube videos.

2. Memorize and recite poems.

Study Skills

1. Know how to obtain information from print and online sources.

2. Take effective notes and develop outlines from written selections.

3. Practice effective study techniques.

Mathematics

As of sixth or seventh grade, we started using Harold Jacobs's text *Mathematics: A Human Endeavor* (W. H. Freeman, 1982). All our kids—even Josh—loved it. Math, Jacobs style, is taught through puzzles, games, and real-life examples, and comes heavily illustrated with curiosity-provoking pictures, photographs, diagrams, and cartoons. The first chapter, for example, plunges students into experiments with the behavior of billiard balls, the four-color map problem, and the invention of the Soma cube puzzle. Readers learn about binary number sequences through the hexagrams of the I Ching and Francis Bacon's seventeenth-century diplomatic cipher, are introduced to functions with the temperature-

dependent chirp rate of crickets, and to coordinate graphing with the leaping speed of kangaroos. Excellent for middle through high school.

The following are covered in any reputable math textbook. See resources, [this page](#). Also see alternatives, [this page](#), [this page](#).

Number Theory

1. Identify factors, multiples, primes, and composite numbers.

Kids should be able to identify the greatest common factor (GCF) and least common multiple (LCM) of given numbers.

2. Understand the properties of real numbers.

Kids should know the definitions of *natural numbers*, *real numbers*, *rational* and *irrational numbers*, and *integers*. They should be able to describe any given number in terms of these number sets. They should also be familiar with the associative, commutative, and distributive properties of the real number system; inverse relationships; and the properties of 0 and 1.

3. Understand the concept of absolute value.

Kids should know the symbol for absolute value, should be able to find the absolute value of any real number, and should be able to use value properties to solve problems and evaluate mathematical expressions.

Ratio and Percent/Fractions and Decimals

1. Use ratios and proportions to solve mathematical and real-world problems.

Kids should be able to read, write, and compute ratios and proportions. They should also be able to determine missing terms in proportions and make accurate scale drawings based on proportions. They should be able to

use their knowledge of ratio and proportion to solve rate problems, using the formula $d = rt$ (distance = rate \times time).

2. Solve mathematical and real-world problems involving percents.

For example, kids should be able to use their knowledge of percents to solve problems involving sales tax and discounts.

Operations

1. Add, subtract, multiply, and divide with both positive and negative numbers.

2. Round numbers to the appropriate significant digit.

3. Continue studies of exponents.

Kids should understand positive and negative exponents and should know that any nonzero number to the power of 0 is 1. They should understand why a negative number raised to an even power is positive, while a negative number raised to an odd power is negative, and they should be able to multiply exponential numbers. They should also be able to convert numbers to and from scientific notation.

4. Experiment with a range of problem-solving strategies and tools, selecting the most appropriate for a given problem.

For example, kids should tackle problems by drawing diagrams, making charts and tables, evaluating patterns, breaking a complex problem down into simpler components, and so on.

5. Use estimation skills in all branches of mathematics.

Measurement

1. Select and use appropriate measures of length, area, volume, capacity, weight/mass, time, and temperature.

2. Compare and convert units of measure both within and between the English and metric systems.

For example, kids at this grade level should be able to convert kilometers to miles, pounds to kilograms, and centimeters to inches, and vice versa.

3. Use measures expressed as rates or products to solve problems.

Measures expressed as rates include speed (miles per hour and kilometers per second) and density (grams per cubic centimeter); measures expressed as products include kilowatt-hours and foot-pounds.

Probability and Statistics

How to Lie with Statistics

Darrell Huff. W. W. Norton, 1993.

A classic on the many ways in which statistics can mislead us. Best to be prepared.

1. Collect, organize, and interpret data using a range of methods, including bar graphs, line graphs, circle graphs, tables and charts, and frequency distributions.

2. Determine the theoretical probability of an event and compare with experimental results.

3. Find the number of combinations possible in a given situation using a variety of computational methods.

4. Show the relationship between two variables using a scatter plot.

Kids should be able to distinguish between independent and dependent events.

5. Graph measures of variability.

Kids should be able to identify and display range, distribution, and outliers, and describe the central tendencies of a data set using mean, median, and mode.

Geometry

1. Identify, classify, and construct regular and irregular polygons.

Kids should be able to determine perimeter, area, and sum of interior angles of each.

2. Describe and construct common solids: right prisms, cylinders, cones, and spheres.

Kids should be able to calculate the surface areas and volumes of these solids using appropriate formulas.

3. Know the properties of parallel lines, perpendicular lines, bisectors, transversals, and angles.

Kids should be able to construct parallel lines, perpendicular lines, transversals, bisectors, and angles using a protractor, compass, and/or straight edge. They should know the properties of angles formed by the transversal of parallel lines and should recognize and define various types and features of angles, including congruent, vertical, complementary, supplementary, adjacent, corresponding, and alternate interior and exterior.

4. Know and understand the Pythagorean theorem and use it to solve geometrical problems.

5. Analyze effects of basic transformations on geometric shapes.

Kids should be able to identify translations, reflections, and rotations. They should be able to determine how changes of scale affect measures of perimeter, area, and volume.

Pre-algebra

See Hands-On Equations ([this page](#)).

1. Evaluate and solve algebraic equations and inequalities in one variable using addition, subtraction, multiplication, and division.

Try this: $2(4x - 3) + x = 6(x + 3)$.

2. Write and solve equations for word problems.

3. Graph simple functions on a coordinate plane and solve related problems.

Kids should be able to translate patterns and proportions into equations and graphs. For example, given a mathematical rule such as $y = 2x$, they should

be able to create a table of values and represent the results as ordered pairs plotted on a coordinate grid. They should be able to translate linear graphs into equations.

Kids should also understand the concepts of function and slope. They should be familiar with equations in the form $y = ax$, where a is the slope of the graphed line, and $y = ax + b$, where a is the slope of the line and b is the y -intercept.

4. Understand equality properties for equations.

Kids should know that equations are equivalent when the same quantity is added or subtracted from each side of the equation, or when each side of the equation is multiplied or divided by a quantity other than zero.

History and Geography

History World

www.historyworld.net

Linked narratives on world history covering everything from Aegean civilizations to Zoroastrianism, plus annotated timelines and a chronological quiz. Recommended for middle-school students and up.

American History

Seventh graders, building upon past history studies, might concentrate on the events of the twentieth century to the end of World War II.

See Joy Hakim's *A History of US: An Age of Extremes and War, Peace, and All That Jazz* ([this page](#)).

1. World War I.

Topics to cover include causes and background of World War I, the major events of the war, the sinking of the *Lusitania*, the entry of the United States into the war, the Treaty of Versailles, the influenza epidemic of 1918, Woodrow Wilson's Fourteen Points, and the League of Nations.

Names to know include Archduke Franz Ferdinand, Kaiser Wilhelm II, Georges Clemenceau, David Lloyd George, Tsar Nicholas II, Paul von Hindenburg, Lord Kitchener, Baron Manfred von Richthofen, Wilfred Owen, Siegfried Sassoon, Rupert Brooke, Edith Cavell, and Mata Hari.

After the Dancing Days

Margaret Rostkowski. HarperCollins, 2000.

At the veterans' hospital where Annie's father works, Annie meets an angry young soldier, Andrew, badly disfigured by a wound—and, as she helps him, learns difficult truths about the nature of war.

Lord of the Nutcracker Men

Iain Lawrence. HarperCollins, 2004.

Ten-year-old Johnny enacts battles with his army of nutcracker soldiers, a game that becomes frightening as he learns more about his father's experiences in World War I.

The War to End All Wars

Russell Freedman. Clarion, 2010.

A well-written history illustrated with powerful period photographs.

World War I

Richard J. Maybury. Bluestocking Press, 2003.

Written as a series of letters to a young niece or nephew, this covers the history of World War I and the ways in which it affects us today.

World War I for Kids

R. Kent Rasmussen. Chicago Review Press, 2014.

An illustrated history of the war with related activities, including making a periscope and a parachute.

Also see resources, [this page](#).

2. America between the wars.

Topics to cover include the Roaring Twenties and Prohibition, the Scopes Monkey Trial, women's suffrage and the passage of the Nineteenth Amendment, the Harlem Renaissance and the Jazz Age, and landmark technological advances of the early twentieth century.

Bootleg

Karen Blumenthal. Square Fish, 2013.

A fast-paced history of the Prohibition era filled with period art, photos, and anecdotes.

Also by Blumenthal, see *Tommy: The Gun That Changed America* (Roaring Brook, 2015).

Daily Life in the United States 1920–1940

David E. Kyvig. Ivan R. Dee, 2004.

What was it like to live through the Roaring Twenties and the Great Depression?

The Great Gatsby

F. Scott Fitzgerald. Scribner, 2004.

The quintessential novel of the Jazz Age.

Movie versions include *The Great Gatsby* (1974), starring Robert Redford in the title role (rated PG), and a 2013 production starring Leonardo DiCaprio (rated PG-13).

Only Yesterday

Frederick Lewis Allen. Harper Perennial, 2010.

A catchy and informal history of the 1920s, with lots of human interest.

The Roaring Twenties

Marcia Amidon Lusted. Nomad, 2014.

A clever and creative history of the era of Prohibition, flappers, and jazz that explores all aspects of the time, along with projects that encourage inquiry and analysis.

Movies: Ken Burns's *Prohibition* (PBS, 2011), a three-part documentary on the rise, rule, and fall of the Eighteenth Amendment; *Inherit the Wind* (1960), the story of the Scopes Monkey Trial, with Spencer Tracy and Fredric March (NR); *The Untouchables* (1987), in which federal agent Eliot Ness goes up against Al Capone (R); and the musical *Chicago* (2002) (PG-13).

3. The Great Depression and the New Deal.

Topics to cover include the presidencies of Warren Harding, Calvin Coolidge, and Herbert Hoover; the Teapot Dome Scandal, the Wall Street crash of 1929; the Oklahoma Dust Bowl; Franklin Delano Roosevelt and the New Deal; and the new social welfare programs.

Crash: The Great Depression and the Fall and Rise of America

Marc Favreau. Little, Brown, 2018.

The creatively illustrated story of the Great Depression and how we survived it. For ages 11 and up.

The Great Depression

Marcia Amidon Lusted. Nomad, 2016.

An illustrated history with a timeline, factoids, cartoons, sidebars, and primary source excerpts, plus projects that encourage kids to investigate the causes and effects of the Great Depression.

The Great Depression for Kids

Cheryl Mullenback. Chicago Review Press, 2015.

From the stock market crash of 1929 through the subsequent decade of economic struggle, with assorted related activities.

Movies: Ken Burns's *The Dust Bowl* (PBS, 2012) is a documentary on the worst man-made ecological disaster in American history.

Also see the Coen brothers' *O Brother, Where Art Thou?* (2000) (PG-13); Gary Sinise's *Of Mice and Men* (1992) (PG-13); John Ford's *The Grapes of Wrath* (1940) (NR); Woody Allen's *Radio Days* (1987) (PG); Peter Bogdanovich's *Paper Moon* (1973) (PG); and John Huston's *Annie* (1982) (PG).

4. World War II.

Topics to cover include causes and historical background of the war, Mussolini's rise to power in Italy, Hitler and Nazi totalitarianism, the Soviet Union under Joseph Stalin, the Spanish Civil War, major events of World War II in Europe and the Pacific, the American home front, the Manhattan Project and the atomic bomb, the Nuremberg war trials, and the creation of the United Nations.

World War II

Diane Taylor. Nomad, 2018.

A creatively designed history of the political, economic, cultural, and military factors that led to World War II, and the major events of the war. Included are primary source excerpts and investigative activities, such as deconstructing period patriotic songs and analyzing historical maps.

In the same format, see *The Holocaust* (Carla Mooney; Nomad, 2017).

World War II

Richard J. Maybury. Bluestocking Press, 2003.

Written as a series of letters to a questioning kid, this is a history of World War II including insights on how it led to subsequent wars.

World War II for Kids

Richard Panchyk. Chicago Review Press, 2002.

From Hitler's rise to power in 1933 to the surrender of Japan in 1945, with maps, a timeline, background information, personal anecdotes, and related activities.

Bomb

Steve Sheinkin. Square Fish, 2018.

The gripping story of the race to build (and steal) the atomic bomb.

The Complete Maus

Art Spiegelman. Pantheon, 1996.

Spiegelman's haunting graphic novel account of his Jewish parents' experience in Nazi Germany. Nazis are shown as cats, Jews as mice.

The Diary of a Young Girl

Anne Frank. Many editions.

Perhaps the world's most famous diary, this is the story of teenager Anne Frank, who when the Nazis invaded Amsterdam retreated with her family into a hidden "Secret Annex" in an old office building.

The Life and Death of Adolf Hitler

James Cross Giblin. Houghton Mifflin Harcourt, 2015.

An absorbing biography with primary source quotes and photographs.

Trinity

Jonathan Fetter-Vorm. Hill and Wang, 2013.

A graphic history of the first atomic bomb.

Movies: Bob Fosse's *Cabaret* (1972), set in Germany as the Nazi Party is rising to power (PG); *Life Is Beautiful* (1997), the story of a Jewish librarian and his son caught up in the Holocaust (PG-13); *The Monuments Men* (2014), in which an unlikely band of soldiers sets out to rescue art masterpieces stolen by the Nazis (PG-13); *Tora! Tora! Tora!* (1970), the story of the Japanese attack on Pearl Harbor (G); *The Guns of Navarone* (1961), in which a small team of British soldiers is sent to occupied Greek territory to take out a massive German gun emplacement (PG); *The Book Thief* (2013), in

which a young Jewish girl copes with the horrors of war by stealing and sharing books (PG-13); and *Hope and Glory* (1987), the story of a 9-year-old boy growing up in the London blitz (PG-13).

5. A survey of American government.

Civics is essential for all citizens. Topics to cover include the structure, function, and powers of national, state, and local governments; the concept of balance of power; the election process; and the political party system. Should we have a different voting system? Does democracy work?

Fault Lines in the Constitution

Cynthia and Sanford Levinson. Peachtree, 2017.

The Constitution isn't a faultless document—look at the current problems with the Electoral College, gerrymandering, and Senate deadlock. A good discussion book.

Keys to American History: Understanding Our Most Important Historic Documents

Richard Panchyk. Chicago Review Press, 2009.

In chronological order with helpful background information, this book covers seventy-two famous documents, including the Mayflower Compact, the Declaration of Independence, the Constitution, the Bill of Rights, the *Dred Scott* decision, the Emancipation Proclamation, the Eighteenth Amendment, and the Civil Rights Act.

Whatever Happened to Justice?

Richard Maybury. Bluestocking Press, 2004.

Maybury discusses problems with the American legal system and argues that all laws can be reduced to just two: "Do what you've promised to do" and "Don't encroach." Written in the form of letters from Uncle Eric to a niece/nephew, Chris.

Also by Maybury, *Are You Liberal? Conservative? Or Confused?* (2004), a clear explanation of the economic policies behind various political labels.

Create a new nation!

This Land Is My Land

Andy Warner. Chronicle Books, 2019.

A graphic history of thirty different micro-nations and self-made states around the world.

You Rule: A Practical Guide to Creating Your Own Kingdom

Lonely Planet Kids, 2015.

All the how-tos for designing your own new nation from scratch.

World History

In seventh grade, kids might explore in greater detail the period from the Renaissance to the nineteenth century.

The Essential World History

William J. Duiker and Jackson J. Spielvogel. Cengage Learning, 2016.

A comprehensive illustrated world history text with critical-thinking questions, connections to today, maps, chronologies, essays with opposing viewpoints, and historical film recommendations. A useful reference.

1. The Renaissance.

Topics to cover include the rebirth of Greek and Roman classicism and the humanist movement; the rise of the Italian city-states as centers of trade; prominent Renaissance figures, including Petrarch, Dante, Brunelleschi, and the Medicis; Renaissance ideals and values, including the concept of the “Renaissance man”; arts and literature; major historical events of the period; and Machiavelli and his influential political treatise, *The Prince*. Kids should also learn about the Northern Renaissance of the Low Countries.

2. The Reformation.

Topics to cover include the ideas of Erasmus; Martin Luther and the rise of Protestantism; the course of the Reformation in Germany, Switzerland, and England; the Counter-Reformation; and the ensuing wars over religion.

3. European history to the Glorious Revolution.

Topics to cover include Henry VIII and his heirs, the Elizabethan Age, conflicts with Spain and the defeat of the Spanish Armada, the Thirty Years' War, Oliver Cromwell and the Puritan Revolution, the Restoration, and the Glorious Revolution. Kids should be able to define *divine right of kings* and should understand the conflicts over the limitation of the monarchy.

4. The Age of Exploration.

Topics to cover include the spice trade and the geography of the Spice Islands; Prince Henry the Navigator and the development of the Portuguese maritime empire; Columbus and his voyages to the New World; the Treaty of Tordesillas and its implications; the Spanish conquistadors and their impact on the Americas; the circumnavigation of the globe; the voyages of the English, French, and Dutch; and early colonization.

Kids should know the names and accomplishments of major explorers of the period and should understand that a corollary to the establishment of New World colonies was the destruction of indigenous peoples and the growth of the African slave trade.

The Stowaway

Karen Hesse. Margaret K. McElderry, 2002.

When Captain James Cook set off on his round-the-world expedition in 1766, he took with him a stowaway, a young boy named Nicholas Young. The story of the voyage is told through Nicholas's fictional journal.

Movie: *Conquistadors* at www.pbs.org/conquistadors, a four-part documentary narrated by archaeologist Michael Wood.

5. The Scientific Revolution and the Enlightenment.

Kids should be familiar with the scientific accomplishments of Copernicus, Kepler, Galileo, and Isaac Newton, and with the political philosophies of René Descartes, Thomas Hobbes, and John Locke. They should also understand the impact of these discoveries and philosophies on eighteenth-century thought, notably their influence on the rising revolutionary movements in the American colonies and France.

See Joy Hakim's **The Story of Science** series (Smithsonian, 2004) ([this page](#)).

6. The Age of Revolution.

Topics to cover include the rise of Prussia as a European power, the War of Austrian Succession and the Seven Years' War, absolutism in France from Louis XIV to Louis XVI, the French Revolution, Napoleon Bonaparte and the French Empire, the Napoleonic Wars, and the restoration of the French monarchy. Kids should also be familiar with the philosophy of Jean-Jacques Rousseau and the Romantic movement.

7. Russian history to the reign of Catherine the Great.

Topics to cover include a survey of the history and culture of early Russia, the Eastern Orthodox Church, and the lives and times of Ivan III (the Great), Ivan IV (the Terrible), Peter the Great, and Catherine the Great.

8. From Catherine the Great to the Russian Revolution.

Topics to cover include an overview of Russian history; the causes and events of the Russo-Japanese War; the Revolution of 1905; the last Romanovs, Nicholas and Alexandra; the Revolution of 1917; Trotsky, Lenin, and Marxism; Bolsheviks and White Russians; and the formation of the Soviet Union.

Angel on the Square

Gloria Whalen. HarperCollins, 2003.

The story of Katya, daughter of a lady-in-waiting, whose secure life in the palace in St. Petersburg is increasingly at risk with the approach of the Russian Revolution.

Breaking Stalin's Nose

Eugene Yelchin. Square Fish, 2013.

Ten-year-old Sasha is preparing to join the Young Soviet Pioneers when an accident with a snowball and his father's arrest bring to light the harsh realities of life under Stalin.

The Family Romanov

Candace Fleming. Schwartz & Wade, 2014.

The tragic story of the last tsar of Russia and his family, told with excerpts from letters, diaries, and memoirs.

Anastasia, the Last Grand Duchess

Carolyn Meyer. Scholastic, 2000.

In the Royal Diaries series, this is the fictionalized journal of the youngest daughter of the tsar in the turbulent days before the Russian Revolution.

Between Shades of Gray

Ruta Sepetys. Philomel, 2011.

The story of a young Lithuanian girl whose family is torn apart after the Soviet takeover and her struggle to survive in a Siberian work camp.

Movies: *Fiddler on the Roof* (1971), with Topol, set in pre-Revolutionary Russia (G); and *Doctor Zhivago* (1965), with Omar Sharif and Julie Christie, set during World War I and the Russian Revolution (PG-13).

9. The Industrial Revolution.

Topics to cover include landmark inventions, the rise of factories and their impact on society, the concept of capitalism, Adam Smith and the laissez-

faire economy, socialism and communism, and Karl Marx and the *Communist Manifesto*.

Animal Farm

George Orwell. Plume, 2003.

A society of downtrodden animals tries to create an ideal society but plunges into totalitarianism. A must-read.

Geography

Don't Know Much About Geography

Kenneth C. Davis. William Morrow, 2004.

Each chapter consists of a collection of catchy questions and answers: "Where was the Garden of Eden?" "Who invented the compass?" "Is America one continent or two?" "Where does all the water go at low tide?"

Mapping the World with Art

Ellen Johnston McHenry. 2013.

An illustrated history of cartography, with step-by-step drawing lessons and extension activities.

1. Survey the geography of Europe.

Topics to cover include the countries, major cities, rivers, lakes, mountain ranges, and associated historical and economic high points. Kids should be aware of how the map of the world changed following the world wars.

