

IEEE PRE-UNIVERSITY EDUCATION LESSON PLANS

<http://www.tryengineering.org/lesson.php>

TryEngineering offers a variety of lesson plans that align with education standards to allow teachers and students to apply engineering principles in the classroom. The matrix below will allow you to select a lesson that will be age and content appropriate for your classroom.



Lesson Plan Focus	Ages
<p>A Century of Plastics Lesson Focus: Lesson focuses on how plastics of all sorts have been engineered in to everyday products over the past century, with emphasis on materials selection and engineering.</p>	Ages 8-18
<p>A Question of Balance Lesson Focus: Lesson focuses on the use of weight scales and measurement by manufacturing engineers. Teams of students are posed with the challenge of developing a system to fill jars with a specific weight or count of products such as marbles or paperclips.</p>	Ages 11-18
<p>Adaptive Device Design Lesson Focus: Lesson focuses on the engineering of adaptive or assistive devices, such as prosthetic devices, wheelchairs, eyeglasses, grab bars, hearing aids, lifts, or braces.</p>	Ages 8-18
<p>All About Electric Motors Lesson Focus: Electric Motors: their principles and everyday uses. Note: This lesson plan is designed for classroom use only, with supervision by a teacher familiar with electrical and electronic concepts.</p>	Ages 10-18
<p>Build a Big Wheel Lesson Focus: Lesson focuses on the engineering behind big wheels (sometimes called Ferris wheels). Teams of students explore the engineering behind the "London Eye," explore the history of big wheels, and construct a working wheel model using pasta, glue, and teabags.</p>	Ages 8-18
<p>Build Your Own Robot Arm Lesson Focus: Develop a robot arm using common materials. Students will explore design, construction, teamwork, and materials selection and use.</p>	Ages 8-18
<p>Clipper Creations Lesson Focus: Develop a working model of a nail clipper.</p>	Ages 8-18
<p>Cracking the Code Lesson Focus: Lesson focuses on how computerized barcodes have improved efficiency in product distribution; explores the barcoding process and engineering design.</p>	Ages 8-18
<p>Critical Load Lesson Focus: Lesson focuses on issues civil engineers face, including critical load and how to reinforce the design of a structure to hold more weight.</p>	Ages 8-14
<p>Design and Build a Better Candy Bag Lesson Focus: Demonstrate how product design differences can affect the success of a final product -- in this case a bag for holding candy. Students work in pairs to evaluate, design, and build a better candy bag.</p>	Ages 8-18
<p>Dispenser Designs Lesson Focus: Lesson focuses on how engineers have to design objects to meet the needs of users, while considering the limitations of materials, and the implications of cost.</p>	Ages 11-18

<p>EEEEK- A Mouse! Lesson Focus: Lesson focuses on computer and mechanical engineering and explores how computer mice operate and how engineering provided an interface between man and machine.</p>	Ages 8-18
<p>Electric Messages: Then and Now Lesson Focus: Lesson focuses on exploring electric message systems, from light signals using International Morse Code to text messaging. Students construct a simple telegraph using a battery, wires, a switch, and bulb, and explore the impact of communications on society.</p>	Ages 8-14
<p>Electric Switches Lesson Focus: Demonstrate how electric circuits can be controlled with a simple switch. Note: This lesson plan is designed for classroom use only, with supervision by a teacher familiar with electrical and electronic concepts.</p>	Ages 8-11
<p>Engineered Memory Lesson Focus: Lesson focuses on the engineering behind storage devices, and engineering improvements over time. Though exploring the operation of the "floppy" disk, students explore the mechanics underlying operation, and then test the disk under a variety of conditions.</p>	Ages 8-18
<p>Engineered Sports Lesson Focus: Lesson focuses on how the principals of aerospace engineering have impacted golf ball design, along with equipment used in other sports. Students analyze the use of dimples on golf balls, and work as a team of engineers to determine whether adding dimples to airplanes would increase fuel efficiency for the airline industry. They also explore the physics of bounce as it relates to several sports balls.</p>	Ages 11-18
<p>Engineering Air Traffic Lesson Focus: Lesson focuses on the engineering behind air traffic control systems. Students work in teams to evaluate data generated for a virtual air traffic system, and determine a plan to bring three planes safely through a set airspace. They then recommend engineering enhancement to the current system.</p>	Ages 11-18
<p>Engineering Ups and Downs Lesson Focus: Lesson focuses on the engineering behind elevators. Teams of students explore principals and requirements of vertical travel, then design and construct a working elevator to service a toy car garage using wheels, pulleys, string, cardboard and other materials.</p>	Ages 11-18
<p>Flashlights and Batteries Lesson Focus: Lesson focuses on the concept of electron flow through the demonstration of electrical circuits in a flashlight, and how batteries operate.</p>	Ages 8-11
<p>Get Connected With Ohm's Law Lesson Focus: Demonstrate Ohm's Law using digital multi-meters. Fun hands-on activities are presented that demonstrate Ohm's Law. Teachers use digital multi-meters to collect data that are plotted to show that voltage and current are related by linear functions for ordinary resistors and by power functions for light bulbs.</p>	Ages 10-18
<p>Getting Your Bearings Lesson Focus: Lesson focuses on the concept of friction and the use of ball bearings to reduce friction.</p>	Ages 8-18
<p>Give Binary a Try! Lesson Focus: Lesson focuses on how binary codes function and binary applications for computer engineers. The lesson offers students an activity to learn to download software and read online binary clock, and advanced students an opportunity to build one from a kit.</p>	Ages 8-18

