

## Engineering Resource List for Grades 5 through 8

The Resources in this document can be used with the Engineering Curriculum Packet for grades 5 through 8.

### Books

#### Non-fiction and Biography

- The Art of Construction: Projects and Principles for Beginning Engineers & Architects, 2000 by Mario Salvadori (Author), Saralinda Hooker (Illustrator), Christopher Ragus (Illustrator). Students discover the basic principles necessary to build all types of structures used in everyday life including bridges, skyscrapers, and other architectural gems. Line art illustrations help to explain projects that demonstrate how these principles keep structures solid.
- The Boy Who Harnessed the Wind: Young Readers Edition, 2015 by William Kamkwamba (Author), Bryan Mealer (Author), Anna Hymas (Illustrator). When a terrible drought struck William Kamkwamba's tiny village in Malawi, his family lost all the season's crops, leaving them with nothing to eat and nothing to sell. William began to explore science books in his village library, looking for a solution. There, he came up with the idea that would change his family's life forever: he could build a windmill. Made from scrap metal and old bicycle parts, William's windmill brought electricity to his home and helped his family pump the water they needed to farm the land.
- Bridges and Tunnels: Investigate Feats of Engineering with 25 Projects (Build It Yourself), 2012 by Donna Latham (Author), Jenn Vaughn (Illustrator). People have tackled seemingly insurmountable obstacles, including vast canyons and mountain ranges, to design and construct these amazing passageways. This book invites readers to explore the innovation and physical science behind structures our world depends on.
- Bridges: Amazing Structures to Design, Build & Test, 1999 by Carol A. Johmann (Author), Elizabeth Rieth (Author), Michael P. Kline (Illustrator). Describes different kinds of bridges, their history, design, construction, and effects on populations, environmental dilemmas, safety, and more.
- Building Big, 2000 by David Macaulay (Author). Why this shape and not that? Why steel instead of concrete or stone? Why put it here and not over there? These questions take you back to the basic process of design from which all structures begin, from the realization of a need for the structure to the struggles of the engineers and designers to map out and create the final construction.
- Built to Last, 2010 by David Macaulay (Author). As humans, we don't always build things to endure the test of time. This book describes buildings and designs that were crafted with a strength of structure and purpose that defy the everyday: Castle, Cathedral, and Mosque.

- Civil Engineering and the Science of Structures (Engineering in Action), 2012 by Andrew Solway (Author).  
Civil engineering is one of the oldest engineering fields. Civil engineers are involved in the design and construction of various structures, including high-rise buildings, sports stadiums, canals, dams, and bridges. This book gives readers an up-close look at the technology used to build various structures around the world, including the ancient pyramids, the Eiffel Tower, the Golden Gate Bridge, and modern skyscrapers.
- Construction Vehicles (How Machines Work), 2008 by Terry Jennings (Author).  
Describes in detail construction vehicles used in digging, paving, and general construction, and how they work.
- Design a Skyscraper (You Do the Math), 2015 by Hilary Koll (Author), Steve Mills (Author), Vladimir Aleksic (Illustrator).  
Find out what it takes to build high in the sky. Follow each stage of the project and complete the math exercises to build one of the world's tallest buildings! We're counting on YOU to do the math! Featuring maths problems from addition and decimals to line graphs and pie charts, these books have different challenges to be solved with a varying range of difficulty.
- Dream Jobs in Architecture and Construction, 2018 by Adrianna Morganelli (Author).  
Careers in architecture and construction involve designing, planning, managing, building, and maintaining structures. This book highlights a variety of specialized jobs with promising growth potential. Find out what path you need to follow in education and training to reach your dream job.
- Duct Tape Engineer: The Book of Big, Bigger, and Epic Duct Tape Projects, 2017 by Lance Akiyama (Author).  
In this book the author breaks away from tabletop crafts and shows you how to design, sculpt, and build backpacks, kayaks, catapults, a queen-size bed, and even a writing desk and chair with duct tape.  
Engineering: Feats and Failures (TIME FOR KIDS Nonfiction Readers), 2012 by Teacher Created Materials (Author).  
Engineers have built some incredible things. But with every new feat, there is failure. Readers will learn about engineering feats and failures like the Titanic, the Hindenburg, the Hoover Dam, and more in this engaging title. This book features brilliant images, charts, and intriguing facts in conjunction with informational text and mathematic skills to keep readers active and engaged.
- Hidden Figures Young Readers' Edition, 2016 by Margot Lee Shetterly (Author).  
Before John Glenn orbited the earth, or Neil Armstrong walked on the moon, a group of dedicated female mathematicians known as “human computers” used pencils, slide rules, and adding machines to calculate the numbers that would launch rockets, and astronauts, into space.
- I Want to Be an Engineer, 1997 by Stephanie Maze (Author).  
Various careers are explored, including civil, mechanical, and electrical engineering as well as robotics and animatronics, which creates many of the special effects used in movies.
- The Invention of the Assembly Line (Engineering That Made America), 2017 by Nikole Brooks Bethea (Author).  
Gives readers a behind-the-scenes look at the invention of the assembly line. Additional features include a table of contents, a Fast Facts spread, critical-thinking questions, primary source quotes and accompanying source notes, a phonetic glossary, an index, and sources for further research.