2. Survey the geography of Russia.

In conjunction with Russian history studies, kids should cover the political, physical, and economic geography of Russia, including climate, resources, mountains, lakes and rivers, boundaries, and major cities.

3. Survey the geography of the United States, expanding upon previous studies.

Topics to cover include a survey of the major geographical regions of the United States, including political, social, and economic features, mountain ranges and notable mountain peaks, lakes and rivers, boundaries, the fifty states and their capitals, major cities, territories, population demographics, natural resources, and landmark features such as Niagara Falls, the Grand Canyon, and Death Valley.

Science

While there are any number of science curricula proposals for middle- and secondary-level students, most fall into three basic categories. Most common is the traditional curriculum in which “discipline-based courses”—earth/space science, biology, chemistry, and physics—are taught in sequence, one per year, through twelfth grade. An alternative approach teaches all four each year in shorter increments—say, eight weeks of earth/space science, followed by eight weeks of biology, chemistry, and physics.

Yet another option is to completely reshuffle the sciences, centering courses on a single overarching “great idea.” One suggestion for such an organizing principle is evolution, which leads to multifaceted explorations of plant and animal classification, adaptation and selective pressures, the fossil record and the age of the earth, the theory of continental drift, and even—on a galactic scale—the evolution of the universe.

Form a science club!

The Science Club Handbook

Alan Small. Amazon Digital, 2016.

Designed for schools, but the same principles apply to a bunch of science-minded homeschoolers. Includes suggestions for club organization, meeting topics, and a helpful list of cool science club

labs, such as “Earthworm Exploration,” “Civil Engineering with Newspaper Towers,” and “Study Cephalopods with Squid Dissection.”

Physical Science

The American Chemical Society website at www.middleschoolchemistry.com has an excellent collection of free downloadable lesson plans for grades six through eight on matter, changes of state, density, the periodic table, water, and chemical change.

Chemistry

Carla Mooney. Nomad, 2016.

An overview of chemistry with cartoons, sidebars, exercises, key questions, and hands-on investigative projects.

In the same format, see *Physics* (Jane P. Gardner; Nomad, 2014).

The Electric Pickle

Joey Green. Chicago Review Press, 2017.

Fifty irresistible experiments based on the periodic table.

1. Survey atomic theory.

Topics to cover include the nature of atoms, molecules, and compounds; the history of chemistry, from the four elements of the ancient Greeks to Mendeleev’s periodic table; models of atomic structure; the many kinds of subatomic particles; and the causes and characteristics of radioactivity.

2. Understand the major types of chemical bonds and reactions.

Topics to cover include the atomic basis of chemical bonds; ionic, covalent, and hydrogen bonds; salts; oxidation and reduction reactions; acids and bases; and chemical equations.

3. Understand and use the periodic table of elements.

The Elements

Theodore Gray. Black Dog & Leventhal, 2009.

A gorgeous and informative visual exploration of every known atom in the universe.

Also by Gray, in the same format, see *Molecules* (2014) and *Reactions* (2017). And for those who like their chemistry with a dash of danger, see *Theodore Gray's Completely Mad Science: Experiments You Can Do at Home but Probably Shouldn't* (2016).

4. Know the six types of simple machines and their use in everyday life.

Kids should also understand how machines reduce the amount of force needed to do work.

5. Understand the difference between speed and velocity, and the impact of force on motion.

6. Know the basic parts of a wave and understand wave propagation.

Kids should understand that waves can be found in a wide range of physical phenomena, from ocean waves to earthquakes, from light and sound to the radio. They should know the two basic kinds of wave (longitudinal and transverse) and understand factors that affect wave behavior.

Life Science

Keeping a Nature Journal

Clare Walker Leslie. Storey Publishing, 2003.

Helpful instructions for keeping different types of nature journals, with many samples of illustrations. For ages 12 and up.

1. Compare and Contrast the Structure and Function of Typical Plant and Animal Cells.

Kids should know the structure and function of the major cell organelles, including nucleus, nuclear membrane, cytoplasm, cell membrane, cell wall, vacuoles, Golgi bodies, lysosomes, endoplasmic reticulum, chloroplasts, and mitochondria.

Cells: Explore Life at Its Tiniest!

Karen Bush Gibson. Nomad, 2017.

A creatively designed overview of cell biology, with links to primary sources and videos.

The Lives of a Cell: Notes of a Biology Watcher

Lewis Thomas. Penguin, 1978.

Short, beautifully crafted essays about biology and the interdependence of living things. A thought-provoking read.

2. Understand the process of cell division.

Kids should be able to define, compare, and contrast meiosis and mitosis and should know what a mutation is.

3. Survey the science of genetics.

Topics to cover include Gregor Mendel's experiments; dominant and recessive traits; alleles, genotype, and phenotype; chromosomes and genes; DNA structure and function; common genetic disorders; and genetic engineering.

Genetics: Breaking the Code of Your DNA

Carla Mooney. Nomad, 2014.

Covers Gregor Mendel, cells, DNA, genes and chromosomes, gametes and meiosis, mutations, and modern genetic advances. Includes a timeline, cartoons, and hands-on projects, such as making 3-D DNA models, extracting DNA, and using Punnet squares.

4. Survey the science of evolution.

Topics to cover include the definition of *evolution*; concepts of mutation, adaptation, natural selection, extinction, and speciation; Charles Darwin, the voyage of the *Beagle*, and *The Origin of Species*; Alfred Russel Wallace; and an overview of the evidence for evolution from the fields of geology, paleontology, comparative anatomy, and molecular biology.

Charles Darwin's On the Origin of Species: A Graphic Adaptation

Michael Keller. Rodale, 2009.

A wonderful graphic account of Darwin's voyage on the *Beagle* and his landmark book outlining the theory of evolution.

Earth and Space Science

1. Survey the geological history of the earth.

Topics to cover include concepts of uniformitarianism and catastrophism, the rock cycle, stratigraphy, fossil formation, radioactive dating, the age of the earth and the progression of life on earth, the way in which crustal plate movements have impacted the distribution of living things, and the Cretaceous extinction.

2. Understand the geologic time scale and its various subdivisions.

Foreign Language

Depending on your kids' levels of expertise, possibilities for foreign language practice might include foreign language television programs and movies or translations of popular books. Antoine de Saint-Exupéry's *The Little Prince*, Lewis Carroll's *Alice in Wonderland*, and J. K. Rowling's

Harry Potter series, for example, have been translated into dozens of different languages.

Try your hand at back translation. That is, start with a foreign-language paragraph, translate it into English, and see how close you've come to the approved English text. A famous example of this comes from Mark Twain who—unhappy with the French translation of his short story “The Celebrated Jumping Frog of Calaveras County”—translated the French piece back into English again, with hilarious results.

See resources on [this page](#), [this page](#), [this page](#).

The Arts

Visual Art

1. Use knowledge of art elements and principles of design to produce a wide range of creative artworks.

2. Use knowledge of art elements and principles of design to analyze and critique a wide variety of artworks.

Kids should be able to discuss and evaluate art in the context of its historical period and geographical location.

3. Study art in conjunction with other academic subjects across the curriculum.

For example, in conjunction with Russian history, see the 2002 movie *Russian Ark*, in which a narrator wanders through the St. Petersburg Winter Palace (now an art museum), encountering characters from three hundred years of Russian history (NR).

4. Survey major schools and periods in art history, from the impressionists to the artists of the twentieth century.

For each school or period, kids should know representative artists and their works. They should know the major features of each genre of art and should be able to recognize and classify artworks by period and school. Topics to cover include impressionism (Degas, Renoir, Monet, and Cassatt); postimpressionism (Cézanne, Seurat, van Gogh, and Gauguin); expressionism (Matisse, Chagall, Munch, and Picasso); abstract art (Kandinsky, Klee, and Mondrian); surrealism (Dalí); and modern American painting (Hopper, Wyeth, O’Keeffe, Wood, Rockwell, and Rivera).

Music

1. Reinforce and expand upon musical concepts introduced in previous grades.

Depending on extent of musical involvement, kids should know musical notation (both bass and treble clefs) and terms. They should recognize I, IV, and V7 chords and should be able to construct major and minor scales and chords in keys with up to three sharps or flats. They should be able to define *octave*.

2. Recognize and identify the major orchestral families and their individual instruments, keyboard instruments, historical instruments, and ethnic instruments by sight and sound.

The History of Music in Fifty Instruments

Philip Wilkinson. Firefly, 2014.

Beginning in the 1700s, when orchestras first took shape, an instrument-by-instrument history of music.

3. Recognize and identify common musical forms.

For example, kids should be able to identify *theme* and *variation*, *rondo*, *suite*, *opera*, *string quartet*, *sonata*, and *fugue*.

4. Survey music history from the Romantic period to the twentieth century.

Topics to cover include the romantic composers (Brahms, Berlioz, Liszt, Wagner); the nationalist composers (Dvořák, Grieg, Tchaikovsky); and American musical traditions (including blues and jazz). Kids should listen to musical examples of each, read biographies of famous musicians and composers, order musical compositions and composers on timelines, and associate musical developments with other historical trends and events. Invent playlists.

Year of Wonder: Classical Music for Every Day

Clemency Burton-Hill. Headline, 2017.

A classical musical selection for every day of the year, ranging from the medieval period to the present day.

5. Listen to a wide range of musical pieces.

6. Participate in instrumental and vocal performances, both group and solo.

Kids should try conducting musical performances (using correct beat patterns).

7. Create and play original musical compositions.

8. Study music in conjunction with other academic subjects.

When studying World Wars I and II, for example, listen to representative music of the period.

Drama

For a tie-in to history, see Bertolt Brecht's *Galileo* (Grove Press, 1994), a study of the scientist's life and a reflection on social and ethical responsibility; *Mother Courage and Her Children* (Grove, 1991), Brecht's passionate antiwar play, set in seventeenth-century Europe; and *The Caucasian Chalk Circle* (Grove, 1999), a King Solomon–like parable set in Russia.

Philosophy and Comparative Religion

Philosophy teaches critical thinking and logical analysis. It also helps students spot bad reasoning and—hopefully—to avoid it in their own thinking and written work. It's also a time-honored way of approaching life's big questions.

The Examined Life: Advanced Philosophy for Kids

David A. White. Prufrock Press, 2006.

Passages from famous philosophers with explanations and spin-off questions. Chapters include “Do We Really Know What We Think We Know?” (Plato), “The Sound of a Tree Falling in the Forest” (Berkeley), and “Technology: Servant or Destroyer?” (Heidegger).

Philosophy for Teens

Sharon M. Kaye and Paul Thomson. Prufrock Press, 2006.

A guide to questioning life's big ideas, with background from the works of famous philosophers, dialogues and thought experiments, activities, and discussion questions. For example, kids tackle whether or not lying is always wrong, what purpose art holds in the world, and what would happen if there were no governments.

Sophie's World

Jostein Gaarder. Farrar, Straus & Giroux, 2007.

Sophie finds two notes in her mailbox—"Who are you?" and "Where does the world come from?"—which cause her to embark on a tour of the history of philosophy from Socrates to Sartre, with the help of a mysterious philosopher.

Health and Physical Education

All kids grow up. According to a 2012 review of participants in the National Longitudinal Study of Adolescent Health, the majority of first sexual experiences occur between the ages of 15 and 19.

In homeschools, attitudes and approaches to sex education vary from family to family. In the public schools, some form of sex education is generally offered between grades six and twelve, though according to a 2014 survey by the Centers for Disease Control and Prevention (CDC), fewer than half of American high schools and fewer than a fifth of middle schools adequately cover the subject.

Critical sex education topics to cover, according to the CDC, include:

How to create and maintain healthy and respectful relationships

- The influence of peers, social media, and other factors on sexual risk behavior
- The benefits of abstinence
- The use of condoms and other forms of contraception to prevent both sexually transmitted diseases (STDs) and pregnancy
- The importance of limiting the number of sexual partners
- How to access reliable information about HIV, STDs, and pregnancy
- The forms of preventive care necessary to maintain reproductive and sexual health

Sex, Teens, and Everything in Between

Shafia Zaloom. Sourcebooks, 2019.

Zaloom, an experienced teen sex educator, provides helpful answers to a wide variety of sex-related topics in her book subtitled *The New and Necessary Conversations Today's Teenagers Need to Have About Consent, Sexual Harassment, Healthy Relationships, Love, and More*.

Life Skills

As kids get older, they should be able to perform increasingly challenging household chores and repairs, such as cleaning the stove or refrigerator, washing floors and windows, unclogging a blocked drain, or fixing a leaky faucet.

State laws differ as to the age when kids can legally be at home unsupervised—check yours—but generally kids can start babysitting in their early teens.

The Babysitter's Survival Guide

Jill D. Chasse. Sterling, 2017.

From how to run a business to dealing with emergencies and cool crafts and games for amusing kids.

Computer and Technology Skills

See [this page](#), [this page](#), [this page](#).

Engineering

KEEP BUILDING!

Connections

James Burke. Simon & Schuster, 2007.

An out-of-the-ordinary history of technological innovation from ancient times to the present, showing the often-unexpected ways in which one thing led to another. A good basis for a multifaceted science program. For ages 12 and up.

Also see the accompanying DVD series (Ambrose Video Publishing, 2007).

CHAPTER 13

Grade Eight

The cure for boredom is curiosity. There is no cure for curiosity.

—DOROTHY PARKER

Language Arts

Literature

While reading is the crux of any literary program, a well-rounded program should also include audio and video presentations of literary material and field trips to theaters, plays, and poetry readings.

See the Junior Great Books for grades six through eight ([this page](#)).

1. Read a wide range of age-appropriate fiction and nonfiction materials.

Often recommended for grade eight:

1984

George Orwell. Berkley, 2003.

The classic dystopian novel of the future, in which doublethink rules and Big Brother is always watching you.

Brave New World

Aldous Huxley. Harper Perennial, 2006.

A chilling vision of a technologically advanced future where people are genetically manufactured in laboratories and socially indoctrinated to fulfill the needs of a totalitarian regime.

I Know Why the Caged Bird Sings

Maya Angelou. Random House, 2009.

Angelou's powerful, painful, and moving memoir of how a love for literature can help overcome racism and trauma.

It Can't Happen Here

Sinclair Lewis. Berkley, 2005.

A cautionary tale about the fragility of democracy when a fascist regime seizes control of the American government, starring Doremus Jessup, a small-town newspaper editor.

My Brother Sam Is Dead

James Lincoln Collier. Scholastic, 2005.

Young Tom Meeker has hard choices to make when his older brother joins the patriots in the Revolutionary War while his father stays loyal to the Crown.

Night

Elie Wiesel. Hill and Wang, 2006.

A powerful and poignant autobiographical account of Wiesel's survival as a teenager in a Nazi concentration camp.

The Once and Future King

T. H. White. Ace Books, 2011.

A brilliant retelling of the King Arthur tales. Most kids are aware of Part I of the book, "The Sword in the Stone," if only from the silly

Disney cartoon version. In its entirety, however, this is a complex and thought-provoking book: funny, tragic, and wise.

The Strange Case of Dr. Jekyll and Mr. Hyde

Robert Louis Stevenson. Many editions.

A tale of dual personality, as the upright Dr. Jekyll trades places with the evil Mr. Hyde.

Z for Zachariah

Robert C. O'Brien. Simon & Schuster, 2007.

Following a nuclear holocaust, 16-year-old Ann Burden lives alone in an isolated valley, believing herself to be the last person alive on earth. Then a stranger arrives.

2. Evaluate works of literature through discussion, debate, and written critique.

Kids should be familiar with such literary elements as plot and subplot, setting, characters and characterization, theme, conflict, suspense and climax, and point of view. They should be able to define and identify protagonists and antagonists.

Build upon literary experiences through projects and activities. For example, try dramatizing excerpts from reading selections, making original illustrations, writing critical essays, or researching a scientific, geographical, or historical aspect of the book. Design original book covers for classic works of literature.

3. Expand upon knowledge of the classics.

Often recommended for eighth grade is William Shakespeare's *Twelfth Night*.

Kids should be able to define and compare tragedy and comedy, and should be familiar with such dramatic elements as farce, satire, soliloquies, and asides.

4. Read and respond to a varied range of poetic forms.

Writing

1. Write frequently, producing a variety of works including reports, essays, short stories, poems, narratives, journal entries, and letters.

Kids should be able to write well-organized essays, including research essays.

2. Identify and analyze the parts of a sentence.

Eighth graders should be able to recognize and use simple, compound, complex, and compound-complex sentences, and should be able to punctuate each correctly. They should be able to identify subject, predicate, complements (including predicate adjectives, predicate nominatives, direct and indirect objects), modifiers (including phrases and clauses), and appositives.

The bottom line: write grammatically and coherently.

3. Use punctuation marks correctly.

Kids should be able to punctuate the four kinds of sentences, and should be familiar with the punctuation of quotations and the uses of parentheses, hyphens, dashes, colons, semicolons, and italics.

4. Identify common parts of speech, including nouns, pronouns, verbs, adjectives and articles, adverbs, conjunctions, and interjections.

5. Expand upon previous spelling and vocabulary skills.

Eighth grade is the last year kids are eligible to enter the Scripps National Spelling Bee (see [this page](#)).

Listening and Speaking Skills

1. Listen and respond to various forms of spoken literature.

Examples include plays, skits, and poetry and prose readings.

2. Listen to and make narrative and informational oral presentations.

Kids might participate in storytelling sessions, debates, group discussions, or dramatic presentations, or give short oral reports on a nonfiction topic. (Create your own TED Talks!) They should be able to listen critically, analyzing oral presentations and media messages for bias, persuasion, propaganda, fallacies, opinion expressed as fact, and unsubstantiated generalities. They should also be able to give coherent oral summations of books or articles.

There are many books on public speaking, variously targeting a range of ages. See, for example, Erik Palmer's *Well Spoken: Teaching Speaking to All Students* (Stenhouse Publishers, 2011) and Carmine Gallo's *Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds* (St. Martin's Griffin, 2015).

3. Memorize and recite poems.

See John Hollander's *Committed to Memory: 100 Best Poems to Memorize* (Turtle Point, 2000) or Ted Hughes's *By Heart: 101 Poems to Remember* (Faber & Faber, 2012).

Study Skills

1. Know how to obtain reliable information from print and online sources.

2. Collect and organize information for research projects.

3. Take effective notes and develop outlines from written selections.

Mathematics

Eighth graders often devote this year to a course in pre-algebra, with accompanying reinforcement and expansion of previously studied arithmetical and geometrical concepts. Or they may take a beginning algebra course.

Can You Solve My Problems?

Alex Bellos. The Experiment, 2017.

Dozens of clever brainteasers and logic puzzles.

Montague Island Mysteries and Other Logic Puzzles

R. Wayne Schmittberger. Puzzlewright, 2016.

Solve murder mysteries with logic.

Movies: *A Beautiful Mind* (2001) is the story of mathematician John Nash, the inventor of game theory, who suffered from schizophrenia (PG-13). In *Good Will Hunting* (1997), the title character, a janitor at MIT, is a math genius with a troubled past (R). *The Theory of Everything* (2014) is the story of physicist Stephen Hawking (PG-13); and in *Stand and Deliver* (1987), a high school math teacher inspires a group of at-risk inner-city kids to learn calculus (PG).

Math in the Movies

mathbits.com

Descriptions of many movies, with associated worksheets.

1. Understand the use of real numbers, including fractions, decimals, percents, ratios, and exponents.

Kids should be able to write numbers in scientific notation; identify prime and composite numbers; find the greatest common factor (GCF) and least common multiple (LCM) of two or more numbers; estimate square roots; and estimate sums, differences, products, and quotients of real numbers. They should also be able to convert among fractions, decimals, percents, and ratios, and use fractions, decimals, percents, and ratios in real-world situations.

2. Know the basic principles of geometry.

Students should be familiar with the classification and measurement of angles and lines. They should be able to identify similar, congruent, and symmetrical figures and calculate the perimeter and area of regular and irregular plane figures and the surface area and volume of solid figures, including rectangular solids, pyramids, prisms, cones, and cylinders.

They should know the Pythagorean theorem and be able to use it to solve problems; and they should be able to apply geometric principles to real-world situations.

Geometry Snacks

Ed Southall. Tarquin, 2017.

Geometry puzzles, recommended for ages 8 to 89+.

The Paper Puzzle Book

Ilan Aribi et al. World Scientific, 2018.

All you need are paper and ingenuity. Puzzles involve flexagons, two-dimensional folding, origami, and more.

3. Understand basic probability and statistics.

Kids should be able to compare and contrast varying graphic representations of the same data. They should be able to use measurements of central tendency, including mean, mode, and median, and apply these appropriately to problem-solving situations. They should be able to find the

mathematical and experimental probabilities of simple and compound events, using hands-on experiments, random number generation, computer simulations, and other methods. They should be able to display and interpret data using scatter plots.

4. Understand the introductory principles of algebra.

Eighth graders should be able to simplify numerical expressions using order of operations, and to describe and identify the commutative and associative properties of addition and subtraction and the distributive properties of multiplication. They should be able to translate word problems into algebraic expressions and to evaluate and solve simple equations. They should be able to solve simple inequalities and graph the solutions, use graphs and tables to represent relations and functions, and extend and create geometric and numerical patterns.

