



Engineering Technology (15.1510) (District)

District > 2016-2017 > Basic > Technology & Engineering > Engineering Technology (15.1510) (District) > Gutierrez, Steve; Masimer, Paul; Scott, Robert; Selk, Kerry; Smith, Shelli; Twining, Kurt
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Unit	CTE Standards and Objectives	Essential Questions	Content	Skills	Vocabulary	Formative & Summative Assessments
Introduction to Engineering <i>(Week 1, 3 Weeks)</i>	UT: CTE: Technical and Engineering UT: Grades 6-8 Exploring Technology Standard 1 Students will learn and use safe practices, learn basic design skills, and be introduced to related careers through activity-based education. Objective 4 Explore related careers. Standard 9 Students	<ul style="list-style-type: none"> • What do you think an engineer does? • Do you think you'd like be an engineer? Why? (or why not?) • How does engineering impact your life? • Why keep a journal? 	<ul style="list-style-type: none"> • How to use an engineering notebook • Engineering Process - 5 steps • What an engineer does • Career opportunities in engineering • Science principles in standard 5.6 & 5.7 	<ul style="list-style-type: none"> • Properly document using the engineering notebook • Research • Present 	<ul style="list-style-type: none"> • Engineer • Engineering Technologist • Legal Document • Identify/Define the Problem • Brainstorm solutions • Create Model/Prototype • Test Model/Prototype • Redesign & Optimize 	Positive & Negative Impacts of Technology Summative: Written: Informative Students write the positive and negative impacts of four different types of technology. Overview of Technology Formative: Oral: Discussion Discussion about content that can be large group or pair share.

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	<p>will explore how math and science are used in engineering and engineering technologies in our world through activity-based education.</p> <p>Objective 1 Explore the nature of engineering technologies.</p> <p>Objective 2 Explore how engineering technologies affect our society.</p>					
<p>Measuring (Week 3, 1 Week)</p>	<p>UT: CTE: Technical and Engineering</p> <p>UT: Grades 6-8 Exploring Technology</p> <p>Standard 1 Students</p>	<ul style="list-style-type: none"> Why do most countries use the metric system and not the standard system of measuring? What careers 	<ul style="list-style-type: none"> How to read and use a ruler to measure an object. Know the difference between standard (SAE) and metric measuring systems 	<ul style="list-style-type: none"> use a ruler to correctly measure an object accurately to 1/16th inch. draw and 	<ul style="list-style-type: none"> metric system Standard system SAE numerator denominator dimension 	<p>Measuring worksheet</p> <p>Formative: Written: Informative</p> <p>measurement worksheet</p> <p>The Ruler Game</p> <p>Summative: Performance: Skill Demonstration</p> <p>practice measuring using halves, quarters, eighths, and sixteenths (online application)</p>

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	<p>will learn and use safe practices, learn basic design skills, and be introduced to related careers through activity-based education.</p> <p>Objective 2 Learn and use measuring skills.</p>	<p>require the use of measurements?</p> <ul style="list-style-type: none"> • Can you think of any product that does not use a form of measuring? 	<ul style="list-style-type: none"> • How to use fractions of an inch (add, subtract, reduce). • fraction to decimal equivalency for halves and quarters 	<p>measure the length of a line accurately to 1/16th inch.</p> <ul style="list-style-type: none"> • add, subtract, and reduce ruler-based fractions 		
<p>General Shop Safety (Week 4, 3 Weeks)</p>	<p>UT: CTE: Technical and Engineering UT: Grades 6-8 Exploring Technology Standard 1 Students will learn and use safe practices, learn basic</p>	<ul style="list-style-type: none"> • What situations could cause injury in your shop? • How can you avoid injury in the shop? • How much is a body part worth (your thumb, eyes, hand, etc.)? • How does your 	<p><u>Basic Safety Rules and Shop Behavior</u></p> <ul style="list-style-type: none"> • Shop organization and cleanup • Safety apparel • Professional conduct • When you can use shop machines and tools 	<ul style="list-style-type: none"> • Demonstrate professional conduct • Wear proper safety attire • Follow shop rules 	<ul style="list-style-type: none"> • Safety Zone • Margin of safety • Safe Practices 	<p>Safety Test Common: Test: Common General safety test. Shop Observation Common: Other: Teacher Observation Observe behavior, safe practices and attire.</p>

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	<p>design skills, and be introduced to related careers through activity-based education.</p> <p>Objective 1 Learn and use basic safety rules for the tools, the equipment, and the facilities that will be used in the course.</p>	<p>behavior impact you and other individuals safety?</p>				
<p>Machine Safety (Week 9, 9 Weeks)</p>	<p>UT: CTE: Technical and Engineering UT: Grades 6-8 Exploring Technology Standard 1 Students will learn and use safe practices, learn basic</p>	<ul style="list-style-type: none"> • How much money is your thumb or your eyesight worth? • How would your life change if you lost a finger, or your eyesight? • Is it fair that you are required to wear safety glasses while 	<ul style="list-style-type: none"> • How to operate the following machinery correctly and safely: scroll saw, disc sander, drill press, router • How to work safely in the engineering lab. 	<ul style="list-style-type: none"> • Pass a written safety test with a score of 100 percent. • Work safely in the engineering lab. • Use tools and machin 	<p>scroll saw disc sander drill Press router machine safety margin of safety blades,bits,cutters RPM</p>	<p>Machine Safety Test Formative: Test: Written</p>