- St. Louis Architecture for Kids, 2001 by Lee Ann Sandweiss (Author), Phyllis Harris (Illustrator), Gen Obata (Photographer).  
This book showcases the beauty and the history of some of our sites and creates anticipation of visits all over the city.
- The Story of Buildings: Fifteen Stunning Cross-sections from the Pyramids to the Sydney Opera House, 2018 by Patrick Dillon (Author), Stephen Biesty (Illustrator).  
A highly readable book about architecture, lavishly illustrated with sixteen intricate cross sections. From straw huts to skyscrapers, palaces to arts centres, The Story of Buildings takes us on a journey across continents and over centuries. Patrick Dillon selects sixteen of the most iconic buildings from around the world including the Parthenon, Notre Dame Cathedral, the Taj Mahal, the Forbidden City, the Bauhaus, Crystal Palace, the Sydney Opera House and the Pompidou Centre, and tells the remarkable human story behind each of them.

## Fiction

- Ghostbusters: Ectomobile, 2017 by Troy Benjamin (Author), Marc Sumerak (Author), Ian Moores (Illustrator).  
Discover the secrets of the Ghostbusters' iconic specter-smashing automobile, Ecto-1, with this comprehensive owner's workshop manual. Along with a detailed breakdown of Ecto-1's capabilities and exclusive cutaway images that show the car's souped-up engine and onboard ghost-tracking equipment, the book also focuses on the Ghostbusters' portable tools of the trade, including proton packs, ghost traps, and PKE meters.
- The Invention of Hugo Cabret, 2007 by Brian Selznick (Author).  
Orphan, clock keeper, and thief, Hugo lives in the walls of a busy Paris train station, where his survival depends on secrets and anonymity. But when his world suddenly interlocks with an eccentric, bookish girl and a bitter old man who runs a toy booth in the station, Hugo's undercover life, and his most precious secret, are put in jeopardy. A cryptic drawing, a treasured notebook, a stolen key, a mechanical man, and a hidden message from Hugo's dead father form the backbone of this intricate, tender, and spellbinding mystery.
- Star Wars: Complete Vehicles, 2013 by DK (Author).  
This book is packed with visual explorations of more than fifty essential Star Wars spacecraft and landcraft, including the TIE bomber, Imperial shuttle, A-wing, B-wing, and more. Full-color cross-section artwork presents in-depth examinations of each craft's weapon systems, engines, hyperdrives, cockpits, and construction secrets.

## Magazines, Journals, Miscellaneous

- Bridges by Kids Discover  
The longest, widest, and tallest bridges in the world are featured in this issue, along with some elementary technical info for kids curious about how bridges are built. First, they'll learn about the three main types – beam, arch, and suspension — and how they work, and then they'll also check out some interesting variations, such as movable, seesaw, covered, and cable-stayed bridges.  
<https://www.kidsdiscover.com/shop/issues/bridges-for-kids/>

- OWL Magazine: The Entertaining, Informative, Challenging, and Inspiring Magazine for Preteens. OWL highlights elements of science, technology, engineering, art, and math to encourage kids to discover, explore, engage, and inspire.  
<https://shop.owlkids.com/products/owl-magazine-ages-9-13>

## Online Links

- Design Squad Global: Fun engineering problems encourage classroom competition, innovation.  
<https://pbskids.org/designsquad>
- Discover Engineering: DiscoverE offers a growing number of hands-on activities, videos, and other resources that volunteers, parents, and students can use to explore engineering. The site also introduces national engineering outreach programs.  
<http://www.discovere.org/>
- eGFI - Engineering Go for It: The eGFI website offers information about engineering careers and how to pursue them, including profiles of engineering students and professionals. Teachers also can find lesson plans, hands-on activities, and professional development opportunities.  
<http://www.egfi-k12.org/>
- EngineerGirl: Designed by the National Academy of Engineering, this fun and informative site celebrates women in engineering and allows girls to explore what engineers do. It also offers resources to parents, teachers and mentors.  
<http://www.engineergirl.org/>
- Tinkercad: Amazingly simple yet powerful online CAD tool turns kids into makers.  
<https://www.tinkercad.com/#>

## Background information for the Educator

- National Center for Technological Literacy: The National Center for Technological Literacy (NCTL) is led by the Museum of Science, Boston. The site provides a vast amount of information for educators on workshops, professional development, curricula for grades K-12, and access to the Museum's Lyman Library.  
<http://www.nctl.org/>
- TeachEngineering: Engineers have a hand in designing, creating or modifying nearly everything around us. Find out more in this growing collection of 750+ free, teacher-tested, standards-based K-12 lessons and activities that engage students and enhance science and math learning using hands-on engineering.  
<http://www.teachengineering.org/>