Given a rule or function that describes a linear equation, they should be able to make a table and create a graph; given an algebraic formula, they should be able to make substitutions and solve for one unknown.

History and Geography

Many public school curricula concentrate on state history and geography in eighth grade. Homeschoolers designing their own history/geography programs may prefer to integrate state history into a more comprehensive ongoing program. Since we moved so often while our kids were growing up—which state to concentrate upon?—our state studies were generalized, which seems a sensible approach, given that the average American is expected to move about eleven times in a lifetime.

State by State

Matt Weiland and Sean Wiley, eds. Ecco, 2009.

Fifty writers and fifty essays on fifty different states. Good writing project: try writing one or more of your own.

Local history, on the other hand, can bring history up close and personal. Many town historical societies and libraries have interesting collections of local historical artifacts; often towns have historical buildings that are open for public tours.

American History

Eighth graders, building upon past American history studies, might spend this year surveying modern times. See *The Century for Young People* by Peter Jennings, Todd Brewster, and Jennifer Armstrong (Doubleday, 1999), an illustrated overview of the twentieth century filled with first-person accounts.

See Joy Hakim's *A History of US: All the People* ([this page](#)).

1. The Cold War era.

Topics to cover include the Marshall Plan, the Truman Doctrine, the origins of the Cold War, containment strategy, the arms race, the Iron Curtain and Eastern European resistance, McCarthyism and the Red Scare, the Korean War, the presidency of John F. Kennedy, the Cuban missile crisis, the space program and the Apollo moon landing, American culture in the 1950s and 1960s, perestroika, the fall of the Berlin Wall, and the dissolution of the Soviet Union.

Alas, Babylon

Pat Frank. HarperPerennial, 2005.

When nuclear holocaust obliterates the United States, one small town in Florida struggles to survive.

Catch You Later, Traitor

Avi. Algonquin, 2016.

Pete Collison and family have come under suspicion of being communists during the 1950s Red Scare.

The Children's Story

James Clavell. Dell, 1989.

Clavell's young daughter came home from school one day and announced that her teacher said her parents would give her a dime if she correctly recited the Pledge of Allegiance. After she'd earned her dime, Clavell asked her if she knew what the Pledge meant—and found that she had no idea. It was this incident that inspired *The Children's Story*, a short, chilling tale that takes place in a school classroom after the United States has been conquered by an unknown country. Food for discussion.

Cloud and Wallfish

Anne Nesbet. Candlewick, 2018.

Eleven-year-old Noah suddenly becomes Jonah when he and his parents take up life behind the Iron Curtain in East Berlin. A story of espionage, intrigue, and abiding friendship.

Countdown

Deborah Wiles. Scholastic, 2013.

It's 1962, the Cold War is raging, the Cuban missile crisis is imminent, and Fanny Chapman has troubles of her own. The first of the Sixties Trilogy.

Fallout

Todd Strasser. Candlewick, 2015.

It's 1962—and when the nuclear bomb falls, Scott's family is the only one in the neighborhood to have a bomb shelter. When frantic neighbors force their way inside, the result is a nightmare.

The Loud Silence of Francine Green

Karen Cushman. Clarion, 2006.

In the era of blacklists and the House Un-American Activities Committee, quiet Francine, who prefers to keep her head down, reexamines her values after her outspoken friend Sophie is expelled from school.

A Night Divided

Jennifer A. Nielsen. Scholastic, 2018.

Gerda and her family find themselves divided by the Berlin Wall.

On the Beach

Nevil Shute. Vintage, 2010.

A nuclear World War III has destroyed the planet, and the last few survivors in Australia wait for the radioactive cloud bringing certain death their way.

2. The civil rights movement.

Topics to cover include the *Plessy v. Ferguson* “separate but equal” ruling; Jim Crow laws; Rosa Parks and the Montgomery bus boycott; *Brown v. Board of Education* and the Little Rock Nine; the Civil Rights Act of 1957; the Woolworth’s lunch counter stand; Martin Luther King Jr. and the march on Washington; Lyndon Johnson and the Civil Rights Act of 1964; the rise of African American militancy movements; and issues today, including voter suppression, continuing discrimination, and the Black Lives Matter movement.

The Autobiography of Malcolm X

Malcolm X. Ballantine, 1992.

The story of the controversial American Muslim minister and civil rights activist.

The Hate U Give

Angie Thomas. Balzer + Bray, 2017.

Starr and Khalil, both black, are pulled over by a white police officer after leaving a party, and Khalil is killed. Starr, the only witness, is terrified to testify—and at the same time is coping with the disparate parts of her life: one in her poor black neighborhood, the other at her elite and mostly white private school.

The Lions of Little Rock

Kristin Levine. Puffin, 2013.

It's 1958 in Little Rock and Marlee's best friend, Liz, has been expelled from school, caught passing for white. The two girls, determined to stay friends, decide to take on segregation.

March

John Lewis. Top Shelf, 2013.

The first of an intense graphic novel trilogy about Congressman Lewis's long struggle for civil and human rights.

Midnight Without a Moon

Linda Williams Jackson. Houghton Mifflin Harcourt, 2017.

It's 1955 and Rose Lee Carter is living with her sharecropper grandparents and hoping to move north. When a neighbor is killed for trying to vote and an African American boy, Emmett Till, is killed for allegedly whistling at a white woman, Rose is determined to become part of the movement for change.

My Mother the Cheerleader

Robert Sharenow. Balzer + Bray, 2009.

Louise's life is uneventful until desegregation comes to New Orleans and her mother pulls her out of school and joins the Cheerleaders, a group of women who gather every morning to heckle 6-year-old Ruby Bridges.

One Crazy Summer

Rita Williams-Garcia. Amistad, 2011.

In 1968, 11-year-old Delphine and younger sisters Vonetta and Fern are sent from Brooklyn to California to stay with their radical mother, Cecile—who sends them to a day camp run by the Black Panthers. The girls learn a lot about themselves, their family, and their country.

See *Eyes on the Prize* (PBS, 1987), the acclaimed fourteen-part documentary about the history of the civil rights movement in America.

3. The Vietnam War era.

Topics to cover include the historical background of the conflict; the Viet Cong; the domino theory; major events of the war including the Gulf of Tonkin incident, the Tet Offensive, and the My Lai Massacre; the antiwar protest movement, including the Kent State shooting; the aftermath of the war; and the Watergate scandal and resignation of Richard Nixon.

The Vietnam War

Barbara Diggs. Nomad, 2018.

In the Inquire and Investigate series, this creatively designed history of the war includes thought-provoking projects, among them creating pro- and antiwar slogans, writing letters from varying perspectives, and analyzing media coverage of the war.

Inside Out and Back Again

Thanhha Lai. HarperCollins, 2013.

A novel in verse based on the author's childhood experience as a refugee fleeing Vietnam after the fall of Saigon. A National Book Award winner.

Shooting the Moon

Frances O'Roark Dowell. Atheneum, 2009.

Twelve-year-old Jamie is thrilled when her brother is sent to Vietnam, following in the footsteps of their military father—but her brother's news from the front, sent only in rolls of film, offers another take on war.

The Wednesday Wars

Gary D. Schmidt. Houghton Mifflin Harcourt, 2009.

Set during the Vietnam War, this is the story of seventh grader Holling Hoodhood, who—among other troubles—is forced to spend Wednesday afternoons with his teacher, Mrs. Baker, who has him reading Shakespeare's plays.

See Ken Burns's ten-part documentary *The Vietnam War* (PBS, 2007).

4. Social movements and progressivism.

Topics to cover include feminism and the women's liberation movement, Cesar Chavez and the United Farm Workers, Native American activism, and environmentalism.

The Absolutely True Diary of a Part-Time Indian

Sherman Alexie. Little, Brown, 2009.

Junior, a budding cartoonist, leaves his school on the Spokane Indian Reservation for the all-white high school in town, where the only other Indian is the school mascot.

The Disreputable History of Frankie Landau-Banks

E. Lockhart. Disney-Hyperion, 2009.

Teenager Frankie, a near criminal mastermind, is out to subvert the patriarchy at her old-boys-dominated private school.

Esperanza Rising

Pam Muñoz Ryan. Scholastic, 2000.

Thirteen-year-old Esperanza has grown up in a wealthy family of landowners in Mexico, then bandits kill her father, and she and her mother flee to California.

Rad American Women A–Z

Kate Schatz. City Lights, 2015.

A collective biography of women who have changed the world, from Angela Davis to Zora Neale Hurston.

Movies: *Brave* (2000), set in a mythical Scotland, in which an unconventional princess combats a curse (PG); *The Milagro Beanfield War* (1988), a wonderful story of Hispanic farmers combating developers (R, apparently for profanity); *Billy Jack* (1971), the story of an ex-Green Beret Native American activist bent on protecting both wild mustangs and a progressive reservation school (PG); and *Norma Rae* (1979), the story of a young single mother trying to unionize the local textile mill (PG).

World History

See *The Essential World History* ([this page](#)).

Following on previous studies, eighth grade world history might cover:

1. The British Empire and the decline of European colonialism.

Topics to cover include the British Commonwealth; Irish nationalism, including the Easter Rebellion and the Irish Free State; Indian nationalism from the Sepoy Rebellion to Mahatma Gandhi; and revolution in Africa.

For a literature tie-in, try Leon Uris's *Trinity* (Avon, 2006) or Rudyard Kipling's *Kim* (Puffin Books, 2011).

Movies: *A Passage to India* (1984), based on the E. M. Forster novel (PG); and *Gandhi* (1982), with Ben Kingsley in the title role (PG).

2. China and the decline of European colonialism.

Topics to cover include China under the Europeans, the Opium Wars and the Boxer Rebellion, the policies of Sun Yat-sen, Mao Zedong and the Long March, the defeat of the Nationalists under Chiang Kai-shek, and the establishment of the People's Republic of China.

The Good Earth

Pearl S. Buck. Simon & Schuster, 2016.

The Pulitzer Prize-winning story of peasant farmer Wang Lung and his wife and their struggles in 1920s China.

Movie: *The Last Emperor* (1987), the tragic story of Pu-Yi, last emperor of China (PG-13).

3. The Middle East.

Topics to cover include territorial mandates in the Middle East, partition and the creation of Israel, the Palestine Liberation Organization, the Arab-

Israeli Wars, the Camp David peace treaty, the Persian Gulf War, the wars in Iraq and Afghanistan, and the politics of oil.

The Breadwinner

Deborah Ellis. Groundwood Books, 2015.

In Afghanistan during the rule of the Taliban, 11-year-old Parvana, after her father's arrest, disguises herself as a boy to become the family breadwinner.

Also see Nadia Hashimi's similarly themed *One Half from the East* (HarperCollins, 2018).

Exodus

Leon Uris. Bantam, 1983.

An epic story of the founding of Israel from the point of view of the Jews.

Palestine

Joe Sacco. Fantagraphics, 2014.

An account of Sacco's experiences and encounters as a journalist in Palestine, Israel, and the Occupied Territories in the early 1990s, in graphic novel form.

Persepolis

Marjane Satrapi. Pantheon, 2004.

Satrapi's graphic novel account of growing up in Tehran during the years of the Islamic Revolution.

A Stone in My Hand

Cathryn Clinton. Candlewick, 2010.

Malaak's father has been killed while trying to find work in Israel, and her older brother has joined a group of angry youth activists who throw stones at Israeli soldiers. Set in Palestine in the 1980s.

4. The post-Cold War era/modern times.

Topics to cover include the diplomatic reinstatement of China, Strategic Arms Limitation Treaty talks, the breakup of the USSR, the reunification of Germany, China under communism and the Cultural Revolution, the Common Market and the European Union, conflict in the Balkans, and the end of apartheid in South Africa.

Balzac and the Little Chinese Seamstress

Dai Sijie. Anchor, 2002.

Two city teenagers are sent to a remote village during China's infamous Cultural Revolution, where they meet the local tailor's daughter and discover a hidden cache of forbidden Western literature.

Cry, the Beloved Country

Alan Paton. Scribner, 2003.

A classic of hope, courage, and endurance, set in South Africa in the days of apartheid.

Geography

Eighth graders should have a good grasp of the basic principles of geography. They should be familiar with the use of maps and globes, should be able to find specific locations on a map given coordinates of latitude and longitude, and should have a well-developed geographic vocabulary.

Around the World in Eighty Days

Jules Verne. Many editions.

In this classic, Phileas Fogg and his valet Passepartout race to circumnavigate the globe in eighty days. (Map their journey—and see how fast you could complete the same trip today.)

Also see the 1956 movie of the same name (G).

Science

While individual science curricula vary, eighth grade science often concentrates on physical science, a discipline that is traditionally repeated with a formal physics course in twelfth grade. See Paul Hewitt's *Conceptual Physics* ([this page](#)).

Basher Science: Physics

Dan Green. Kingfisher, 2008.

Imagine physics as a collection of snarky characters, each of whom describes him-/herself in the first person.

The Book of Potentially Catastrophic Science

Sean Connolly. Workman, 2010.

Organized timeline-style, from the first stone tools to the Large Hadron Collider, with background information and fifty great experiments. The sort of stuff that makes kids fall in love with science.

Also see Connolly's *Book of Totally Irresponsible Science* (2008).

Einstein and Relativity for Kids

Jerome Pohlen. Chicago Review Press, 2012.

The life and ideas of Albert Einstein with a timeline, photos and sidebars, and explanations of his major discoveries. Hands-on experiments include modeling a nuclear reaction with dominoes and the expanding universe in a microwave, and calculating the speed of light with a melting chocolate bar.

Also see *Isaac Newton and Physics for Kids* (Kerrie Logan Hollihan; CRP, 2012).

Physics

Jane P. Gardner. Nomad, 2014.

In the Inquire and Investigate series, this book covers forces, motion, Newton's laws, gravity, electricity, magnetism, light and

optics, and sound with cartoons, fact boxes, and thought-provoking activities.

1. Understand concepts of force and motion.

Kids should know the definitions of *velocity* and *speed*, be familiar with the formula $s = d/t$, and be able to interpret graphs plotting position versus time and speed versus time. They should understand concepts of force, including gravity, elasticity, and friction; the effects of balanced and unbalanced forces on objects; and the relationship between force and mass.

2. Understand concepts of density and buoyancy.

For example, kids should be able to calculate density given mass and volume, should understand the concept of buoyancy and know how to predict whether a given object will float or sink, and should understand Archimedes's principle.

3. Understand concepts of work and power.

For example, kids should be able to define *work* and *power*, to solve problems using the formula $w = fd$ (work = force \times distance) and $p = w/t$ (power = work/time), and know common units of measure of work and power in both English and metric systems.

4. Expand upon earlier studies of electricity and magnetism.

For example, kids should be able to compare current and static electricity; know the characteristics and functions of conductors, insulators, and capacitors; define *amperes*, *watts*, and *ohms*; and solve problems using Ohm's law (watts = amperes \times volts). They should also understand the relationship between electricity and magnetism and be able to cite practical applications of this phenomenon.

5. Understand concepts of sound and light and properties of wave propagation.

Kids should understand the basic properties of waves, including wavelength, frequency, and amplitude, and know the difference between longitudinal and transverse waves. They should know the properties of light and sound waves and the composition of the electromagnetic spectrum; they should understand concepts of wave interference and resonance, and the Doppler effect and the concept of redshift.

Foreign Language

See [this page](#).

The Arts

Visual Art

- 1. Use knowledge of art elements and principles of design to produce a wide range of creative artworks.**
- 2. Use knowledge of art elements and principles of design to analyze and critique a variety of artworks.**
- 3. Study art in conjunction with other academic subjects across the curriculum.**

For example, pair studies of the Middle East with surveys of Arabic miniature painting, or the history of the Vietnam War with the story of sculptor Maya Lin and the creation of the Vietnam Veterans Memorial.

4. Survey art and architecture from the twentieth century to the present.

Study representative artists and their works, know characteristic features of each school or genre, and recognize and classify artworks accordingly. Topics to cover might include modern painters (Pollock, Rothko, Warhol, Lichtenstein, Lawrence), photographers (Steichen, Stieglitz, Bourke-White, Adams), sculptors (Rodin, Brancusi, Picasso, Moore, Calder, Nevelson, Oldenburg), and architects (Wright, Gropius, Le Corbusier, Mies van der Rohe).

Archidoodle: The Architect's Activity Book

Steve Bowkett. Laurence King, 2013.

Interactive architectural challenges, from designing your own skyscraper to inventing a cliff house.

Cool Architecture

Simon Armstrong. Pavilion, 2015.

World architecture from Stone Age huts to skyscrapers, with interesting facts and quirky illustrations.

The Story of Buildings

Patrick Dillon. Candlewick, 2014.

From the pyramids to the Sydney Opera House and beyond, with great breakaway illustrations by Stephen Biesty.

The Three Little Pigs: An Architectural Tale

Steven Guarnaccia. Abrams, 2010.

In this picture book the pigs are architects Frank Gehry, Phillip Johnson, and Frank Lloyd Wright.

Music

1. Review and reinforce musical concepts introduced in earlier grades.

Kids playing musical instruments should know musical notation and musical terms. They should be familiar with major and minor chords, chord changes, and intervals, and should be able to construct major and minor scales in keys with up to three sharps and flats.

2. Recognize and identify the major orchestral families and their individual instruments, keyboard instruments, historical instruments, and ethnic instruments by both sight and sound.

3. Recognize and identify common musical forms.

4. Continue survey of music history.

Kids should listen to selections of famous works, read biographies of musicians and composers, order musical pieces and composers on timelines, and associate musical styles and developments with historical periods. Listen and respond to a range of musical pieces.

5. Participate in instrumental and vocal performances, group and solo.

6. Create and play original musical compositions.

7. Study music in conjunction with other academic subjects across the curriculum.

Drama

For performers, see the many collections of monologues for teens and young actors.

Recommended plays include Anton Chekhov's *Uncle Vanya*, Samuel Beckett's *Waiting for Godot*, Henrik Ibsen's *A Doll's House*, Eugene O'Neill's *The Iceman Cometh*, Bertolt Brecht's *The Threepenny Opera*, and Arthur Miller's *Death of a Salesman*.

Also see *Take Ten* (Vintage, 1997), a collection of short but powerful plays that can be performed in just ten minutes. Try writing one or more of your own.

Writing the 10-Minute Play

Glenn Alterman. Limelight, 2013.

How-tos, examples, marketing hints, and a list of contests. Give it a try!

Philosophy and Comparative Religion

Stephen Law's *The Philosophy Gym* (Thomas Dunne, 2003) is a collection of creative approaches to answering classic and modern questions, such as "Where did the universe come from?" "Could a machine think?" "Does God exist?" and many more. Read and talk.

Health and Physical Education

See [this page](#).

Life Skills

See [this page](#).

Computer and Technology Skills

Continue to expand upon skills introduced in previous grades.

Engineering

William Gurstelle's books are irresistible for young engineers. For example, see *Backyard Ballistics* (Chicago Review Press, 2012), which has detailed instructions for building potato cannons, match rockets, tennis ball mortars, and Cincinnati fire kites; and *The Practical Pyromaniac* (2011), which includes science, history, and instructions for twenty-five fantastic incendiary devices. (The book begins cautiously, with instructions on how to use a fire extinguisher.)

CHAPTER 14

High School: An Overview

A magnificent education, as countless examples attest, can be obtained simply by reading.

—NEIL POSTMAN

High school, education-wise, is the Age of Textbooks—and while it's not a bad idea to have one for reference purposes, most researchers agree that textbooks aren't the best way to learn. Better is to get input from a varied range of sources, among them videos, podcasts, websites, television programs, lectures, mentors, periodicals, and books.

How to Read a Book: The Classic Guide to Intelligent Reading

Mortimer J. Adler and Charles Van Doren. Touchstone, 1972.

There's more to reading than you might think. Adler and Van Doren describe the four levels of reading:

Elementary or basic reading, in which readers learn how to identify words and string them into sentences.

Inspectional reading, in which readers skim systematically to discover what a book is about and what kind of a book it is (novel? scientific treatise?).

Analytical reading, in which a book is read thoroughly and in depth.

Syntopical or comparative reading, in which many books on a topic are read and placed in relation to each other. Usually a research project at the high school or college level calls for syntopical reading.

The book also discusses how best to read specific genres, such as literature, poetry, science and mathematics, and philosophy.

And then there's the question of what to learn.

In public school, curricula become somewhat more amenable to individual interests once a student enters high school. Kids in secondary school generally have the option to select one or more elective classes each semester and can, to a certain extent, begin to concentrate their efforts in specific academic areas. States have minimum requirements for high school graduation, however, as do many colleges for enrollment eligibility.

Secondary School Minimum Requirements

English/language arts: four years

Mathematics: two years

Science: two or three years

History/geography: two or three years

Health and physical education: four years

In addition to these core basics, high school students must complete assorted electives—for example, additional mathematics, science, foreign language, civics, economics, psychology, art, music, and/or driver's education classes—thus earning a total number of required course credits, which are computed somewhat differently from school system to school system. Community service or volunteer activities and part-time job, internship, or apprenticeship hours can often be used to fulfill high school credit requirements. Many homeschoolers at this level also take correspondence courses, online classes, or community college or university classes.

