

Engineering

Resource List for Grades 9 through 12

The Resources in this document can be used with the Engineering Curriculum Packet for grades 9 through 12.

Books

Non-fiction and Biography

- 101 Things I Learned in Engineering School, 2018 by John Kuprenas (Author), Matthew Frederick (Author).
An experienced civil engineer presents the physics and fundamentals underlying the many fields of engineering. This book uses real-world examples to show how the engineer's way of thinking can illuminate questions from the simple to the profound: Why shouldn't soldiers march across a bridge? Why do buildings want to float and cars want to fly? What is the difference between thinking systemically and thinking systematically?
- Amazing Feats of Aerospace Engineering (Great Achievements in Engineering), 2014 by Angie Smibert (Author).
Discusses the field of aerospace engineering, including its history, some of its most famous feats, and what the future holds for the field, and explains how most people get into the profession.
- Amazing Feats of Civil Engineering (Great Achievements in Engineering), 2014 by L.E. Carmichael (Author).
Explains what civil engineering is, how most people get into the profession, and discusses notable civil engineers and their projects.
- Civil Engineering: A Very Short Introduction, 2012 by David Muir Wood (Author), Non-fiction. 9-12
In this title, the author turns a spotlight on a field that we often take for granted. He explains the nature and importance of civil engineering in the history of civilization and urbanization, outlines its many accomplishments in the modern era, and points to the hurdles that civil engineering will face in the future.
- 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 a 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.
- The Eads Bridge, 1999 by Howard Miller (Author), Quinta Scott (Photographer).
Scott's photographic essay explores the Eads Bridge as art and architecture in a series of

beautiful renderings of its confident lines, spidery supports, gracefully bulky details, and unexpected interior spaces. The historical appraisal of the bridge by historian Howard S. Miller is as much the story of the personalities of the Mississippi River and James Eads as of the bridge itself.

- Eero Saarinen: Shaping the Future, 2011 by Donald Albrecht (Editor), Eeva-Liisa Pelkonen (Editor).
From the swooping concrete vaults of the TWA Terminal at JFK Airport to the 630-foot-tall Gateway Arch in St. Louis, the iconic designs of Eero Saarinen (1910–1961) captured the aspirations and values of mid-20th-century America.
- Elon Musk and the Quest for a Fantastic Future, Young Readers' Edition, 2017 by Ashlee Vance (Author).
There are few people in history who could match Elon Musk's relentless drive and vision. A modern combination of famous inventors and industrialists like Thomas Edison, Henry Ford, and Steve Jobs, Elon is the man behind companies such as SpaceX, Tesla Motors, SolarCity, and PayPal that are transforming the way we live.
- Engineering the City: How Infrastructure Works, 2008 by Matthys Levy (Author), Richard Panchyk (Author).
Explains how cities obtain water, gas, and electricity and how these infrastructure systems developed along with the cities themselves. Provides experiments, games, and construction diagrams for interactive learning.
- Engineers, 2015 by DK (Author).
This book covers more than 100 architects, designers, and engineers in detail, including blueprints of their work, biographical information, and insights into the particular genius of each. Engineers also includes timeline spreads to add context for the groundbreaking and sometimes controversial projects that made history.
- The Gateway Arch: A Biography, 2014 by Tracy Campbell (Author), Non-fiction. 9-12
Rising to a height of 630 feet, the Gateway Arch in St. Louis is a monument to America's western expansion. Envisioned in 1947 but not completed until the mid-1960s, the arch today attracts millions of tourists annually and is one of the world's most widely recognized structures. The author uncovers the complicated and troubling history of the beloved structure and the book explores how a medley of players with widely divergent motivations (civic pride, ambition, greed, among others) brought the Gateway Arch to fruition, but at a price the city continues to pay.
- Secret Subway: The Fascinating Tale of an Amazing Feat of Engineering, 2009 by Martin W. Sandler (Author).
In 1869, Alfred Beach wanted to build America's first air-powered railway below New York City. Boss Tweed, a powerful politician and crook, opposed it. Secretly, Beach and his crew carved a 300-foot tunnel beneath a department store.
- Women of Steel and Stone: 22 Inspirational Architects, Engineers, and Landscape Designers, 2017 by Anna M. Lewis (Author).
This title features 22 thoroughly researched and engaging profiles of architects, engineers, and landscape designers, describing these groundbreakers' strengths, interests, and challenges as they were growing up and starting their careers, and what they achieved.

Fiction

- His Dark Materials: The Golden Compass / The Subtle Knife / The Amber Spyglass, 2011 by Philip Pullman (Author, Preface), Lucy Hughes-Hallett (Introduction). Philip Pullman's trilogy is a masterpiece that transcends genre and appeals to readers of all ages. His heroine, Lyra, is an orphan living in a parallel universe in which science, theology, and magic are entwined. The epic story that takes us through the three novels is not only a spellbinding adventure featuring armored polar bears, magical devices, witches, and daemons, it is also an audacious and profound reimagining of Milton's Paradise Lost that has already inspired a number of serious books of literary criticism.
- I, Robot, 2008 by Isaac Asimov (Author). This collection of stories originally appeared in the American magazines Super Science Stories and Astounding Science Fiction between 1940 and 1950 and were then compiled into a book for stand-alone publication 1950. The stories are woven together by a framing narrative in which the fictional Dr. Susan Calvin tells each story to a reporter (who serves as the narrator) in the 21st century. Although the stories can be read separately, they share a theme of the interaction of humans, robots, and morality.
- To Capture What We Cannot Keep: A Novel, 2017 by Beatrice Colin (Author). As the Eiffel Tower rises, a marvel of steel and air and light, the subject of extreme controversy and a symbol of the future, 2 people must decide what their love is worth. Seamlessly weaving historical detail and vivid invention, the author evokes the revolutionary time in which they live-one of corsets and secret trysts, duels and Bohemian independence, strict tradition and Impressionist experimentation.
- Star Wars: The Essential Guide to Weapons and Technology, 1997 by Bill Smith (Author), David Nakabayashi (Author), Troy Vigil (Author). Discover what separates Luke Skywalker's Lightsaber from Darth Vader's energy blade, master the workings of Chewbacca's Wookiee Bowcaster, find out the secret behind a Jawa's trusty Ionization Gun, and much, much more.

Magazines, Journals, Miscellaneous

- Nuts and Volts: Tinkerers, inventors, and other electronics enthusiasts will love Nuts & Volts magazine. <http://www.nutsvolts.com/>
- Popular Mechanics: The ultimate magazine for practical advice on do-it-yourself projects, this magazine also provides insight on products, technology, and modern trends in industries ranging from automotive to robotics. <https://www.popularmechanics.com>

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 through the use of hands-on engineering.
<http://www.teachengineering.org/>