<p>Give Me a Brake</p> <p>Lesson Focus: Lesson focuses on brakes, force, and friction, using bicycle rim brakes to demonstrate basic braking mechanisms to stop, slow, or prevent motion.</p>	Ages 8-18
<p>Hand Biometrics Technology</p> <p>Lesson Focus: Lesson focuses on engineering applications of biometric technologies for identification or security applications. After exploring hand geometry biometrics, students work in teams of "engineers" to evaluate pros and cons of incorporating a hand recognition biometric technology into a new security system for a museum.</p>	Ages 8-18
<p>Heart of the Matter</p> <p>Lesson Focus: Lesson focuses on the engineering and operation of artificial heart valves, and the interface between man and machine.</p>	Ages 8-18
<p>Here Comes the Sun</p> <p>Lesson Focus: Lesson focuses on solar panel design, and its application in the standard calculator. It explores how both solar panels and calculators operate and explores simple circuits using solar power.</p>	Ages 8-18
<p>Hull Engineering</p> <p>Lesson Focus: Lesson focuses on how the shape of ship's hull can impact its speed and stability potential in water. Teams of students design and test their own ship's hull on paper, and build it using foam and other everyday materials.</p>	Ages 11-18
<p>Infrared Investigations</p> <p>Lesson Focus: Lesson focuses on how infrared technology is used by engineers creating equipment and system for a variety of industries. Teams of students explore the application of infrared in remote controls, test materials that encourage or prevent infrared transmission, and develop systems that allow transmission of infrared in restricted environments.</p>	Ages 8-18
<p>Insulators and Conductors</p> <p>Lesson Focus: Demonstrating the concept of conducting or insulating electricity. Note: This lesson plan is designed for classroom use only, with supervision by a teacher familiar with electrical and electronic concepts.</p>	Ages 8-11
<p>Move That Lighthouse!</p> <p>Lesson Focus: Lesson focuses on how engineers have to evaluate multiple structural, economic, and environmental factors when moving a building.</p>	Ages 8-18
<p>Pipeline Challenge</p> <p>Lesson Focus: Lesson focuses on how engineers develop pipeline systems to transport oil, water, gas, and other materials over very long distances. Students work in teams of "engineers" to develop a pipeline system to transport both a golf ball and ping pong ball across the classroom terrain.</p>	Ages 8-18
<p>Program Your Own Game</p> <p>Lesson Focus: Lesson focuses on how software engineers design computer games and other software. Student teams work together to develop a simple computer program using free software that is available in multiple languages.</p>	Ages 11-18
<p>Pulleys and Force</p> <p>Lesson Focus: Lesson focuses on the concept of force and the use of pulleys to reduce required force.</p>	Ages 8-11
<p>Rotational Equilibrium</p> <p>Lesson Focus: Demonstrate the concept of rotational equilibrium.</p>	Ages 14-18

<p>Sail Away Lesson Focus: Lesson focuses on watercraft engineering and sailing. Students work in teams to design a sailboat out of everyday objects that can catch a breeze from a fan, stay afloat with a set load, and sail four feet.</p>	Ages 8-18
<p>Series and Parallel Circuits Lesson Focus: Demonstrate and discuss simple circuits and the differences between parallel and serial circuit design and functions. Note: This lesson plan is designed for classroom use only, with supervision by a teacher familiar with electrical and electronic concepts.</p>	Ages 8-14
<p>Ship the Chip Lesson Focus: Lesson focuses on engineering package designs that meet the needs of safely shipping a product. Students work in teams of "engineers" to design a package using standard materials that will safely ship a single chip through the mail to the school address.</p>	Ages 8-18
<p>Simple Kitchen Machines Lesson Focus: Lesson focuses on simple machines and how they can be found in many everyday items. Students explore the different types of simple machines, how they work, and how they are integrated into many items. Students explore common kitchen machines and identify how many simple machine types are incorporated into each item.</p>	Ages 8-11
<p>Simple Machines Lesson Focus: Simple machines: their principles and uses.</p>	Ages 8-11
<p>Sort it Out! Lesson Focus: Lesson focuses on the engineering behind industrial sorting processes. Working as an engineering group, students then work in teams to design and build a system to sort different sized coins for packaging.</p>	Ages 8-18
<p>Sticky Engineering Challenge Lesson Focus: Lesson focuses on how engineers work to solve problems and impact daily life through new and improved products. As engineers do, teams of students select adhesive options to help them meet a construction goal.</p>	Ages 8-18
<p>Two Button Buzzer Circuit Lesson Focus: Demonstrate how two switches interact in an electrical circuit such as that used to sound a buzzer. Note: This lesson plan is designed for classroom use only, with supervision by a teacher familiar with electrical and electronic concepts.</p>	Ages 8-14
<p>Wind Tunnel Testing Lesson Focus: Lesson focuses on wind tunnel tests that engineers in many industries use to when developing products such as airplanes, cars, and even buildings. Teams of students build their own model car out of everyday products and test their design in a wind tunnel made of a fan blowing through a long cardboard box.</p>	Ages 11-18