Sample Four-Year Program

Grade nine

Language arts
Algebra I
World History I
Earth science
Foreign language
Art/music
Health and physical education

Grade ten

Language arts
Geometry
World History II
Biology
Foreign language
Art/music
Health and physical education

Grade eleven

Language arts
Algebra II/trigonometry
American history
Chemistry
Foreign language
Art/music
Health and physical education

Grade twelve

Language arts
Pre-calculus/calculus

American government
Physics
Foreign language
Art/music
Health and physical education

The bulk of available literature on high-school-level education is not about how to change approaches and curricula to make high school more relevant and appealing to kids, but rather on helping kids to succeed within the confines of the existing system—that is, how to score well on standardized tests. For those kids who are college-bound, parents naturally want them to have the best chance of being accepted at the school of their choice. For many colleges, admissions departments continue to rely on a conventional high school curriculum and SAT scores.

By the high school years, kids are far more independent—and, often, more independent-minded—about the course of their education. At this stage, we were helpers, cheerleaders, and facilitators, as our kids increasingly pursued education on their own. Josh took distance-learning classes in Chinese, entomology, and the Vietnam War; Ethan, similarly, took calculus and music theory. Caleb joined a community theater group and took drama and literature classes at the local high school. By this age, your kids may want to come up with their own reading lists and propose their own courses of study.

RESOURCES

Many colleges, community colleges, and universities offer distance-learning programs; and many classes are available online.

Coursera

www.coursera.org

Courses from a range of universities and educational institutions.

EdX

www.edx.org

Online courses from the world's best universities. Prices vary; costs are higher if you want a verified certificate.

The Great Courses

www.thegreatcourses.com

Over five hundred courses in a wide range of disciplines, available on CD or DVD, or in digital format. Categories include science, history, fine arts, economics, literature and language, philosophy, religion, music, and mathematics. Middle- and high-school-level students should have no trouble coping with most. All courses go on sale periodically at greatly reduced prices.

Khan Academy

www.khanacademy.org

Free online classes in all disciplines, many appropriate for high-school-level students. Also included are SAT test prep and workshops on college admission and personal finance.

Masterclass

www.masterclass.com

Dozens of online classes taught by a wide range of experts, among them writing by Malcom Gladwell or Margaret Atwood, economics by Paul Krugman, documentary filmmaking by Ken Burns, and space exploration by Chris Hadfield. Annual charge.

MIT Open Courseware

ocw.mit.edu

MIT plans to publish all course materials online and make them available to everyone. Searchable by topic.

Udemy

www.udemy.com

A large selection of online video courses for teens and adults.

PODCASTS!

Podcasts—that is, episodic series of audio files available for download—can be terrific learning tools, and more and more are available every year. Right now, some of the best include:

99% Invisible

99percentinvisible.org

Learn about the unnoticed things that shape our world. (Where did fortune cookies come from? Why did Sigmund Freud use a couch?)

BackStory

www.backstoryradio.org

By a group of historians, intriguing accounts of popular topics seen through the lens of American history.

Freakonomics Radio

freakonomics.com

Based on Steven Levitt and Stephen Dubner's popular books, this is a look at the hidden side of everything, using creative statistics and economics.

Our Fake History

ourfakehistory.com

What really happened? This covers the myths we think are history, as well as the real history hidden in myths.

Radiolab

www.wnycstudios.org/podcasts/radiolab

The award-winning *Radiolab* team has been offering fascinating and wide-ranging explanations of everything under the sun since 2002.

Revisionist History

revisionisthistory.com

Hosted by Malcolm Gladwell, each episode is a reinterpretation of a person, event, or idea from history, “because sometimes the past deserves a second chance.”

Star Talk

www.startalkradio.net

Science, pop culture, and more, hosted by Neil deGrasse Tyson.

Language Arts

As kids move through secondary school, language arts courses become more specialized. For example, students have the option to concentrate on American literature, British literature, women’s literature, world literature, mythology, or poetry; writers may concentrate on creative writing, journalism, or nonfiction writing.

Many suggestions for high-school-level reading lists are available online. Most include fiction and nonfiction titles, poetry, and plays. Few lists agree on the specifics. Just what an educated person should read is a battle reaching back decades, between the defenders of the Western canon—traditional classics, often vilified as a collection of dead white males—and the proponents of multiculturalism.

100 Books That Changed the World

Scott Christiansen. Universe, 2018.

An illustrated history from the I Ching and the epic of Gilgamesh through Shakespeare, Darwin, Thoreau, and Harry Potter. Also by Christiansen, see *100 Diagrams That Changed the World* (2012) and *100 Documents That Changed the World* (2015).

500 Great Books for Teens

Anita Silvey. Houghton Mifflin Harcourt, 2006.

Detailed book summaries, categorized by genre.

Great Books

David Denby. Simon & Schuster, 2013.

Critic/journalist Denby, long after the fact, revisits—book by book—the required Great Books class he took at Columbia University.

Great Books for High School Kids

Rick Ayers and Amy Crawford, eds. Beacon, 2004.

An eclectic and terrific collection. No *Silas Marner*.

How to Read Literature Like a Professor

Thomas C. Foster. Harper Perennial, 2014.

Subtitled *A Lively and Entertaining Guide to Reading Between the Lines*, this is a truly delightful account—with lots of examples—of how to get the most out of literature.

Also see *How to Read Poetry Like a Professor: A Quippy and Sonorous Guide to Verse* (2018).

The New Lifetime Reading Plan

Clifton Fadiman and John S. Majors. HarperCollins, 1999.

Brief, interesting introductions to over a hundred works of classic world literature, from the epic of Gilgamesh to Chinua Achebe.

The Whole Five Feet

Christopher R. Beha. Grove, 2010.

Beha—having learned that his grandmother used the Harvard Classics to educate herself during the Great Depression—decided

to spend a year reading all forty-four volumes. An appendix lists the titles, an eclectic collection that begins with Benjamin Franklin's autobiography and ends with *Beowulf*.

A sample recommended reading list for the college-bound, from the National Endowment for the Humanities:

Chinua Achebe. *Things Fall Apart*.
Jane Austen. *Pride and Prejudice*.
Charlotte Brontë. *Jane Eyre*.
Willa Cather. *Death Comes for the Archbishop*.
Miguel de Cervantes. *Don Quixote*.
Kate Chopin. *The Awakening*.
Stephen Crane. *The Red Badge of Courage*.
William Faulkner. *The Sound and the Fury*.
F. Scott Fitzgerald. *The Great Gatsby*.
Nathaniel Hawthorne. *The Scarlet Letter*.
Ernest Hemingway. *A Farewell to Arms*.
Zora Neale Hurston. *Their Eyes Were Watching God*.
Harper Lee. *To Kill a Mockingbird*.
Jack London. *The Call of the Wild*.
Gabriel García Márquez. *One Hundred Years of Solitude*.
Herman Melville. *Bartleby the Scrivener* and *Moby Dick*.
Flannery O'Connor. *A Good Man Is Hard to Find*.
George Orwell. *Animal Farm*.
Edgar Allan Poe. *Selected Tales*.
John Steinbeck. *The Grapes of Wrath*.

Harriet Beecher Stowe. *Uncle Tom's Cabin*.

Mark Twain. *The Adventures of Huckleberry Finn*.

Edith Wharton. *The House of Mirth*.

Eudora Welty. *Collected Stories*.

Common drama selections include Arthur Miller's *The Crucible*, assorted plays by Shakespeare, and Sophocles's *Antigone* and *Oedipus Rex*.

Common poetry recommendations include *Beowulf*, Chaucer's *Canterbury Tales*, Dante's *Inferno*, Homer's *The Iliad* and *The Odyssey*, and Walt Whitman's *Leaves of Grass*.

Nonfiction selections include Henry Adams's *The Education of Henry Adams*, Frederick Douglass's *Narrative of the Life of Frederick Douglass*, Henry David Thoreau's *Walden*, and Malcolm X's *The Autobiography of Malcolm X*.

There are also dozens—thousands—of alternatives; don't be afraid to assemble a list of your own. Our sons all submitted high school reading lists as part of their college applications; none of the three were alike, and though some of the titles above were included, none precisely resembled this one.

Writing

Check writing competitions and contests online for opportunities open to teens.

Scholastic Art and Writing Awards

www.artandwriting.org

Teens in grades seven to twelve from public, private, or homeschools can apply in many different categories of art and

writing.

Letters About Literature

www.read.gov/letters

Students in grades four through twelve are challenged to write a letter to an author (living or dead) who has made a difference in their lives. Sponsored by the Library of Congress.

Bennington Young Writers Awards

www.bennington.edu/events/young-writers-awards

Students in grades ten through twelve can enter in one of three categories: poetry, fiction, and nonfiction.

New Voices One-Act Competition

www.youthplays.com/submit_play.php

For playwrights under age 19.

Mathematics

Mathematics in the high school years may be taught in an ordered traditional sequence—algebra (grade nine), geometry (grade ten), advanced algebra and trigonometry (grade eleven), calculus (grade twelve)—or it may be taught in an integrated fashion, such that algebra, geometry, and trigonometry concepts are covered simultaneously over a two- or three-year period. Trigonometry, mathematical analysis, and linear algebra may also be combined in a pre-calculus course, taught in the eleventh or twelfth grade.

Selection of an appropriate course of study depends upon the interests, abilities, and goals of the individual student; parents and kids will have to decide from among a range of options. Science- and technology-oriented kids should take at least three and preferably four years of mathematics.

By the end of seventh grade or so, Josh, our oldest, had put his foot down on conventional math. He finished pre-algebra—an unpleasant

experience for both of us—and then pointed out that since math was making him miserable, he'd prefer not to continue, at least not with what we were doing. So instead we created a math-related literature program for his high school years.

A MATH READING LIST

The Beauty of Numbers in Nature

Ian Stewart. MIT Press, 2017.

From snowflakes to sand dunes, sunflowers to beehives. A fascinating survey of mathematical patterns.

The Calculus Diaries

Jennifer Ouellette. Penguin, 2010.

How a former mathphobe learned to apply calculus to everything from weight loss to Disneyland rides to the zombie apocalypse.

Euclid in the Rainforest

Joseph Mazur. Plume, 2006.

Part adventure story, part exploration of math.

Extreme Measures

Martin Brookes. Bloomsbury, 2004.

The story of Sir Francis Galton, one of the great Victorian polymaths, whose motto was "Count whatever you can."

Fantasia Mathematica

Clifford Fadiman, ed. Copernicus, 1997.

A classic collection of math stories, essays, and anecdotes by such authors as Aldous Huxley, H. G. Wells, Robert Heinlein, and Arthur C. Clarke.

Fermat's Enigma

Simon Singh. Anchor, 1998.

The story of the epic quest to solve the world's greatest math problem.

Flatland

Edwin Abbott. Dover, 1992.

Originally published in 1884, this is still a geometrical charmer, ostensibly written by “A. Square.” In Flatland, the women are line segments and the men are polygons whose social status is determined by the number of sides. There’s philosophical discussion material here, too.

Freakonomics

Steven D. Levitt and Stephen J. Dubner. William Morrow, 2009.

A catchy study in economic statistics, tackling such problems as “Which is more dangerous, a gun or a swimming pool?” and “How much do parents really matter?”

Here’s Looking at Euclid

Alex Bellos. Free Press, 2011.

Learn about the Amazonian tribe that can count only to five, the Japanese godfather of Sudoku puzzles, and the brothers who built a supercomputer in their Manhattan apartment.

How Not to Be Wrong: The Power of Mathematical Thinking

Jordan Ellenberg. Penguin, 2015.

Reaganomics, baseball, the lottery, and public opinion polls are all matters of math.

Innumeracy

John Allen Paulos. Henry Holt, 1991.

With many interesting examples, this is a convincing account of how our inability to deal with large numbers and probabilities gets us into trouble.

The Man Who Counted

Malba Tahan. W. W. Norton, 2015.

First published in Brazil in 1949, this is a collection of tales centered on mathematical problems and puzzles. (What to do for the three brothers whose father has left them thirty-five camels?)

Math with Bad Drawings

Ben Orlin. Black Dog & Leventhal, 2018.

Mathematical concepts explained with humor and really bad stick-figure drawings. Chapters include “How to Think Like a Mathematician,” “Geometry: The Design of Stuff That Works,” and “Statistics: The Fine Art of Honest Lying.”

The Math Gene

Keith Devlin. Basic Books, 2001.

Why is math so hard—at least for some? Devlin explains that we all use more mathematical reasoning skills than we think.

Mathenauts

Rudy Rucker. Arbor House, 1987.

A collection of math-centric science fiction stories, with themes that range from the fourth dimension to a cubic earth.

The Mismeasure of Man

Stephen Jay Gould. W. W. Norton, 1996.

How do we measure intelligence? And how have our tests been misused?

Zero: The Biography of a Dangerous Idea

Charles Seife. Penguin, 2000.

The Babylonians invented it, the Greeks banned it, and the Christian church used it to fend off heretics. This is the story of one of the most important tools in mathematics.

History and Geography

Most public school curricula require kids to study two to three years of history/geography to obtain a high school diploma. Generally this includes courses in American history (one year), world history (one year), and civics

or American government (one year), with options for more specialized electives such as ancient history, modern history, African American history, women's history, world geography, comparative religion, anthropology, sociology, and economics.

There are many ways of organizing history, geography, and related studies. A common approach is to study world history as a two-year sequence in ninth and tenth grades. World History I (grade nine) thus spans prehistory to 1000 CE; World History II (grade ten) covers the years from 1000 CE to modern times. Some programs split World History I and II at a somewhat later date, dividing the courses around 1500 CE. Another alternative is to condense world history to a less detailed one-year course, covering prehistory to 1000 CE (or 1500 CE) in the first semester and continuing through modern times in the second.

The Concord Review

www.tcr.org

A quarterly journal that publishes academic research papers in history by secondary students. Submission guidelines and subscription information are available online.

ONLINE RESOURCES

Big History Project

school.bighistoryproject.com/bhplive

For middle- and high-school-level students, 13.8 billion years of amazing history online.

Internet History Sourcebooks

sourcebooks.fordham.edu

For high school and college students, these are excellent chronological collections of primary sources. Multiple sourcebooks are available, including the Ancient History Sourcebook, Medieval Sourcebook, and Modern History Sourcebook. Also included is an extensive movie list, categorized by historical period.

Stanford History Education Group

sheg.stanford.edu

See the Reading Like a Historian curriculum for a long list of excellent lessons in American and world history, with downloadable lesson plans and source materials. Also see Beyond the Bubble, a history program featuring documents from the Library of Congress. A great approach for high school students.

Zinn Education Project

www.zinnedproject.org

A wide-ranging history site with many resources and activities, based on Howard Zinn's *A People's History of the United States* (see [this page](#)).

PERIODICALS

American Scholar

theamericanscholar.org

A quarterly publication from the Phi Beta Kappa Society covering politics, history, science, and the arts.

Archaeology

www.archaeology.org

From the Archaeological Institute of America. Published bimonthly. See the website for videos, slideshows, and archaeology in the news.

BBC History Magazine/BBC World History Magazine

www.historyextra.com

Many fascinating topics, plus quizzes, history in the news, and weekly podcasts. Published monthly in print and digital editions.

History Magazine

www.history-magazine.com

Covers key events in global history. Published bimonthly.

History Today

www.historytoday.com

A wide range of history topics. Published monthly in print and digital editions.

National Geographic

www.nationalgeographic.com

Gorgeously illustrated monthly articles on culture, exploration, wildlife, science, travel, and more. Print and digital editions.

Wilson Quarterly

wilsonquarterly.com

Compelling essays and articles on issues shaping our world today. Print and digital editions.

News

KNOW WHAT'S GOING ON!

The Learning Network

www.nytimes.com/section/learning

For teens, *The New York Times* maintains the Learning Network website, with contests, student activities, quizzes, an article of the day, and lesson plans categorized by academic subject (language arts, social studies, science and math, English language learners (ELL) and arts, and current events).

Magazines, in print or online, are also an excellent source of news, politics, literature, cultural commentary, technology, science and medicine, and finance.

The Atlantic

www.theatlantic.com

News, politics, culture, technology, and more through articles and podcasts.

The Economist

www.economist.com

International news, politics, business, science, technology, and more. Student subscriptions available.

Harper's

harpers.org

The oldest general-interest monthly magazine in America.

New Yorker

www.newyorker.com

News, culture, criticism, humor, podcasts, and more.

Time

time.com

National and international news, politics, reviews, and more.

Science

Most public school curricula require two or three years of science for a high school diploma. Depending on the scope of the local high school, students may fulfill this requirement from a battery of science choices, including geology, astronomy, biology, chemistry, physics, botany, and environmental science. In the traditional science sequence, kids study earth and space science in ninth grade, biology in tenth, chemistry in eleventh, and physics in twelfth. Homeschoolers, according to the interests of their children, should adjust their science curricula appropriately.

For serious science students, consider laboratory-based science classes at local high schools or colleges. Schools usually have professional lab equipment that is not available to or affordable by the average homeschool.

An excellent resource is *The Sciences: An Integrated Approach* (James Trefil and Robert M. Hazen; Wiley, 2016), a well-written and creatively designed textbook that combines the physical, life, and earth and space sciences. Included are a Science by the Numbers feature, “Stop and Think” exercises, and lists of helpful online resources. This is generally recommended as a text for college-level non-science majors, but it is readily adaptable for high school kids.

BOOKS

Astrophysics for People in a Hurry

Neil deGrasse Tyson. W. W. Norton, 2017.

Complex concepts cleverly presented, from quarks to dark matter to the speed of light and the shape of space.

Cosmos

Carl Sagan. Ballantine, 2013.

The fourteen-billion-year history of the cosmos. One of the bestselling science books of all time.

The Disappearing Spoon

Sam Kean. Back Bay Books, 2011.

Fascinating tales of chemistry, told through the elements of the periodic table.

Also by Kean, see *The Violinist's Thumb*, tales of DNA and the genetic code; and *Caesar's Last Breath*, an all-encompassing account of air.

Field Notes from a Catastrophe

Elizabeth Kolbert. Bloomsbury, 2015.

An impressive, important, and frightening history and science of climate change.

Also by Kolbert, see *The Sixth Extinction* (Henry Holt, 2014).

The Gene

Siddhartha Mukherjee. Scribner, 2017.

The history, science, and human side of heredity and genetics.

How Science Works

DK, 2018.

How do lasers work? What about gene therapy, black holes, or the greenhouse effect? Dozens of science questions in a range of disciplines answered through creative graphics.

Napoleon's Buttons

Penny Le Couteur. Jeremy P. Tarcher, 2004.

The seventeen crucial molecules that changed the world. Find out how Napoleon's army was done in by tin.

A Short History of Nearly Everything

Bill Bryson. Broadway Books, 2004.

Bryson visited scientists, mathematicians, archaeologists, and anthropologists in a quest to understand how we got from the Big Bang to civilization.

Song of the Dodo

David Quammen. Scribner, 1997.

Islands are far more important than you might think in terms of the origin and extinction of species.

Also see Quammen's intriguing collections of science essays, among them *Natural Acts* (2009), *The Flight of the Iguana* (1998), and *The Boilerplate Rhino* (2001).

We Have No Idea

Jorge Cham and Daniel Whiteson. Riverhead, 2017.

A witty overview of all the weird things in the universe about which we know nothing.

What If?

Randall Monroe. Houghton Mifflin Harcourt, 2014.

If you've got a teenager who thinks that he/she doesn't like science, try this one. Subtitled *Serious Scientific Answers to Absurd*

Hypothetical Questions, this book deals with dozens of such knotty problems as “What would it be like if you traveled back in time starting in Times Square, New York?” and “What if everyone actually had only one soulmate, a random person somewhere in the world?”

See the accompanying website at what-if.xkcd.com.

The World Without Us

Alan Weisman. Picador, 2008.

What would happen if people suddenly disappeared from the planet?

PERIODICALS

Popular science magazines are a great resource for up-to-date, reader-friendly information on a wide range of scientific disciplines. The following are available in both print and digital editions:

Discover

discovermagazine.com

National Geographic

www.nationalgeographic.com

New Scientist

www.newscientist.com

Popular Science

www.popsci.com

Psychology Today

www.psychologytoday.com/us

Science News

www.sciencenews.org

Scientific American

www.scientificamerican.com

Smithsonian

www.smithsonianmag.com

ACADEMIC JOURNALS FOR HIGH-SCHOOL-LEVEL STUDENTS

The Columbia Junior Science Journal

cjsjournal.org

Publishes one- to two-page research papers by high school students in the fields of biology, physics, engineering, and the social sciences.

Journal of Emerging Investigators

www.emerginginvestigators.org

An open-access science journal publishing research in the biological and physical sciences by middle and high school students. Run by Harvard University graduate students.

The Arts

Check online for arts contests and competitions open to teens.

Congressional Art Competition

www.house.gov/educators-and-students/congressional-art-competition

Contact your representative to confirm your district's participation.

National YoungArts Competition

www.youngarts.org

For visual, literary, design, or performing artists, ages 15–18.

National Geographic Student Photo Contest

ngstudentexpeditions.com

Click on the photo contest page for rules.

Also see *Drawing for Older Children and Teens* (Mona Brookes; Tarcher, 1991).

Philosophy and Comparative Religion

Currently, philosophy is not a required high-school subject in the United States—but its benefits, in terms of evaluating and constructing arguments and tackling fundamental questions, are incalculable.