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	<p>design skills, and be introduced to related careers through activity-based education.</p> <p>Objective 1 Learn and use basic safety rules for the tools, the equipment, and the facilities that will be used in the course.</p> <p>Objective 2 Learn and use measuring skills.</p>	<p>working in the shop? why or why not?</p>		<p>ery properly and safely.</p>		
<p>Engineering Design (Week 4, 4 Weeks)</p>		<p>What is the coolest thing you have ever designed? What did you do to design it? What is the most important invention of all time? Why?</p>	<ul style="list-style-type: none"> • Engineering Design Process (all 5 steps) <ul style="list-style-type: none"> ○ Importance of prototyping • Use of engineering notebook to 	<p>Apply engineering design process in the solving of a sample problem Redesign an existing prototype Optimize the solution to a problem Test the prototype,</p>	<ul style="list-style-type: none"> • Prototype • Model • Brainstorm • Criteria • Constraints • Efficiency • Evaluate 	

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<p>Technical Design (Week 7, 4 Weeks)</p>		<p>What products have you used today that were not previously drawn on a computer? What role does drawing play in design?</p>	<p>Drawing/Design process</p>	<p>document process used in solving problems</p> <p>record the results of tests</p> <p>Apply the different sketching methods in the design process Perform basic functions on a computer aided design software program Assemble a project based on their drawings Document design proceedings</p>	<p>Thumbnail sketch Rough sketch Technical sketch Isometric Orthographic/Orthogonal Proportion CAD Scale</p>	
<p>Simple Machines/Fischert echnik (Week 11, 5 Weeks)</p>	<p>UT: CTE: Technical and Engineering UT: All Grades Exploring Technology</p>	<ul style="list-style-type: none"> • What simple machines did you use on your way to school this morning? • Who invented the six 	<ul style="list-style-type: none"> • Students need to know the six simple machines and their application. 	<ul style="list-style-type: none"> • Students will be able to identify and explain the six simple machines, and list five examples 	<ul style="list-style-type: none"> • lever • incline plane • pulley • screw • wedge • wheel and axle • mechanical advantage 	<p>Simple Machines Formative: Written: Informative complete the worksheet  5.3.3.A SimpleMachinesExploration.docx</p>

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	<p>Standard 9 Students will explore how math and science are used in engineering and engineering technologies in our world through activity-based education.</p> <p>Objective 4 Participate in activity based learning activity to explore engineering technologies. Some examples are listed below. (Note: All activities must have strong math and science applications.) a. Participate in a 3D modeling activity. b. Participate in an</p>	<p>simple machines</p> <ul style="list-style-type: none"> • How do simple machines make life easier? • How is energy saved through mechanical advantage? 		<p>es of practical use for each.</p> <ul style="list-style-type: none"> • Students will use at least five of the six simple machines to build a contraction or project. 	<ul style="list-style-type: none"> • simple machine • compound machine • Gear ratios • hydraulic • pneumatic 	

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	architectural modeling activity. c. Participate in an aviation/aerospace activity. d. Participate in a biotechnology activity. e. Participate in a boat hull (hydroplane or hydrofoil) activity. f. Participate in a bridge design and construction activity. g. Participate in an energy conversion and storage activity. h. Participate in an environmental/water purification activity. i. Participate in a materials testing activity. j. Participate in a mouse trap cars activity. k. Participate in a power systems activity. l. Participate in					

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	a restraint systems (crash) activity. m. Participate in a rocketry activity. n. Participate in a tower design activity. o. Participate in a truss design and construction activity. p. Participate in a wind tunnel activity.					
Electronics <i>(Week 16, 3 Weeks)</i>		How would life change if electronics ceased to exist? What is your most used electronic device? Why? What is inside an electric motor that makes it work? (draw a diagram)	Difference between series and parallel circuits Elements of a circuit Functions of various electrical components Ohms law	Construct a series circuit Construct a parallel circuit Properly use a digital multimeter	Commutator Armature Electromagnet Coil Series circuit Parallel circuit Circuit Conductor Current Source Load Ground Volts Amps Resistance Ohms Ohms law Static Direct Current Alternating Current Short circuit Battery	

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<p>Careers (Week 3, 17 Weeks)</p>	 <p>ENGINEERING CAREER INFORMATION WORKSHEET.pdf</p>					
<p>Lab Maintenance (Week 19, 1 Week)</p>	<p>UT: CTE: Technical and Engineering UT: Grades 6-8 Exploring Technology Standard 1 Students will learn and use safe practices, learn basic design skills, and be introduced to related careers through activity-based education.</p>	<ul style="list-style-type: none"> • How is a clean environment related to a safe environment? • Why is it important to keep machines in proper working condition? • Why is shop organization important? • If you tripped on some garbage in your dad's garage and then broke your arm, who would be 	<ul style="list-style-type: none"> • the importance of a well-maintained facility • basic machine and shop maintenance • lock out/tag out safety procedures 	<ul style="list-style-type: none"> • complete the items on the facility and machinery maintenance schedule 	<ul style="list-style-type: none"> • Student responsibility • maintenance • preventive maintenance • lock out/tag out 	<p>Maintenance Assignment Formative: Performance: Authentic Task assign groups of students to perform basic lab maintenance assignments. Students will then be instructed how to carry out that assignment. An inspection of the assignment will take place at the completion of the assignment.</p>

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	Objective 1 Learn and use basic safety rules for the tools, the equipment, and the facilities that will be used in the course.	liable/responsible?				