PLATO: Philosophy Learning and Teaching Organization

www.plato-philosophy.org

Information, resources, and book lists for elementary-, middle-, and high-school-level philosophy programs.

Hi-Phi Nation

hiphination.org/

From *Slate* podcasts, this show, produced and written by a philosophy professor, begins with a story and then explores its philosophical implications.

Philosophy Talk

www.philosophytalk.org

A weekly radio show that examines a wide range of philosophical issues.

Also see classes available through the Great Courses (www.thegreatcourses.com), Khan Academy (www.khanacademy.org), and TED-Ed (ed.ted.com).

BOOKS

An Illustrated Book of Bad Arguments

Ali Almosawi. *The Experiment*, 2014.

A handy illustrated guide to all the goofs made in debates.

The Philosophy Gym: 25 Short Adventures in Thinking

Stephen Law. Thomas Dunne Books, 2003.

Big questions, with explanations and suggestions for further reading. (Where did the universe come from? How do you know you're not a brain in a vat?)

The Pig That Wants to Be Eaten: 100 Experiments for the Armchair Philosopher

Julian Baggini. Granta, 2010.

Are you a computer simulation? If God is all-powerful, could he create a square circle?

Also see Baggini's *The Duck That Won the Lottery* (Plume, 2009).

A Sneetch Is a Sneetch and Other Philosophical Discoveries: Finding Wisdom in Children's Literature

Thomas E. Wartenberg. Wiley Blackwell, 2013.

Philosophy through children's books, starting with *Harold and the Purple Crayon*. ("Can you get wet swimming in an imaginary ocean?")

What Does It All Mean? A Very Short Introduction to Philosophy

Thomas Nagel. Oxford University Press, 1987.

Short descriptions of important questions: "Do we really have free will?" "Why should we be moral?" "Does anything we do with our lives matter?"

Computer and Technology Skills

Must-Have Tech Skills for High-School-Level Kids

1. Keyboarding.

Fast, accurate typing is a plus for everything from searching the internet to writing papers. High school kids should type at an average of at least sixty words per minute.

2. Online etiquette skills.

A lot of kids fall afoul of this. Social media isn't just a platform for fooling around with friends; it's also increasingly essential to a successful academic or professional career. Err on the side of formality and don't post personal details that you wouldn't be comfortable showing to your grandma.

3. Software basics.

Kids should be able to use word processing, spreadsheet, and presentation programs. Commonly this means Microsoft Word, Excel, and PowerPoint.

4. Online research.

Know how to make the most of search engines and online reference materials and databases. (Not all search terms, for example, are equally effective.) Kids should also know how to assess website credibility.

5. Basic computer upkeep.

Kids should know how to update software, check for viruses and spam, and replace printer cartridges. They should also know the basic parts of the computer and understand networking.

6. Security and privacy.

Protect personal information, know what (and what not) to download, create strong passwords, and change passwords periodically. Be aware of

phishing: emails or other messages sent by scammers looking for personal or financial information.

For advanced computer-savvy kids, skills may include creating websites, blogs, or online courses, making YouTube videos, or designing games.

Engineering

The term *Maker movement* is used to describe a loose community of DIY fans, technology lovers, hobby inventors, and builders of all sorts, including traditional crafters. Many public libraries, schools, and community centers now house Makerspaces equipped with materials for makers, such as hand tools, digital cameras, 3-D printers, laser cutters, electronics gear, craft supplies, and sewing machines.

Make Magazine

makermedia.com

Make magazine and the companion website provide a wealth of projects and information for tinkerers, builders, and budding engineers. The print magazine is published bimonthly.

CHAPTER 15

Grade Nine

It is very difficult to live among people you love and hold back from offering them advice.

—ANNE TYLER

Language Arts

The Great Books program for high school ([this page](#)) includes Truman Capote's *Miriam*, Robert Louis Stevenson's *The Strange Case of Dr. Jekyll and Mr. Hyde*, and H. G. Wells's *The Time Machine*.

Norton Anthology of English Literature

Stephen Greenblatt, ed. W. W. Norton, 2018.

The *Norton Anthology*, a vast literary compendium from ancient to modern times, has for years served as the standard for introductory college humanities courses. Newer versions incorporate contemporary works and video modules.

Also see the *Norton Anthology of American Literature*.

Reading

1. Read a wide range of age-appropriate fiction and nonfiction materials.

See reading list and resources, [this page](#).

2. Evaluate works of literature through discussion, debate, and written critique.

3. Expand upon knowledge of the classics.

Suggestions for students at this grade level include William Shakespeare's *Romeo and Juliet* and *Antony and Cleopatra*; Dylan Thomas's *Under Milkwood*; Anton Chekhov's *The Seagull*; and selections from Greek, Roman, and Norse mythology.

4. Read and respond to a varied range of poetic forms.

Celebrate National Poetry Month in April. See the American Academy of Poets (www.poets.org), which features a searchable database of poems. Try writing a poem a day for thirty days.

Making Your Own Days

Kenneth Koch. Touchstone, 1999.

All about the language of poetry, with an anthology of ninety poems chosen to illustrate crucial points.

The Poetry Handbook

Mary Oliver. Mariner Books, 1994.

How a poem is built, using examples from well-known poets.

Writing

By now, kids should have mastered the elements of English grammar, sentence structure, syntax, and spelling. Writing studies should concentrate

on refining skills, perfecting style, and developing a distinctive personal voice.

According to the Common Core standards, kids by this age should be developing proficiency in three types of essay writing: argumentative, informational, and narrative. Almost certainly the best way to learn here is to read excellent essays. The Best American series (Mariner Books) publishes annual collections of the year's best in several genres, including essays, short stories, sports writing, and science and nature writing.

The Art of Writing Fiction: Notes on the Craft for Young Writers

John Gardner. Vintage, 1991.

A classic filled with astute observations on the process of writing fiction, what to watch out for, and what to remember—namely, “there are no rules for real fiction.”

Models for Writers

Albert Rosa and Paul Eschholz. Bedford/St. Martin's, 2015.

All about the various types of essays, with multiple excellent examples, discussion questions, and suggested writing projects. Highly recommended.

1. Write frequently and for many purposes, producing a range of works including reports, essays, short stories, poems, narratives, journal entries, and business and personal letters.

Kids should be able to use an ordered writing process, involving pre-writing, drafting, revising, editing, proofreading, and publishing. They should be able to produce well-organized research reports, gathering information from a variety of sources, citing these appropriately, and including a stylistically correct bibliography.

NaNoWriMo

nanowrimo.org

The acronym stands for National Novel Writing Month, which takes place annually in November. Adult participants commit to

producing a fifty-thousand-word novel in the thirty days of November. Younger writers in grades K–12 set lesser goals but adhere to the same time schedule. See ywp.nanowrimo.org for more information.

2. Be familiar with the use of standard writers' reference works.

Kids should be able to use dictionaries, thesauri, quotations collections, style manuals, and usage handbooks. A good choice here is the *Oxford American Writer's Thesaurus* (Oxford University Press, 2012) which—unlike *Roget's International Thesaurus*, which groups words according to category—simply lists words in alphabetical order, dictionary-style.

3. Use word processing and publishing software.

4. Survey the history of the English language.

An option for kids at this grade level is a survey of how the English language has evolved over time. Kids might study samples of literature from various periods in the history of English; review how English has been shaped by social, cultural, and geographical influences over time; and study the effects of such innovations as the printing press and the dictionary.

Haggard Hawks and Paltry Poltroons

Paul Anthony Jones. Constable & Robinson, 2013.

The origins of English in ten words—that is, ten words derived from each of a large number of categories, including horses, sports, weapons, people, and places in ancient Greece.

The Mother Tongue

Bill Bryson. William Morrow, 2001.

“More than 300 million people in the world speak English,” Bryson's witty history of English begins, “and the rest, it sometimes seems, try to.” There follows a quote from a Yugoslavian hotel:

“The flattening of underwear with pleasure is the job of the chambermaid.”

From the Great Courses ([this page](#)), see *The History of English* (thirty-six lectures), *The Story of Human Language* (thirty-six lectures), and *English in America* (twelve lectures). Available for download or on DVD or CD.

Listening and Speaking Skills

1. Listen and respond to various oral presentations.

Try plays, skits, poetry and prose readings, speeches, storytelling sessions, and lectures. Check the schedules of local colleges and universities, which often offer excellent presentations, lecture series, and drama programs that are open to the public.

Kids should be able to analyze the material presented and ask substantive and appropriate questions. They should also be able to listen critically, evaluating oral presentations and media messages for bias, persuasiveness, propaganda, fallacies, opinion expressed as fact, and unsubstantiated generalizations.

2. Make well-organized oral presentations to a group.

Kids might offer to do a talk at a local public library or community center.

3. Analyze historically significant speeches.

Examples might include Lincoln’s Gettysburg Address, Martin Luther King Jr.’s “I Have a Dream,” and Sojourner Truth’s “Ain’t I a Woman?”

Study Skills

1. Obtain information from a wide range of reference sources, including print and online resources,

interviews, and site visits.

2. Practice effective study techniques.

A good resource for high-school-level students is William Armstrong's classic *Study Is Hard Work* (David R. Godine, 2010). Sample chapters include "Learning to Listen," "Getting More from What You Read," and "Written Work," plus separate chapters on how to study math, science, history, and languages.

Mathematics

Reputable standard textbooks will cover basic algebra requirements.

Generally recommended are *Elementary Algebra* (Harold R. Jacobs; Master Books, 2016) and *Algebra: Structure and Method* (Richard G. Brown et al.; McDougal Littell, 2000).

The Heart of Mathematics: An Invitation to Effective Thinking

Edward B. Burger and Michael Starbird. Wiley, 2012.

This textbook concentrates on creative and critical thinking with a math basis, targeted at college-level students who are not majoring in math. Interesting, mind-expanding, and even (a rarity for math books) funny.

Also by Burger and Starbird, see *Coincidences, Chaos, and All That Math Jazz* (W. W. Norton, 2006).

A Mind for Numbers

Barbara Oakley. Tarcher/Perigee, 2014.

Subtitled *How to Excel at Math and Science Even if You Flunked Algebra*, this book emphasizes that there are multitudinous learning strategies for solving math problems.

Also see math reading list, [this page](#).

History and Geography

A common study for grade nine is world history, from prehistory to 1000 CE. This should involve a range of resources and approaches, including fiction and nonfiction books, multicultural myths and legends, biographies of key historical figures, magazines and historical journals, maps, online resources, videos, hands-on investigations, and field trips. While a history textbook can serve as a useful summary and reference point, it shouldn't be your sole resource. Many kids, by their high school years, are ready for adult popular histories, of which there are many.

A comparative study of popular world history texts sponsored by the Thomas B. Fordham Institute (2004) found *World History: People and Nations* (Sue Miller, ed.; Holt, Rinehart & Winston, 2000) to be the top pick, based on such criteria as accuracy, organization, use of primary sources, interest level, and graphics.

A History of the World in 100 Objects

Neil MacGregor. Penguin, 2013.

From the hand-axe to the credit card, each with several pages of interesting explanation. An appendix of maps shows where each of the featured objects came from.

There are many other books that use a similar format, among them *History of the World in 1,000 Objects* (DK, 2014) and *The Smithsonian's History of America in 101 Objects* (Richard Kurin; Penguin, 2016).

A People's History of the World

Chris Harman. Verso, 2017.

Described as the world history equivalent of Howard Zinn's popular *A People's History of the United States* (HarperCollins, 2017), this book covers people and events from the Stone Age to the new millennium.

Sapiens

Yuval Noah Harari. Harper Perennial, 2018.

A fascinating and information-packed history of humankind.

Ways of the World

Robert Strayer and Eric W. Nelson. Bedford/St. Martin's, 2015.

Recommended for AP world history courses. Each chapter concludes with a list of primary sources, encouraging an exploratory and inquiry-based approach to history.

The World in Ancient Times

Various authors. Oxford University Press, 2005.

Each volume in the series includes photos, period artwork, sourced quotations, and an interesting text targeted at grades seven through ten. Individual titles are:

The Early Human World (Peter Robertshaw and Jill Rubalcaba)

The Ancient Near Eastern World (Amanda H. Podany)

The Ancient Egyptian World (Eric H. Cline)

The Ancient Chinese World (Terry Kleeman)

The Ancient Greek World (Jennifer T. Roberts)

The Ancient Roman World (Ronald Mellor)

The Ancient South Asian World (Jonathan Mark Kenoyer and Kimberley Heuston)

The Ancient American World (William Fash and Mary E. Lyons)

From the Great Courses ([this page](#)), see *History of the Ancient World: A Global Perspective*, a forty-eight-lecture course by Professor Gregory Aldrete of the University of Wisconsin, available for download or on DVD or CD.

1. The development of the earliest human communities and the beginnings of agriculture.

Topics include the paleontological evidence for human ancestry, the distinctions between anthropology and archaeology, techniques of anthropological and archaeological research, hunter-gatherer societies, toolmaking and the discovery of fire, and the rise of agrarian societies.

To really appreciate the Stone Age, try making an atlatl or starting a fire from scratch.

2. The first great civilizations.

Topics include the civilizations of Mesopotamia, Egypt, the Indus River Valley, and China; the social, political, religious, and economic features of each; and the development of writing.

Ancient Lives, available on DVD, is a superb account of life in ancient Egypt by archaeologist John Romer.

Also see Bob Brier's *History of Ancient Egypt* from the Great Courses (www.thegreatcourses.com).

3. The history of ancient Greece, 2000 BCE–300 BCE.

Topics include the social, political, and economic features of ancient Greek civilization; Greek mythology and religion; the birth of democracy; the Persian and Peloponnesian Wars; the Golden Age of Athens; Greek science, literature, art, architecture, and philosophy; and Alexander the Great and the spread of the Hellenes.

Mythology: Timeless Tales of Gods and Heroes

Edith Hamilton. Grand Central Publishing, 2011.

A classic retelling of Greek mythology.

The Naked Olympics

Tony Perrottet. Random House, 2004.

An engrossing account of the original Olympic Games (“the Woodstock of antiquity”).

The Penelopiad

Margaret Atwood. Canongate, 2006.

Odysseus's story from the point of view of Penelope.

Till We Have Faces

C. S. Lewis. HarperOne, 2017.

A retelling of the myth of Cupid and Psyche.

War Music

Christopher Logue. Farrar, Straus and Giroux, 2018.

A remarkable take on the *Iliad*, mixing translation, adaptation, and invention.

4. The history of ancient Rome, 700 BCE–500 CE.

Topics include the social, political, and economic features of ancient Rome; Roman mythology and religion; the Roman Republic; the Roman Empire; the origin and spread of Christianity; Roman science, literature, art, architecture, philosophy, and law; and the decline and fall of the Roman Empire.

Pair with a reading of Shakespeare's *Julius Caesar*.

The Emperors of Rome

David Potter. Quercus, 2016.

From Julius Caesar on, with great color illustrations.

I, Claudius

Robert Graves. Vintage, 1989.

The fictionalized autobiography of Claudius, who survived Augustus, Tiberius, and Caligula, to become emperor.

SPQR

Mary Beard. Liveright, 2013.

A sweeping history of ancient Rome, filled with interesting details.

HBO's two-season *Rome* (2005) is a gripping saga set in the first century BCE during the transition from republic to empire, with a

large cast of characters, some real and some fictional.

5. The rise of Islam, the Crusades, and the meeting of East and West.

Topics include the origin, doctrines, and spread of Islam; the social, political, and economic features of the Islamic nations; the multiple causes of the conflict between Muslims and Christians; the Crusades; and the impact of Arab culture on Western civilization.

1001 Inventions and Awesome Facts from Muslim Civilization

National Geographic, 2012.

A beautifully illustrated compendium of inventions and discoveries from the Muslim world from the seventh century on, among them the elephant water clock, chess, algebra, and coffee.

The House of Wisdom: How Arabs Transformed Western Civilization

Jonathan Lyons. Bloomsbury, 2010.

After the fall of Rome, with Europe plunged into the Dark Ages, the Arab world was a great center of learning.

6. The Byzantine Empire.

Topics include the establishment of Constantinople; the social, political, and economic features of the Byzantine Empire; the codification of Roman law under the emperor Justinian; the split between the Greek Orthodox and Roman Catholic branches of the Christian church; Byzantine art and architecture; and the impact of the Byzantine Empire on Russia and eastern Europe.

7. The great civilizations of Africa, Asia, and the Americas.

Topics include the social, political, economic, and religious features of the major eastern and western African kingdoms; the social, political, economic, and religious features of ancient India; Hinduism; the introduction of Islam to India; the social, political, economic, and religious

features of ancient China and Japan; the principal tenets of Buddhism, Confucianism, Taoism, and Shintoism; and the social, political, economic, and religious features of early civilizations in the Americas, including the Olmecs, Maya, Aztecs, and Incas.

8. Identify global trends from 4000 BCE to 1000 CE.

As well as details, facts, stories, and individual personalities, kids should study history in a broad sense, tracing population movements, the spread of religions, the multifaceted effects of technological and social developments, and the like. For these studies they should use maps and timelines, along with other references and research sources.

9. Incorporate geography into history studies. Kids should understand and be able to give examples of the major influences of geography upon civilization.

Globalization

Carla Mooney. Nomad, 2018.

An overview of the ramifications of globalization, with exercises and projects designed to enhance critical thinking.

In the same series, see *Human Migration* (Judy Dodge Cummings, 2016).

Prisoners of Geography: Ten Maps That Explain Everything About the World

Tim Marshall. Scribner, 2016.

How geography shapes politics from Russia, China, and Africa to the Arctic.

News

See [this page](#).

Science

Often ninth-grade science concentrates on the earth and space sciences: astronomy, geology, and meteorology. As you look for resources, don't underestimate popular collections of science essays—they're not textbooks, with the public school seal of approval, but they're generally much better written and far more interesting.

Earth and Space Sciences for NGSS (Tracy Greenwood et al.; Biozone, 2016) is a textbook specifically designed to align with the Next Generation Science Standards ([this page](#)). Emphases include “crosscutting”—that is, interconnections among core scientific topics; an engineering design component that encourages real-world problem-solving; and mathematical analysis and interpretation of experimental data.

1. The science of the solar system.

Topics include Big Bang cosmology and its supporting evidence; the compositions of the sun and the terrestrial and gas planets; theories of the origin of the moon; the effects of asteroid impacts on earth, moon, and planets; planetary orbits and retrograde motion; Kepler's laws; the relationship between Earth's tilt, orbital position, and the seasons; moon phases; and lunar and solar eclipses.

Planetary Science

Matthew Brenden Wood. Nomad, 2017.

A creatively designed survey of the solar system, with cartoons, fact boxes, primary sources, and activities intended to promote inquiry and investigation.

The Planets

Dava Sobel. Penguin, 2006.

The origins and oddities of the planets through popular culture, literature, art, music, biography, and history.

2. The earth in the universe.

Topics to cover include the composition of stars and galaxies; the classification of stars; the life histories of stars and the origins of the heavy elements; Hertzsprung-Russell diagrams; astronomical instruments, including reflecting, refracting, radio, and X-ray telescopes; and the measurement of astronomical distances.

Cosmos

Carl Sagan. Ballantine Books, 2013.

Fourteen billion years of cosmic history. One of the most popular science books of all time.

Cosmos: The Infographic Book of Space

Stuart Lowe and Chris North. Aurum, 2015.

Space in numbers and graphics, from the beginnings of space exploration to the ends of the universe.

Night Watch

Terence Dickinson. Firefly, 2006.

Viewing guides for the naked eye, binoculars, or small telescopes, with a great series of star charts.

Secrets of the Night Sky

Bob Berman. William Morrow, 1996.

Berman's astronomy essays are fun, informative, and fascinating. Check out his many other titles.

3. The structure of the earth.

Topics include the shape of the earth, including polar flattening and equatorial bulge; the circumference of the earth, including measurements from the experiments of Eratosthenes to modern times; the structure of the earth's internal layers; the earth's magnetic field; and gravity.

Annals of the Former World

John McPhee. Farrar, Straus and Giroux, 2000.

A geological trip across the United States. Winner of the Pulitzer Prize.

The Map That Changed the World

Simon Winchester. Harper Perennial, 2009.

The story of William Smith—the canal digger who discovered stratigraphy—and the birth of modern geology.

The Story of Earth: The First 4.5 Billion Years, from Stardust to Living Planet

Robert M. Hazen. Penguin, 2013.

A popular history of planet Earth, from the Big Bang on.

The Story of the Earth in 25 Rocks

Donald R. Prothero. Columbia University Press, 2018.

Chapters include “Volcanic Tuff: Vulcan’s Wrath: The Eruption of Vesuvius,” “Coal: The Rock That Burns Fires the Industrial Revolution,” and “Moon Rocks: Green Cheese or Anorthosite? The Origin of the Moon.”

4. Plate tectonics.

Topics include the history and evidence for the theory of plate tectonics; tectonic processes, including subduction, rifting, seafloor spreading, continental collision, and mountain formation; the relationships among volcanoes, earthquakes, and plate boundaries; the structure of the ocean floor; earthquakes and the Richter scale; and classification and features of volcanoes. Names to know include Charles Lyell and Alfred Wegener.

By Simon Winchester, see *A Crack in the Edge of the World* (2013), the story of the great California earthquake of 1906; and *Krakatoa* (2005), the story of the phenomenal volcanic eruption of 1883.

5. Rocks and minerals.

Topics include a survey of the most common elements and the most abundant minerals in the earth’s crust; common rock types; economically

valuable minerals; the identification of rocks and minerals, including key properties and basic crystal systems; the rock cycle; the fossil record and the geologic time scale; and fossil fuels. Be familiar with the Mohs scale of mineral hardness.

Stoned

Aja Raden. Ecco, 2016.

An absorbing account of how eight jewels shaped history. What makes a jewel precious? Discover why glass beads weren't a bad exchange for Manhattan, and learn the truth about Marie Antoinette's incriminating diamond necklace.

6. The hydrologic (water) cycle.

Topics include clouds, precipitation, sources of fresh water on and under the earth, water capacity of soils and groundwater zones, the relationship between slope and runoff velocity, the causes and effects of erosion; streams and rivers; flooding; and the source of minerals and salts in seawater.

7. Oceans.

Topics include a survey of oceans as complex interactive systems, topographic features of the ocean floor, the layer structure of ocean waters, waves and currents, the Coriolis effect, the effects of ocean currents on climate, and the causes and effects of sea level and polar ice cap variations. Understand the dangers of ocean pollution, overfishing, and coral-reef bleaching.

Moby-Duck

Donovan Hohn. Penguin, 2012.

In 1992, thousands of bath toys were lost at sea. Where did they go and why?

Plastic Ocean

Charles Moore. Avery, 2012.

The story of the researcher who discovered the Great Pacific Garbage Patch.

8. The atmosphere.

Topics include the structure of atmospheric layers, measurements and studies of atmospheric changes over geologic time, the origin of atmospheric oxygen, the causes and effects of variations in carbon dioxide concentration, atmospheric regulation mechanisms, the ozone layer and its disruption, and the atmospheres of other planets.

Caesar's Last Breath

Sam Kean. Little, Brown, 2017.

A fascinating science and history of the air we breathe, from the periodic table to the stratosphere, and from Cleopatra to the Moulin Rouge.

9. Energy transfer patterns and the dynamics of earth systems.

Topics include the internal energy of the earth; solar energy and its effects and uses; the causes and consequences of the greenhouse effect; the differential heating and circulatory patterns of the atmosphere and oceans; the effect of the earth's rotation on wind and ocean currents; the causes and effects of temperature inversions; climatic zones; the effects of geologic and geographic features on climate; the interaction of wind, ocean currents, and mountain ranges in the formation of global weather patterns; the distinctions between weather and climate; weather prediction; and climate changes over time.

The Boy Who Harnessed the Wind

William Kamkwamba. William Morrow, 2010.

The story of the Malawian boy who built a windmill to supply his village with electricity and running water. Also available in a Young Readers Edition.

10. Biogeochemical cycles.

Topics include the carbon cycle (photosynthesis and respiration); the global carbon cycle, including the transfer of carbon in the atmosphere, oceans, biomass, and fossil fuels; and the nitrogen cycle.

11. The earth sciences at home.

Students should relate the principles learned in earth science studies to geographical features of their home states.

See the Roadside Geology series (Mountain Press) for state-by-state field guides.

Foreign Language

See [this page](#).

The Arts

Visual Art

1. Apply knowledge of art elements and principles of design to produce a wide range of creative artworks.

2. Analyze and critique artworks.

3. Study art in conjunction with other academic subjects across the curriculum.

Art studies might be correlated with a chronological progression through world history, using a range of sources. Topics to cover include prehistoric

art; the first architecture, including dolmens, menhirs, and cromlechs; Mesopotamia, including ziggurats and bas-reliefs; the art and architectures of ancient Egypt, Greece, and Rome; pre-Columbian art and architecture in the Americas; early African art; and Byzantine art and architecture.

Art That Changed the World

DK, 2013.

A lavishly illustrated chronological overview of art from ancient times to the present, emphasizing key artworks and paintings that inspired major art movements.

Heilbrunn Timeline of Art History

www.metmuseum.org/toah

From the Metropolitan Museum of Art, an illustrated timeline of art and culture through images from the museum collection.

Movies: *Frida* (2002), the story of the life of Frida Kahlo (R); *Pollock* (2000), the life and career of abstract artist Jackson Pollock (R); *Girl with a Pearl Earring* (2003), the story of a young peasant girl working in the household of painter Johannes Vermeer (PG-13); *Mr. Turner* (2014), the life of eccentric British painter J. M. W. Turner (R); *Woman in Gold* (2015), the story of a woman's quest to recover a Klimt painting stolen from her family by the Nazis (PG-13); and *The Monuments Men* (2014), the story of the World War II platoon whose mission was to rescue artworks from the Nazis (PG-13).

Music

In Michelle Falkoff's *Playlist for the Dead* (HarperTeen, 2016), Sam's friend Hayden is dead, leaving behind only a playlist of songs and a suicide note. Each chapter begins with one of Hayden's song titles.

Music project: try making playlists of your own to accompany books on your reading list.

1. Use and understand musical concepts studied in the earlier grades.

Kids should know musical notation and musical terms, and be familiar with scale patterns, intervals, chord progressions, and musical forms.

2. Recognize and identify the major orchestral families and their individual instruments, keyboard instruments, historical instruments, and ethnic instruments by both sight and sound.

3. Listen and respond to a range of musical pieces.

Kids should be able to identify musical genres, use their knowledge of musical concepts to analyze and critique assorted selections, and pair selected compositions with the appropriate composer.

4. Identify and classify musical selections according to historical and cultural context.

Kids should be able to arrange musical pieces and their composers on timelines; associate musical selections with historical periods and with cultural and social developments; and should read biographies of representative composers.

5. Participate in instrumental and vocal performances, both group and solo.

6. Create and play original musical compositions.

7. Study music in conjunction with other academic subjects across the curriculum.

Movies: *Amadeus* (1984), the life of Mozart as told by his jealous rival Salieri (R); *Ray* (2004), the life of rhythm and blues musician

Ray Charles (PG-13); *Coal Miner's Daughter* (1980), the story of country singer Loretta Lynn (PG); *The Competition* (1980), the story of a piano competition (with romance) (PG); and *La Vie en Rose* (2007), the life of French singer Edith Piaf (PG-13).

Drama

Caleb was a committed drama student by high school. In most communities, there are a range of opportunities for homeschoolers, including local theater groups—which often have roles for young actors, as well as various volunteer positions—and in many states homeschoolers can participate in drama activities at the public schools. Caleb performed in many plays with community theaters; he was also able to join the drama club at the local high school, where he acted in several plays—including a starring role in *The Music Man*—and took classes in drama.

Josh was interested in playwriting. Some of his one-act plays were performed by local drama groups, and he hosted a public-access TV project producing and performing plays by local playwrights. At this age, Josh also started writing weekly movie reviews for the local newspaper—at first for free, later for pay. This continued through his four years of college.

Public access television, available in most communities, is open to the public and is a great resource for homeschoolers. Stations provide free studio facilities and classes for those who want to produce their own television shows.

Philosophy and Comparative Religion

See [this page](#).

Health and Physical Education

As of middle and high school, our sons began taking fencing lessons, offered at a community co-op, and had begun playing racquetball. All also enjoyed hiking—Ethan joined a mountain climbing group—biking, and kayaking.

Other non-school-based options for physical education include local gyms and fitness centers, schools of dance, yoga and Zumba groups, gymnastics, swimming, bowling, tennis, jogging, biking, and sports team participation at community recreation centers.

American Red Cross

www.redcross.org

Classes for a range of ages in babysitting and childcare, CPR, first aid, lifeguarding, and more.

Life Skills

When to get a job? By the age of 16, kids are officially eligible for paying work, though certain hourly restrictions apply. Popular part-time jobs for teens include waitstaff positions, dishwasher, grocery store bagger or stocker, cashier, salesperson, lifeguard, camp counselor, tutor or teacher assistant, lawn maintenance worker, and babysitter.

Snagajob, at www.snagajob.com, is a database of job listings with pages just for teens; for general job listings, see Indeed at www.indeed.com.

What Color Is Your Parachute? For Teens

Carol Christen and Richard N. Bolle. Ten Speed Press, 2015.

A career guide for teens, modeled on the popular adult book of the same name. Information on how to identify interests and skills in preparation for choosing a college major and future job.

Computer and Technology Skills

Continue to develop computer and technology skills from previous grades.

Computers: helpmates or potential threats? Read and discuss.

The Age of Spiritual Machines

Ray Kurzweil. Penguin, 2000.

What will happen when computers become smarter than people? AI expert Kurzweil discusses plans for dealing with conscious machines.

The Diamond Age

Neal Stephenson. Spectra, 2000.

In a future where nanotechnology rules, a street urchin finds a stolen interactive book capable of reprogramming all of society.

Feed

M. T. Anderson. Candlewick, 2012.

Titus and friends all have computer chips implanted in their heads. When Titus's feed malfunctions during a party trip to the moon, he lands in the hospital, where he meets the bright and unconventional Violet, who has decided to fight the feed.

The Most Human Human

Brian Christian. Anchor, 2012.

Each year the artificial intelligence community administers the Turing test to the latest in software design, attempting to assess whether or not a computer can think. Given the same test, could you prove that you're human?

The Moon Is a Harsh Mistress

Robert Heinlein. Orb, 1997.

In a parallel to the American Revolution, the residents of the former Lunar penal colony rebel against the Lunar Authority that controls it

from Earth—with the help of a supercomputer that has become sentient.

The Thrilling Adventures of Lovelace and Babbage

Sydney Padua. Pantheon, 2015.

A graphic novel about the invention of the first computer—and an exciting alternative reality in which Lovelace and Babbage go on to use their difference engine to alter the economy, battle spelling errors, and fight crime.

See skills list, [this page](#).

Engineering

See previous grades.

CHAPTER 16

Grade Ten

Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it.

—SAMUEL JOHNSON

Language Arts

Literature

The Great Books program for high school ([this page](#)) includes classical and contemporary literature, both fiction and nonfiction, chosen for their thought-provoking discussion potential. The First Series, recommended for tenth graders, includes “Why War?” by Sigmund Freud, “The Melian Dialogue” by Thucydides, “The Social Me” by William James, and “Rothschild’s Fiddle” by Anton Chekhov.

1. Read a wide range of age-appropriate fiction and nonfiction materials.

See reading list, [this page](#).

2. Evaluate works of literature through discussion, debate, and written critique.

3. Expand upon knowledge of drama, classic and contemporary.

Recommendations for tenth graders include William Shakespeare's *Henry V* and *The Taming of the Shrew*, Sophocles's *Antigone*, Lillian Hellman's *Watch on the Rhine*, Arthur Miller's *All My Sons*, and Eugene O'Neill's *Mourning Becomes Electra*.

4. Read and respond to a varied range of poetic forms.

Writing

Writing at the high school level includes specialized concentrations such as creative writing, nonfiction writing, and journalism. Writing may also be integrated with literature courses.

See *Models for Writers* ([this page](#)).

1. Write frequently and for many purposes, producing a range of works including reports, essays, short stories, poems, narratives, journal entries, and business and personal letters.

2. Be familiar with the use of standard writers' reference works.

3. Use word processing and publishing software.

4. Expand upon knowledge of the history of the English language.

Listening and Speaking Skills

- 1. Listen and respond to various forms of oral presentations.**
- 2. Participate in group discussions both as a speaker and as a listener.**
- 3. Make well-organized oral presentations to a group.**
- 4. Analyze historically significant speeches.**

See *Lend Me Your Ears: Great Speeches in History* by William Safire (W. W. Norton, 2004), a collection of over two hundred famous speeches from the ancient Greeks to the present.

Study Skills

- 1. Obtain information from a wide range of reference sources, including print and online sources, interviews, and site visits.**
- 2. Practice effective study techniques.**

Students in tenth grade have the option to take the PSAT (Preliminary Scholastic Aptitude Test) in the fall semester. Useful, should you decide to tackle this, is a PSAT prep workbook with sample questions and practice tests.

Mathematics

Common recommendations for tenth grade math are Algebra II, Geometry, or Business Mathematics. Any reputable textbook will cover the required basic concepts.

Recommended textbooks include *Geometry* (Harold R. Jacobs; W. H. Freeman, 1987) and *The Art of Problem Solving* (Sandor Lehoczky and Richard Rusczyk; AoPS Inc., 2006). Also see the math reading list, [this page](#).

History and Geography

A common choice for tenth graders is World History II (1000 CE to modern times), which builds upon the previous year's world history studies. As always, homeschoolers should select their course of study based upon their children's interests and goals.

Annual Editions

McGraw-Hill

Each book in this series is a collection of articles from a range of magazines, journals, and other sources, all pertaining to a general topic. Titles include *American Government*, *Anthropology*, *Archaeology*, *Economics*, *Geography*, *Microbiology*, *World History*, and many more.

The World History I edition, for example, includes articles from such sources as *Vanity Fair*, *Discover*, *Science News*, *Smithsonian* magazine, and *The New York Times*.

History: From the Dawn of Civilization to the Present Day

Adam Hart-Davis. DK, 2015.

A beautifully illustrated visual history supplemented with timelines, images of artifacts, photographs, graphics, and more.

1. The world in 1000 CE.

Topics include the social, political, and economic aspects of feudalism; trade, commerce, and the rise of towns; the importance of the guilds; the major countries and leaders of pre-1000 western Europe; the major countries and leaders of Byzantium and the Middle East; the cultures and kingdoms of India, China, and Japan; the cultures and kingdoms of the Americas and Africa; the role of the Catholic Church in western and eastern Europe; the Vikings; and the conflicts between Christians and Muslims.

See Robert Lacey's *The Year 1000: What Life Was Like at the Turn of the First Millennium* (Little, Brown, 1999).

2. The late Medieval period.

Topics include major political and social developments in Spain, France, England, and Russia; the Crusades; the Mongol invasions and conquests; the rise of the Ottoman Turks; and the causes and consequences of the Black Death.

Genghis Khan and the Making of the Modern World

Jack Weatherford. Broadway Books, 2005.

Weatherford argues that Genghis Khan and his Mongol army were instrumental in creating the modern world by linking medieval Europe to the cultures of Asia.

Life in a Medieval Castle

Joseph and Frances Gies. HarperPerennial, 2015.

The history and daily life of a castle, filled with interesting facts and human interest. See *Life in a Medieval Village*, *Life in a Medieval City*, and other titles by the same authors.

A Morbid Taste for Bones

Ellis Peters. Mysterious Press, 2014.

The first in the Chronicles of Brother Cadfael series, in which a medieval monk and ex-Crusader solves mysteries. Also see the TV series starring Derek Jacobi as Brother Cadfael.

Terry Jones' Medieval Lives

Terry Jones. BBC Books, 2005.

The human stories behind the typical medieval roles of peasant, knight, damsel, monk, outlaw, merchant, physician, and king.

The Time Traveler's Guide to Medieval England

Ian Mortimer. Touchstone, 2011.

A helpful handbook for visitors to the fourteenth century.

A World Lit Only by Fire

William Manchester. Little, Brown, 1993.

"In the year 1500, after a thousand years of neglect, the roads built by the Romans were still the best on the continent." A fascinating account of how the contentious and wasteful Middle Ages led to the Renaissance.

3. The Renaissance.

Topics include the rise of the Italian city-states; the blossoming of Renaissance art, architecture, literature, and science; Machiavelli and *The Prince*; and features of the Northern Renaissance.

Movies: See the TV series *The Borgias* (2011–2013), the dramatic story of the rise of the Borgias to power in the fifteenth century; and *The Agony and the Ecstasy* (1965), the story of Michelangelo and the painting of the Sistine ceiling (NR), based on the Irving Stone novel of the same name.

4. The Reformation.

Topics include background history and causes of the Reformation; key Reformation figures including Martin Luther and John Calvin; Henry VIII and the establishment of the Anglican Church; and the impact of the Reformation on Europe.

A Man for All Seasons

Robert Bolt. Vintage, 1990.

Bolt's play tells the story of Sir Thomas More's courageous but ill-fated conflict with Henry VIII.

The Tudors

G. J. Meyer. Bantam, 2011.

An exciting history of a famous dynasty, from Henry VII to Elizabeth I. Each chapter includes a section of background information.

The Tudors is a multi-part TV series on the reign and marriages of Henry VIII, starring Jonathan Rhys Meyers as a very handsome Henry. Well done, but definitely for mature audiences.

Movies: *Luther* (2003), with Joseph Fiennes in the title role (PG-13); *Elizabeth* (1998), with Cate Blanchett as the young queen (R), and *Elizabeth: The Golden Age* (2007), the story of the queen's later years (PG-13); *Anne of the Thousand Days* (1969), the story of Anne Boleyn (PG); and the film version of *A Man for All Seasons* (1988), with Charlton Heston as Sir Thomas More (NR).

5. Comparative religions worldwide.

Topics include monotheism and polytheism; a survey of major leaders, sacred writings, traditions and beliefs, and histories of Judaism, Christianity, Islam, Buddhism, and Hinduism; a survey of the geographic distributions of the world's great religions; political, social, and economic influences of the world's great religions; and major religious conflicts, past and present.

Comparative Religion

Carla Mooney. Nomad, 2015.

In the Inquire and Investigate series, this covers the cultural, spiritual, and geographical backgrounds of five major world religions, with fact boxes, cartoons, primary sources, and thought-provoking projects and activities.

Pagans

James J. O'Donnell. Ecco, 2016.

Subtitled *The End of Traditional Religion and the Rise of Christianity*, this is the story of how an oddball monotheistic religious cult became the official faith of Rome.

6. Exploration, expansion, and colonization.

Topics include the growth of the Ottoman Empire; the Mughals in India; explorations and settlements by Europeans in the Americas (Spanish, French, English, and Portuguese); contacts with Asia; early settlement patterns; the impact of cultural and social exchanges, including the Columbian exchange; the effects of colonization on native peoples; the slave trade; and the rise of mercantilism.

7. The ages of Absolutism, enlightenment, and revolution.

Topics include absolute monarchism in Europe, the reign of Louis XIV in France, the tsars of Russia, the impact of the Glorious Revolution, the curtailment of the monarchy, the science and philosophy of the Enlightenment, the American and French Revolutions, and the rise and fall of Napoleon.

Movies: *Master and Commander* (2003) (PG-13) and the TV miniseries *War and Peace* (2007).

8. The Industrial Revolution.

Topics include the rise of industrial economies; Western imperialism in Africa and Asia; the social, political, and cultural impact of science and technology; the rise of capitalism and free enterprise economies; and the rise of socialism and communism.

9. The Age of Imperialism.

Topics to cover include the takeover of Africa, British imperialism in India and Asia, western expansion in the United States, independence movements

in Latin America and Mexico, and the opening of Japan.

10. The twentieth century.

Topics include the causes, events, and effects of World War I; the Russian Revolution; the rise of totalitarianism in Germany, Italy, Japan, and the Soviet Union; the worldwide economic depression of the 1930s; the causes, events, and effects of World War II; the Holocaust; political and social revolutions in Asia; independence of Asian and African colonies; the Korean and Vietnam Wars; the Cold War; the space race; and the breakup of the Soviet Union.

A World Undone

G. J. Meyer. Bantam, 2007.

An outstanding history of the Great War, in which the narrative alternates with supplemental background information on such topics as the Serbs, the Romanovs, and the Ottoman Turks.

The Guns of August

Barbara Tuchman. Random House, 1994.

Beginning with the funeral of Edward VII, this is the story of the causes and outbreak of World War I. A Pulitzer Prize winner.

Tuchman's other World War I histories are *The Proud Tower* and *The Zimmermann Telegram*.

Fiction books to accompany studies of World War I include Erich Maria Remarque's *All Quiet on the Western Front* and Ernest Hemingway's *A Farewell to Arms*.

Movies: *Lawrence of Arabia* (1962), the story of the English officer who united the Arab tribes during World War I and led them against the Turks (PG); *Sergeant York* (1941), the classic starring Gary Cooper in which an unlikely hillbilly sharpshooter becomes a war hero (NR); *The African Queen* (1951), starring Katharine Hepburn and Humphrey Bogart, in which a disreputable riverboat captain and a straitlaced missionary set out to attack a German warship (PG); *The Blue Max* (1966), the story of a young German

fighter pilot (NR); and Steven Spielberg's *War Horse* (2011), the story of a World War I cavalry horse (PG-13).

11. Modern times.

The rise of technology, social networking, and its global effects; the resurgence of terrorism; war in the Middle East; the Arab Spring; the global economy; and the impact of climate change.

12. Continue geography studies; pair geography with other subjects.

Longitude

Dava Sobel. Bloomsbury, 2007.

The story of John Harrison, the clockmaker who solved the eighteenth century's most pressing problem: how to measure longitude.

Also see the TV series *Longitude* (2000), the parallel stories of Harrison and the modern-day horologist restoring his original clocks.

Science

A common pick for tenth-grade science is a year-long course in biology.

Recommended textbooks include *Biology: How Life Works* (James Morris et al.; W. H. Freeman, 2015) and *Biology: The Core* (Eric J. Simon; Pearson, 2016). Also see Robert Bruce Thompson's *Illustrated Guide to Home Biology Experiments* (Maker Media, 2012), which has instructions for setting up a home biology lab and performing a range of substantive experiments.

The Biology Coloring Book

Robert D. Griffin. Collins Reference, 1986.

An informative text paired with sophisticated coloring for scientists.

Froguts

www.froguts.com

An online subscription service of virtual dissections, including frog, starfish, cow eye, and fetal pig.

Also see dissection ([this page](#)).

1. Structure and function of the cell.

Topics include cell theory; the structure and function of the cell membrane; enzymes and their functions; prokaryotic cells, eukaryotic cells, viruses, and prions; the concept of the central dogma of molecular biology (that is, information flows from DNA to RNA to protein); cellular organelles and the process of protein synthesis; the structure and function of chloroplasts and mitochondria; and the processes of photosynthesis and respiration.

2. Principles of inheritance: Mendelian genetics.

Topics include the historical background of the study of heredity; the work of Gregor Mendel; basic genetic terminology; the distinction between genotype and phenotype; autosomal and X-linked characteristics; and methods for calculating probabilities of inheritance from generation to generation.

3. Principles of inheritance: cellular and molecular genetics.

Topics include the processes of mitosis and meiosis; chromosomes and genes; crossing over and nondisjunction; recombination frequencies and genetic maps; DNA structure and genetic coding; the processes of transcription, translation, and protein synthesis; epigenetics; and genetic engineering.

The Gene

Siddhartha Mukherjee. Scribner, 2017.

An absorbing history of the gene by the author of the Pulitzer Prize–winning *The Emperor of All Maladies*, on the history and science of cancer.

Genome

Matt Ridley. HarperPerennial, 2006.

The story of the human genome, chromosome by chromosome.

The Manga Guide to Molecular Biology

Masaharu Takemura et al. No Starch Press, 2009.

Rin and Ami are sent to a very unusual summer school, and end up teleported into a human cell. Real science in comic-book form.

Mutants

Armand Marie Leroi. Penguin, 2005.

The story of the genetic code and the unusual people—the mutants—who have revealed the secrets of heredity, from Croatian dwarves to Cyclops kids, born with one eye in the middle of their foreheads.

She Has Her Mother's Laugh

Carl Zimmer. Dutton, 2018.

A fascinating overview of the science and history of heredity, filled with unusual information and human interest.

4. The theory of evolution.

Topics include the historical background of evolutionary theory, including the work of Charles Darwin and Alfred Russel Wallace, biological and geological evidence for the theory, mutation and natural selection, Hardy-Weinberg equilibrium, and evolution and biodiversity.

The Beak of the Finch

Jonathan Weiner. Vintage, 1995.

The Pulitzer Prize–winning story of Darwin's Galapagos finches.

Ever Since Darwin

Stephen Jay Gould. W. W. Norton, 1992.

This is the first of evolutionary biologist Gould's many excellent science essay collections. Check out "A Biological Homage to Mickey Mouse," a clever account of the evolution of Mickey, found both online and in Gould's *The Panda's Thumb* (2010).

The Selfish Gene

Richard Dawkins. Oxford University Press, 2016.

Now a science classic, this explains how we're simply vehicles for gene replication.

Also by Dawkins, see *The Blind Watchmaker* (2015) and many other titles.

Movies: see *Creation* (2009), on Charles Darwin and the writing of *Origin of Species* (PG-13); and David Attenborough's documentary *Charles Darwin and the Tree of Life* (2009).

5. Classification of living things.

Topics include the Linnaean system of binomial nomenclature and a survey of the five kingdoms of living things and their characteristics.

The Diversity of Life

E. O. Wilson. Belknap, 2010.

The story of evolution, speciation, and extinction on our planet, this last brought on by five cataclysmic events—and Wilson warns we may be facing a sixth, caused by ourselves.

Life

Richard Fortey. Vintage, 1999.

The natural history of the first four billion years of life on earth.

The Photo Ark

Joel Sartore. National Geographic, 2017.

One man's quest to document all the world's animals.

The Tangled Tree

David Quammen. Simon & Schuster, 2018.

Quammen explains how new advances in DNA research are changing our understanding of evolution.

Movies: David Attenborough's many excellent documentaries deal with the vast diversity of life, among them *The Life of Birds* (1998), *The Private Life of Plants* (1995), and *The Life of Mammals* (2002–2003).

6. Human anatomy and physiology.

Topics include the structure and functions of the basic body systems.

Gulp

Mary Roach. W. W. Norton, 2014.

A funny, fact-filled, and occasionally icky story of the human digestive tract.

Human Errors

Nathan H. Lentz. Houghton Mifflin Harcourt, 2018.

We're not perfect. All about our various biological glitches, from our susceptibility to colds to our junk-filled genome.

See What I'm Saying

Lawrence D. Rosenblum. W. W. Norton, 2011.

The amazing story of the extraordinary and unexpected powers of our five senses.

The Way We Work

David Macaulay. Houghton Mifflin Harcourt, 2008.

How the human body works, from atoms and molecules through cells, tissues, and organs, illustrated with Macaulay's superb diagrams and drawings.

Your Inner Fish

Neil Shubin. Vintage, 2009.

Subtitled *A Journey into the 3.5-Billion-Year History of the Human Body*. Also see the PBS documentary of the same name (2014).

7. Ecology.

Topics include biodiversity, the major components of a biological community, food chains and food webs, the principles of population growth, a survey of the major biomes of the world, and evaluation of the impact of human beings on the environment.

Around the World in 80 Trees

Jonathan Drori. Laurence King, 2018.

How trees play a role in every aspect of human life. A great tie-in to geography.

Last Chance to See

Douglas Adams. Ballantine, 1992.

In this funny and heart-wrenching book, Adams and zoologist Mark Carwardine travel the world in search of endangered animals.

Pilgrim at Tinker Creek

Annie Dillard. HarperPerennial, 2007.

The classic story of a year with nature in Virginia's Roanoke Valley.

The Sixth Extinction

Elizabeth Kolbert. Picador, 2015.

Over the past half a billion years, there have been five mass extinctions—and the human impact on the planet may be carrying us toward a sixth.

Photosynthesis

Blue Orange

An award-winning green strategy board game in which players plant and shape an ever-changing forest. For two to four players ages 10 and up.

Foreign Language

The best way to learn a foreign language may be to go where it's spoken and speak it.

AFS-USA

www.afsusa.org

International student exchange programs in forty different countries.

Council on International Educational Exchange (CIEE)

www.ciee.org

A wide range of summer, semester, year-long, and other study abroad programs for high school, college, and postgraduate students.

National Geographic Expeditions

ngstudentexpeditions.com

Travel programs for middle and high school students ages 13 and up.

Travel for Teens

www.goabroad.com/providers/travel-for-teens

Nearly a hundred different travel programs for teens in a wide range of countries.

Also see resources, [this page](#).

The Arts

Visual Art

1. Apply knowledge of art elements and principles of design to produce a wide range of creative artworks.

2. Analyze and critique artworks from a wide range of sources.

3. Study art in conjunction with other academic subjects across the curriculum.

Music

For serious young musicians, check out summer camps and programs. The Boston University Tanglewood Institute (www.bu.edu/cfa/tanglewood), for example, offers intensive programs in orchestra, vocals, wind ensemble, piano, composition, and harp, along with two-week workshops devoted to individual instruments, from flute to double bass.

Drama

Check out summer acting camps for teens, or theater festivals that accept teen participants or volunteers.

New York Film Academy Summer Camps

www.nyfa.edu/summer-camps/teens/acting

SOCAPA: School of Creative and Performing Arts

www.socapa.org/teen-camps/acting-camps

Philosophy and Comparative Religion

See [this page](#).

Health and Physical Education

Add some science to your exercise program:

The Sports Gene

David Epstein. Portfolio, 2014.

Are sports stars genetic freaks—or normal people who have spent ten thousand hours or more in obsessive training? A wide-ranging look at the science of athletics.

Life Skills

Driver's education requirements vary from state to state; check with your local Department of Motor Vehicles. Commonly kids can get a learner's permit at age 15 and can qualify for a formal license at 16. Often teenagers and new drivers are required to have had a class in driver's education. These are routinely offered at local high schools, and—depending on the state—homeschoolers can often enroll. An alternative is to attend a class at a licensed professional driving school. In some states, kids have the option to take a class online.

From my homeschool journal (Caleb is 16):

Caleb is taking a driver's ed class from a driver's school in town; they meet for three hours in the evenings, and then schedule in-car driving practice during the day. Caleb's notebook is a running commentary on the class and instructor. "She has just spent half an hour explaining left turns. The only thing that is keeping me alive is the hope of pizza for supper."

Computer and Technology Skills

Continue to build on existing computer and technology skills.

See skills list, [this page](#).

Engineering

There are many how-to books on building robots, drones, and other devices for a wide range of skill levels. And try some connections to literature.

Making Simple Robots

Kathy Ceceri. Maker Media, 2016.

Step-by-step illustrated directions for making cool robots out of simple stuff.

Do Androids Dream of Electric Sheep?

Philip K. Dick. Del Rey, 2017.

Can you tell the difference between the living and the machine? The basis for the 1982 science-fiction film *Blade Runner*.

Edison's Eve

Gaby Wood. Anchor, 2003.

A history of robotics, from eighteenth-century automata to the present.

R.U.R.

Karel Čapek. Penguin, 2004.

Written in 1920, this acclaimed play—which first coined the word *robot*—is the story of a robot rebellion.

CHAPTER 17

Grade Eleven

The growth of understanding follows an ascending spiral rather than a straight line.

—JOANNA FIELD

Language Arts

Literature

The Great Books program for high school ([this page](#)) includes “Politics” by Aristotle, “Of Commonwealth” by Thomas Hobbes, “Sorrow-Acre” by Isak Dinesen, “Habit” by William James, and “The Overcoat” by Nikolai Gogol. Each selection is accompanied by a list of discussion questions intended to promote critical thinking.

1. Read a wide range of age-appropriate fiction and nonfiction.

See reading list, [this page](#).

2. Evaluate works of literature through discussion, debate, and written critique.

3. Expand upon knowledge of drama, classic and contemporary.

Recommendations for this grade level often include William Shakespeare's *Othello*, Oliver Goldsmith's *She Stoops to Conquer*, Sean O'Casey's *Juno and the Paycock*, George Bernard Shaw's *Saint Joan*, Tom Stoppard's *Rosencrantz and Guildenstern Are Dead*, and J. M. Synge's *The Playboy of the Western World*.

If you've got access to a community theater, keep an eye on their schedule. Often discounts are available for season tickets or reduced rates for younger children.

4. Read and respond to a variety of poetic forms.

The Classic Hundred Poems (William Harmon, ed.; Columbia University Press, 1998) is a collection of the most frequently cited poems in English anthologies, with interesting annotations. (Number one is William Blake's "The Tyger.")

Writing

1. Write frequently and for many purposes, producing a range of works including reports, essays, short stories, poems, narratives, journal entries, and business and personal letters.

Try writing in all academic disciplines, including math, science, history, and the arts.

See William Zinsser's *Writing to Learn* (Harper Perennial, 1993), which demonstrates how writing is a highly effective means of learning, with many examples from all academic disciplines.

2. Be familiar with the use of standard writers' reference works.

3. Use word processing and publishing software.

4. Expand upon knowledge of the history of the English language.

Listening and Speaking Skills

1. Listen and respond to various forms of oral presentations.

2. Participate in group discussions, both as a speaker and as a listener.

Does your town hold town meetings? Take your kids.

3. Make well-organized oral presentations to a group.

How about teaching an online class? If your teenagers have a skill they'd like to share—anything from pottery-making to science experiments to book talks—they might consider creating instructional YouTube videos. Create your own television programs via public-access TV.

Study Skills

1. Obtain information from a wide range of reference sources, including print and online sources, interviews, and site visits.

2. Practice effective study techniques.

In the fall of eleventh grade, students commonly take the PSAT (Preliminary Scholastic Aptitude Test), which prepares them for the college admissions tests (SAT I or ACT) to be taken the following year, either in the spring semester of eleventh grade or the fall semester of twelfth. In view of this, many students find test preparation and practice manuals helpful.

Mathematics

A common recommendation for eleventh graders is intermediate algebra and trigonometry or a pre-calculus course that integrates algebra, geometry, trigonometry, and mathematical analysis. Most standard textbooks fulfill the listed requirements.

A recommended textbook is *Intermediate Algebra* (Margaret L. Lial et al.; Pearson, 2015).

Also see the math reading list, [this page](#).

History and Geography

A common choice for eleventh grade is a survey of American history. There are many supplementary titles, both fiction and nonfiction, for each topic. A few suggestions follow, but do some research and see what works for you. Have your kids create their own reading lists.

Recommended textbooks include *The American Pageant* (David M. Kennedy and Elizabeth Cohen; Cengage Learning, 2015) and *The Unfinished Nation: A Concise History of the American People* (Alan Brinkley; McGraw-Hill, 2015)—though recall that many progressive historians strongly urge not teaching history from a textbook.

America's Women

Gail Collins. William Morrow, 2007.

A four-hundred-year history of women in America, from the Virginia tobacco brides through Rosie the Riveter and the rise of feminism.

A Different Mirror

Ronald Takaki. Back Bay, 2008.

A history of multicultural America in the voices of Native Americans, African Americans, Jewish Americans, Irish Americans, Asian Americans, Latinos, and more.

A People's History of the United States

Harold Zinn. Harper Perennial, 2015.

American history from the bottom up—our story from the point of view of women, factory workers, African Americans, Native Americans, and immigrants.

These Truths: A History of the United States

Jill Lepore. W. W. Norton, 2018.

The intertwined story of American politics, law, journalism, and technology.

Twenty-Five Books That Shaped Our National Identity

Thomas C. Foster. Harper Perennial, 2011.

From Benjamin Franklin's *Autobiography* ("Maybe Just a Little Made-Up") through *Walden*, *Moby-Dick*, *Huckleberry Finn*, *On the Road*, and *To Kill a Mockingbird*.

1. Prehistory to the Age of Discovery.

Topics include the civilizations of pre-Columbian America, the arrival of the Europeans, the first settlements, and the impact of European settlement on the Native Americans.

1491

Charles C. Mann. Vintage, 2006.

An astonishing look at the Americas before Columbus. Pair this one with Mann's *1493* (2012), the story of the massive global changes engendered by Columbus's arrival in the New World.

Mayflower

Nathaniel Philbrick. Penguin, 2007.

A wonderful retelling of the Pilgrim story. It's not what you might expect.

The Wordy Shipmates

Sarah Vowell. Riverhead, 2009.

A fun-to-read take on the history of the Puritans.

2. The colonial period.

Topics include the social, political, and economic features of the colonial period; the causes and effects of the French and Indian War; British colonial policies and their implications; the Declaration of Independence; and the Revolutionary War.

1776

David McCullough. Simon & Schuster, 2005.

A narrative of a momentous year, told from both sides.

Lin-Manuel Miranda's *Hamilton* isn't the only musical set in the Revolutionary War period; there's also, for example, Sherman Edwards's *1776*—but it's certainly the most famous. Best, of course, is to see the play. Also available on CD.

Pair with Ron Chernow's biography *Alexander Hamilton* (Penguin, 2005).

3. The new nation.

Topics include the Constitution and the Bill of Rights, the organization of the national government, the development of the political party system, the Louisiana Purchase, the causes and events of the War of 1812, the Monroe

Doctrine, westward expansion and its impact on the Native Americans, the Missouri Compromise, the Erie Canal and the transcontinental railroad, the Mexican War, the California Gold Rush, the opening of Japan, the Kansas-Nebraska Act, and the abolitionist movement.

4. Civil War and Reconstruction.

Topics include the background and causes of the Civil War, states' rights and secession, major events and leaders of the Civil War, and Reconstruction politics and their impact.

Confederates in the Attic

Tony Horwitz. Vintage, 1999.

The legacy of the Civil War and its continuing impact today.

John Brown's Body

Stephen Vincent Benét. Ivan R. Dee, 1990.

The story of the Civil War in a phenomenal epic poem, filled with wonderful characters.

The Killer Angels

Michael Shaara. Ballantine, 2010.

A superb fictionalized account of the Battle of Gettysburg.

Kindred

Octavia Butler. Beacon, 2004.

Dana, a modern African American woman, is suddenly transported back in time to the antebellum South. What was it like to be a slave? Terrifying and thought-provoking.

To Be a Slave

Julius Lester. Puffin Books, 2000.

First-person narratives of what it was like to be a slave. A painful and unforgettable part of our national heritage.

Movies: Ken Burns's documentary *The Civil War* (PBS, 2015), originally broadcast in 1990, is a must-see. Also see *Amistad*

(1997, R); *Gone with the Wind* (1939, NR) (see [this page](#)); *Gettysburg* (1993; PG); *Cold Mountain* (2003; R); *12 Years a Slave* (2013, R); and *Lincoln* (2012), with Daniel Day-Lewis as Lincoln (PG-13).

5. The Industrial Revolution.

Topics include immigration and its effects, landmark inventors and inventions, the impact of new technologies in transportation and communication, the effect of industrialization and urbanization on American society, and late nineteenth-century reform movements.

6. World War I and the Great Depression.

Topics include the United States and its rising role as a world power, the causes and major events of World War I, the causes and effects of the Great Depression, and Franklin Delano Roosevelt and the New Deal.

Dead Wake

Erik Larson. Broadway Books, 2016.

The story of the *Lusitania*, told in the alternating voices of William Turner, the ship's captain, and Walther Schwieger, captain of the pursuing German submarine.

Flu

Gina Kolata. Touchstone, 2001.

The story of the influenza pandemic of 1918 and the search for the virus that caused it.

The Guns of August

Barbara Tuchman. Presidio Press, 2004.

The Pulitzer Prize-winning classic about the outbreak of World War I. Sequels are *The Proud Tower* and *The Zimmermann Telegram*.

USA Trilogy

John Dos Passos. Mariner, 2013.

The three books in the series use a mix of fictional narratives, newspaper collages, and song lyrics to cover the first three decades of the twentieth century. Titles are *The 42nd Parallel, 1919*, and *The Big Money*.

Also see Erich Maria Remarque's *All Quiet on the Western Front* (Ballantine, 1987) and Ernest Hemingway's *A Farewell to Arms* (Scribner, 2014).

Movies: *The First World War* (2003), a ten-part series, with excerpts by Winston Churchill, Isak Dinesen, Siegfried Sassoon, Rudolf Hess, and Woodrow Wilson; Ken Burns's *Prohibition* (PBS, 2011), a three-part documentary about the rise and fall of the Eighteenth Amendment, and his *Jazz* (PBS, 2001), a sweeping history beginning in nineteenth-century New Orleans.

From PBS's The American Experience series, *The Great War* (2017) draws on diaries, memoirs, and letters to tell the story of World War I through many different voices. See the PBS website at www.pbs.org.

The multi-season *Upstairs, Downstairs* (1971–1975) is the addictive story of the British Bellamy family and their servants from the early twentieth century through World War I.

Peter Jackson's *They Shall Not Grow Old* (2018) is a fascinating documentary about World War I, with impressive colorized footage of period film. Rated R.

7. World War II.

Topics include the rise of totalitarianism in Germany, Italy, and Japan; the causes and major events of World War II; the Holocaust; and the postwar role of the United States in international affairs.

Hiroshima

John Hersey. Vintage, 1989.

A journalistic masterpiece about the dropping of the atomic bomb, told in multiple voices.

Night

Elie Wiesel. Hill and Wang, 2006.

An autobiographical account of Wiesel's survival as a teenager in the Nazi death camps.

The Rise and Fall of the Third Reich

William L. Shirer. Simon & Schuster, 2011.

An acclaimed classic on the rise of Hitler, Nazi Germany, the Holocaust, and the events of World War II.

Slaughterhouse-Five

Kurt Vonnegut. Dial, 1999.

Centering on the World War II firebombing of Dresden, this is the story of veteran Billy Pilgrim, who has become unstuck in time.

Also for science fiction fans, see Connie Willis's award-winning *Blackout* (Spectra, 2010) and *All Clear* (Spectra, 2010), in which time travelers from a future Oxford University are marooned in World War II.

Also see Herman Wouk's *The Winds of War* (Back Bay Books, 2002) and *The Caine Mutiny* (Back Bay Books, 1992), and Joseph Heller's *Catch-22* (Simon & Schuster, 2011).

Movies: Ken Burns's *The War* (PBS, 2007), a documentary on World War II, beginning with Pearl Harbor, and *The Roosevelts* (2014); the TV miniseries *Band of Brothers* (2001), which follows a platoon of American soldiers from Operation Overlord to V-J Day (NR), based on the book of the same name by historian Stephen Ambrose; *Conspiracy* (2001), with Kenneth Branagh, the story of the Wannsee Conference in 1942 where German officials decided upon the "Final Solution" (R); *Judgment at Nuremberg* (1961), the story of the postwar Nazi war crimes trial (NR); *Schindler's List* (1993), set in German-occupied Poland, where Oskar Schindler attempts to save Jews from the Nazis (R); and *Enigma* (2001), the

fictionalized story of Bletchley Park and the breaking of the Nazi Enigma code (R).

8. Postwar foreign affairs.

Topics include the Korean and Vietnam Wars, the causes and effects of the Cold War, modern Middle Eastern policies, modern African policies, the space race, and the end of the Cold War and breakup of the Soviet Union.

The Best and the Brightest

David Halberstam. Ballantine, 1993.

A bestselling history of the Vietnam War.

In Pharaoh's Army

Tobias Wolff. Vintage, 1995.

A National Book Award finalist, this is a memoir of Wolff's experiences in Vietnam.

The Things They Carried

Tim O'Brien. Mariner, 2009.

A now-classic work of war fiction centered around the Vietnam War.

Movies: Ken Burns's documentary *The Vietnam War* (PBS, 2017); *Fog of War* (2003), subtitled *Eleven Lessons from the Life of Robert S. McNamara* (PG-13); *Apocalypse Now* (1979, R); *Good Morning, Vietnam* (1987, R); *Full Metal Jacket* (1987, R); *The Deer Hunter* (1978, R); and *Born on the Fourth of July* (1989, R).

9. Postwar domestic affairs.

Topics include the impact of the civil rights movement, the women's liberation movement, and the contrast between conservative and liberal economic strategies.

Movies: *Malcolm X* (1992), a biography of the black nationalist leader, starring Denzel Washington (PG-13); *Mississippi Burning*

(1988), in which FBI agents arrive in a southern town to investigate the disappearance of civil rights activists (R); *Selma* (2014), the story of Martin Luther King Jr.'s epic march from Selma to Montgomery, Alabama, in a campaign to secure equal voting rights in 1965 (PG-13); and *Thirteen Days* (2000), a gripping story of the Cuban missile crisis (PG-13).

10. Modern times.

Topics include the effect of the personal computer, the internet, and social media; terrorism and 9/11; the wars in the Middle East; the Human Genome Project; immigration issues; and the impact of climate change.

11. Continue geography studies; pair history topics with geography.

Atlas Obscura

www.atlasobscura.com

Joshua Foer et al. Workman, 2016.

Subtitled *An Explorer's Guide to the World's Hidden Wonders*, this is a fascinating tour of the world, from the glowworm caves of New Zealand to Virginia's Great Stalacpipe Organ and the South African pub built inside a baobab tree.

How the States Got Their Shapes

Mark Stein. Smithsonian, 2008.

Find out why Oklahoma has a panhandle and much more.

Maphead

Ken Jennings. Scribner, 2012.

A tour of the weird world of geography wonks, from geocaching to inventing imaginary kingdoms.

On the Map

Simon Garfield. Avery, 2013.

An absorbing history of maps from their beginnings to the age of satellites and smartphones.

Science

A common choice for eleventh grade is a one-year course in chemistry.

Chemistry in the Community (American Chemical Society, W. H. Freeman, 2014), is an excellent issues-based text centered on real-world problems, recommended for all levels of high school students. Kids investigate, analyze data, and make measured decisions on a wide range of topics.

Also see Robert Bruce Thompson's *Illustrated Guide to Home Chemistry Experiments* (Maker Media, 2008), which has detailed instructions for equipping a home laboratory, step-by-step instructions for experiments, explanations, and review questions.

Chemistry and Science Fiction

Jack H. Stocker, ed. ACS, 1999.

All about chemistry in the world of science fiction, from Arthur Conan Doyle to Ray Bradbury.

ChemMatters

www.acs.org

From the American Chemistry Society, a terrific high-school-level magazine dedicated to demystifying chemistry in everyday life. Interesting topics and experiments.

ReAction! Chemistry in the Movies

Mark A. Griep and Marjorie L. Mikasen. Oxford University Press, 2009.

There's more chemistry in the movies than you might think, from Dr. Jekyll on.

The Right Chemistry

Joe Schwarcz. Doubleday, 2012.

Short, catchy essays on the chemistry of everyday life.

Also by Joe Schwarcz, see *That's the Way the Cookie Crumbles*, *The Genie in the Bottle*, and other titles.

Also see *Theodore Gray's Completely Mad Science* (Black Dog & Leventhal, 2016), subtitled *Experiments You Can Do at Home but Probably Shouldn't*.

1. Principles of chemical investigation.

Topics include laboratory techniques and safety procedures; scientific measurement; and concepts of accuracy, precision, and significant figures.

2. Atomic structure and the periodic table.

Topics include atomic structure (historical and quantum models) and subatomic particles; the organization and components of the periodic table; concepts of atomic mass, weight, and number; isotopes; and electron configurations and oxidation numbers.

Also see Sam Kean's *The Disappearing Spoon* and Penny LeCouteur's *Napoleon's Buttons* from the science reading list ([this page](#)).

Molecules at an Exhibition: Portraits of Intriguing Molecules in Everyday Life

John Emsley. Oxford University Press, 1999.

Also by Emsley, see *Nature's Building Blocks: An A–Z Guide to the Elements* (Oxford University Press, 2011) and *Molecules of Murder* (Royal Society of Chemistry, 2015).

Uncle Tungsten

Oliver Sacks. Vintage, 2002.

Sacks's fascinating memoir of his chemistry-laden boyhood.

3. Chemical formulas and equations.

Topics include chemical formulas (molecular, structural, empirical, and Lewis diagrams); balancing chemical equations; ionic and covalent bonds; basic types of reactions; physical and chemical equilibria; and reaction rates and kinetics.

4. Molar relationships.

Topics include Avogadro's principle, stoichiometric relationships, the gas laws, and acid/base theory.

5. Kinetic theory.

Topics include pressure, temperature, and volume relationships; phase changes; the heats of fusion and vaporization; specific heat capacity; and the properties of solutions.

6. Other areas of chemistry.

Topics include organic chemistry, biochemistry, electrochemistry, nuclear chemistry, and environmental chemistry.

A Field Guide to Radiation

Wayne Biddle. Penguin, 2012.

All kinds of radiation described in short, alphabetized entries, from actinium and acute radiation syndrome to zirconium.

The Radioactive Boy Scout

Ken Silverstein. Villard, 2005.

The true story of a bright Boy Scout and his homemade nuclear reactor.

Uranium

Tom Zoellner. Penguin, 2010.

A wide-ranging biography of the rock that shaped the world—from medieval mining problems to nuclear war.

Foreign Language

A key skill in learning foreign language is the ability to translate from one language to another.

Le Ton Beau de Marot

Douglas Hofstadter. Basic Books, 1998.

By a cognitive scientist, this creative book on language centers on the translation of an essentially untranslatable poem by sixteenth-century French poet Clément Marot.

Found in Translation

Nataly Kelly. Tarcher/Perigee, 2012.

Translation is everywhere, from NASA to the United Nations to your favorite Chinese restaurant. Learn about the immense impact of translation on daily life.

The Language Hoax

John H. McWhorter. Oxford University Press, 2016.

McWhorter takes on the Sapir-Whorf hypothesis, which argues that the language we speak shapes our perception of the world.

The Language Instinct

Steven Pinker. Harper Perennial, 2007.

How language works, how we learn it, and how it changes and evolves.

In the Land of Invented Languages

Erika Okrent. Spiegel & Grau, 2010.

A history of invented languages, from Esperanto to Klingon.

Is That a Fish in Your Ear?

David Bellos. Farrar, Straus and Giroux, 2012.

How do we ever know that we understand what someone else says?

Trip of the Tongue

Elizabeth Little. Bloomsbury, 2012.

A trip across America in search of the languages and cultures that shape us.

Also see resources, [this page](#).

The Arts

Visual Arts

1. Apply knowledge of art elements and principles of design to produce a range of creative artworks.

2. Analyze and critique artworks from a range of sources.

3. Identify and classify artworks according to historical and cultural context.

4. Study art in conjunction with other academic subjects across the curriculum.

Bright Earth

Philip Ball. University of Chicago Press, 2003.

How art, chemistry, and technology have interacted throughout history to give us colors.

Color

Victoria Finlay. Random House, 2004.

A history of the palette, combining history, geography, art, culture, and human-interest stories.

Mauve

Simon Garfield. W. W. Norton, 2002.

How a young English chemist isolated a shade of purple from coal tar that revolutionized fashion and the dye industry.

Music

For a link to history studies, survey the music of the Civil War and of World Wars I and II.

Drama

For a link to history, plays set in World War II include Michael Frayn's *Copenhagen* (Anchor, 2000), the story of a 1941 meeting between physicists Werner Heisenberg and Niels Bohr; and Lillian Hellman's *Watch on the Rhine*, found in *Six Plays by Lillian Hellman* (Vintage, 1979).

Philosophy and Comparative Religion

Heads Up Philosophy (DK, 2014) covers the big questions in philosophy, along with the major big answers, plus short biographies of famous philosophers. For example, "What Is Knowledge?" includes biographies of David Hume and Immanuel Kant; "What Is Reasoning?" features biographies of Aristotle and Ludwig Wittgenstein.

See resources, [this page](#).

Health and Physical Education

See [this page](#), [this page](#).

Life Skills

See [this page](#), [this page](#).

Computer and Technology Skills

A rewarding project for many teens is to start and maintain a blog. Blogs are versatile websites that can be structured as anything from online diaries to book or game reviews, short stories, cartoons, travelogues, how-to guides, or science and nature observations.

For example see WordPress at wordpress.com for creating a domain name and customizable blogs and websites. See skills list, [this page](#).

Engineering

There are many summer programs in engineering, electronics, computer science, and robotics for interested high-school-level students, such as UCLA's Game Lab Summer Institute (games.ucla.edu), the Boeing High School Scholars Program at Embry-Riddle Aeronautical University, Brown University's STEM II program, and MIT's summer program series.

TryEngineering

tryengineering.org

A pre-university engineering education resource sponsored by IEEE, IBM, and the New York Hall of Science. Included are thousands of free lesson plans and activities, categorized by age.

For a tie-in to history, see these works by David McCullough: *The Great Bridge* (Simon & Schuster, 1983), the story of the engineering feat that produced the Brooklyn Bridge; *The Path Between the Seas* (1978), the story of the Panama Canal; and *The Wright Brothers* (2015), the history of Wilbur, Orville, and the airplane.

Movie: Ken Burns's *Empire of the Air: The Men Who Made Radio* (PBS, 2002).

CHAPTER 18

Grade Twelve

Education is the movement from darkness to light.

—ALLAN BLOOM

In twelfth grade, kids ordinarily apply to college, plan for a gap year, or make other decisions about their futures. Options are legion. In addition to or instead of traditional two- or four-year college programs, kids may decide to travel, participate in internships or volunteer programs, try an apprenticeship, tackle a business of their own, and/or embark upon a homeschool/college experience via distance learning.

There are numerous handbooks for guiding kids through the process of college admission applications, essay writing, interviewing, and preparing a transcript.

Language Arts

Literature

The Great Books program for high school ([this page](#)) includes “On Happiness” by Aristotle, “Habits and Will” by John Dewey,

“Crito” by Plato, “On Liberty” by John Stuart Mill, “A Hunger Artist” by Franz Kafka, and “A Room of One’s Own” by Virginia Woolf. Each selection is accompanied by thought-provoking discussion questions.

1. Read a wide range of age-appropriate fiction and nonfiction.

See reading list, [this page](#).

New Sudden Fiction

Robert Shapard, ed. W. W. Norton, 2007.

A collection of short-short stories from a wide range of authors.

Points of View: An Anthology of Short Stories

James Moffett, ed. Berkley, 1995.

Short stories by a wide range of authors, grouped by voice, from first-person interior monologues to third-person narration.

2. Evaluate works of literature through discussion, debate, and written critique.

3. Expand upon knowledge of drama, classic and contemporary.

Recommendations for twelfth graders include William Shakespeare’s *Hamlet*, Henrik Ibsen’s *A Doll’s House*, and *Oedipus* by Sophocles.

4. Read and respond to a varied range of poetic forms.

The Voice That Is Great Within Us

Hayden Carruth, ed. Bantam, 1983.

Recommended collection of twentieth-century American poetry.

Writing

- 1. Write frequently and for many purposes, producing a range of works including reports, essays, short stories, poems, narratives, journal entries, and business and personal letters.**
- 2. Be familiar with the use of standard writers' reference works.**
- 3. Use word processing and publishing software.**

Listening and Speaking Skills

- 1. Listen and respond to various forms of oral presentations.**
- 2. Participate in group discussions, both as a speaker and as a listener.**
- 3. Make well-organized oral presentations to a group.**

Study Skills

- 1. Obtain information from a wide range of sources, including print and online sources, interviews, and site visits.**
- 2. Practice effective study techniques.**

In the fall of twelfth grade, students commonly take standardized college admissions tests (SAT I and/or ACT), as well as a battery of optional SAT II tests in specific academic subjects. Some students find test preparation handbooks and practice tests to be helpful.

Mathematics

Math choices for twelfth grade depend on the individual student's learning pace, career goals, and interest. Some may decide not to pursue math beyond geometry or intermediate algebra; others may study pre-calculus in twelfth grade rather than eleventh. Twelfth graders with a strong interest in mathematics, science, and technology might at this point take an introductory course in calculus.

Any reputable textbook will cover the basics of pre-calculus or calculus. Commonly recommended are *Thomas' Calculus* (Joel R. Hass, et al.; Pearson, 2017) and *Calculus: The Language of Change* (David W. Cohen and James M. Henle; Jones and Bartlett, 2005).

From the Great Courses ([this page](#)), see *Understanding Calculus*, taught by Bruce Edwards of the University of Florida, a thirty-six-lecture introduction.

Movie: For inspiration, see *Stand and Deliver* (1988), the story of Jaime Escalante, the high school teacher who inspired his at-risk students to learn calculus (PG).

Also see the math reading list, [this page](#).

History and Geography

Depending on school system requirements and individual student interests, some kids may want to complete four years of history/geography courses; others may be satisfied with less. A common choice for twelfth graders is a one-year course in civics or American government. A recommended textbook is *Magruder's American Government* (Prentice Hall, 2013), in which the core text is supplemented with primary sources, political cartoons, photos, and infographics. Available in print and digital formats.

What Unites Us

Dan Rather. Algonquin, 2017.

A collection of thoughtful essays on the defining features of America, grouped under the topics of freedom, community, exploration, responsibility, and character.

It's Your World—If You Don't Like It, Change It

Mikki Halpin. Simon Pulse, 2004.

You can make a difference. Activism for teenagers. Get involved!

Movies about law: *Adam's Rib* (1949), in which Katharine Hepburn and Spencer Tracy play opposing lawyers (NR); *12 Angry Men* (1957), in which Henry Fonda fights to prevent a miscarriage of justice (NR); *Witness for the Prosecution* (1957), with Charles Laughton as a British barrister, based on the Agatha Christie novel (NR); *To Kill a Mockingbird* (1962), with Gregory Peck as lawyer Atticus Finch, the superb film version of Harper Lee's novel (NR); *Inherit the Wind* (1960), the story of the Scopes Monkey Trial (NR); *Erin Brockovitch* (2000), the story of the single mother who fought the power company polluting a California city's water (R); *Philadelphia* (1993), in which a man with AIDS is unfairly fired from his law firm and takes the case to court (PG-13); *A Few Good Men* (1992), in which a military lawyer defends Marines accused of murder (R); Steven Spielberg's *Amistad* (1997), in which the participants in a slave revolt are taken to court (R); and *Judgment at Nuremberg* (1961), the story of the Nazi war crimes trial (NR).

Movies about politics and government: *Dave* (1993), in which an upright temp agency owner fills in for an unscrupulous president (PG-13); *Mr. Smith Goes to Washington* (1939), in which Jimmy Stewart fights political corruption on the floor of the Senate (NR); *All the King's Men* (2006), based on the life of Louisiana governor Huey Long (PG-13); George Cukor's *Born Yesterday* (1950), in which a tycoon's showgirl girlfriend learns American history (NR); *All the President's Men* (1976), the story of the Watergate scandal (PG); *The Candidate* (1972), in which a California candidate for Senate runs up against the realities of politics (PG); *Wag the Dog* (1997), in which a spin doctor and a Hollywood producer fabricate a war to cover up a presidential sex scandal (R); and *Good Night and Good Luck* (2005), in which journalist Edward R. Murrow sets out to bring down Senator Joe McCarthy (PG).

1. The United States Constitution.

Topics include the historical evolution of democracy; a survey of the principles of democracy as expressed by key political philosophers; political principles expressed in major American documents, such as the Declaration of Independence and the *Federalist Papers*; the Constitution and its amendments; and landmark Supreme Court interpretations of the Constitution.

In the We the People curriculum from the Center for Civic Education (www.civiced.org), students explore the Constitution through primary sources, critical-thinking exercises, discussion, and simulated congressional hearings.

2. Governmental institutions.

Topics include the structure, functions, and powers of executive, legislative, and judicial branches of the federal government; comparisons of federal, state, and local governments; and the concept of bureaucracy.

3. The political process.

Topics include the political party system, the politics of influence, interest groups and the media, political campaigns and the election process, and the responsibilities of citizenship.

4. National policy.

Topics include domestic policy, foreign policy, interstate commerce and international trade, governmental regulation, and the comparison of the political and economic systems of the United States to those of other nations.

Science

A common choice for twelfth-grade science students is a one-year course in physics. A top pick for textbooks is Paul G. Hewitt's *Conceptual Physics: The High School Physics Program* (Prentice Hall, 2009), which features reader-friendly explanations, colorful diagrams and illustrations, interesting examples, and suggestions for hands-on explorations. Topics covered are mechanics, heat, electricity and magnetism, waves, the atom, chemistry, earth science, and astronomy.

Physics for Future Presidents

Richard A. Muller. W. W. Norton, 2009.

The science behind the headlines.

Also by Muller, see *Energy for Future Presidents* (2013).

The Physics of Star Trek

Lawrence M. Krauss. Basic Books, 2007.

Cloaking? Warp speed? Dilithium crystals? Find out what's possible.

The Physics of Superheroes

James Kakalios. Avery, 2006.

From Superman to Storm, find out which comic book writers got it right scientifically and which got it wrong.

Six Easy Pieces

Richard P. Feynman. Basic Books, 2011.

The essentials of physics explained, including the scoop on matter and atomic processes, basic and quantum physics, and the relation of physics to other disciplines, from biology to psychology. Take “easy” with a grain of salt.

Storm in a Teacup

Helen Czerski. W. W. Norton, 2018.

The fascinating physics behind everything from popping popcorn to ducks’ feet.

1. Force and motion.

Topics include Newton’s first, second, and third laws; the universal law of gravitation; concepts of circular motion; vectors; and trajectories.

2. Conservation of momentum and energy.

Topics include the distinctions between kinetic and potential energy; a survey of the various kinds of energy; elastic and inelastic collisions; and specific heat.

3. Thermodynamics.

Topics include the laws of thermodynamics; properties of energy transfers; the concept of entropy; and the relationships among heat flow, work, and efficiency.

4. Oscillations and waves.

Topics include the distinction between transverse and longitudinal waves; concepts of wavelength, frequency, and speed; an overview of the electromagnetic spectrum; basic properties of waves (including

interference, diffraction, refraction, polarization, and the Doppler effect); and the wave and photon models of light.

5. Electricity and magnetism.

Topics include an overview of the basic features and concepts of electricity and magnetism; Ohm's law and Coulomb's law; power concepts; properties of resistors, capacitors, and transistors; the relationship between electric current and magnetic field; and the properties of plasmas.

6. Nuclear physics.

Topics include atomic structure, radioactivity and half-life, ionization, nuclear fission and fusion, and basic concepts of quantum physics.

Foreign Language

Middlebury Language Schools (www.middlebury.edu/lis) are intensive language immersion summer programs in eleven different languages for ages 18 to 80+. Applicants need to submit an official transcript and a recommendation letter and, if accepted, to take a pledge to use only their chosen language for the duration of the course. Scholarships are available. Also see resources, [this page](#).

The Arts

Local arts councils often have opportunities for teen volunteers and may be a source for mentors. For interested kids, contact painters, sculptors, potters, glassblowers, weavers, and other artists and craftspeople.

Health and Physical Education

Recommended for healthy adults: at least 150 minutes of moderate aerobic activity or 75 minutes of vigorous aerobic activity each week. Moderate exercise includes such activities as brisk walking or swimming; vigorous exercise includes running and aerobic dancing.

Also recommended: strength training for all major muscle groups at least twice a week.

As a general goal, aim for at least thirty minutes of physical activity every day.

Life Skills

See [this page](#), [this page](#).

Philosophy and Comparative Religion

See [this page](#).

Computer and Technology Skills

See skills list, [this page](#).

Epilogue

MOVING ON

No two families' homeschooling experiences are the same. In fact, no two homeschooled *kids* pursue an education in exactly the same way. You'll doubtless discover in the course of reading this book that not all the listed resources are just right for your kids—but not to worry. Flip ahead or back in the book, or check out alternatives, of which dozens of new ones pop up every day. And see many more at my website: www.rebeccaruppresources.com.

I wish you all kinds of luck in your homeschooling journey. Trust me—you'll do just fine.

Keep in touch!

For Randy
Who made it possible

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It's true that raising kids takes a village, and we're grateful to have had one.

ABOUT THE AUTHOR

REBECCA RUPP has published more than 200 articles in national magazines and nearly two dozen books, for both children and adults. She lives on Lake Champlain in northern Vermont, where she can see Canada from her back porch, and often threatens to go there after listening to the evening news. She has a very nice husband and three eccentric sons.



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