Exploring Technology 1 (**District**)

District > 2016-2017 > Basic > Technology & Engineering > Exploring Technology 1 (**District**) > Scott, Robert; Twining, Kurt

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Unit	CTE Standards and Objectives	Essential Questions	Content	Skills	Vocabulary	Formative & Summative Assessments
Introduction to Technology *(Week 1, 1 Week)*	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	• How does technology impact your life? • How have you used technology today in your life? • What is the difference between technology, science and engineering?	• What technology is • Careers in technology • Technology resources • History of technology 01-KJH EngineeringOverview.pptx 02-KJH_EngineeringDisciplines.pptx	• Explain what technology is • Identify different technology fields/careers • Explain how technology affects their lives • Describe the positive and negative impacts of technology	• Technology • Science • Engineering • Technologist •	**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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	will explore how math and science are used in engineering and engineering technologies in our world through activity-based education. Objective 1 Explore the nature of engineering technologies. Objective 2 Explore how engineering technologies affect our society.				
Systems and Optimization (SA) *(Week 1, 2 Weeks)*					
SA-History of	UT: CTE: Technical	• Is research and developm	• How to work safely in the engineering lab.	• Using the shop tools and equipment	• Engineering • Catapult • Trebuchet • fulcrum

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Engineering *(Week 2, 3 Weeks)*	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 1 Learn and use basic safety rules for the tools, the equipment, and the facilities that will be used in the course. Objective 2 Learn and use measuring skills.	ent worth the time and expense? • Why do students typically learn better and remember longer when they combine information with application? • What was the most valuable lesson that you learned from this activity? • What was the greatest invention of all time? Why?	• How to use tools and equipment properly and safely.	construct a catapult that is capable of launching a penny at least 10 meters or a Ping-Pong ball and hit a target at least three meters away. • Write a student reflection on the construction of their catapult	• potential energy • tension • cantilever • System • Tehnological system • input • processes • output • feedback • data • open-loop system • closed-loop system • malfunction • requirements/parameters • trade-off/compromise • maintenance • Design process	

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	Standard 4 Students will explore energy and power technologies in our world through activity-based education. Objective 4 Participate in activity based learning activity to explore energy and power technologies. Some examples are: a. Participate in an electronics/electricity activity. b. Participate in an energy conversion and storage activity. c. Participate in a fluid power activity. d. Participate in an internal combustions engines				

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	activity. e. Participate in a solar power activity. f. Participate in a steam power activity. g. Participate in a water power activity. h. Participate in a wind power activity. Standard 6 Students will explore transportation technologies in our world through activity-based education. Objective 4 Participate in activity based learning activity to explore transportation technologies. Some examples are: a. Participate in an aviation / aerospace activity. b. Participate				

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	in a boat hull (hydroplane or hydrofoil) activity. c. Participate in a CO2 cars activity. d. Participate in a hover craft activity. e. Participate in a mouse trap cars activity. f. Participate in a restraint systems (crash) activity. g. Participate in a rockery activity. h. Participate in a wind tunnel activity. Standard 8 Students will explore construction technologies in our world through activity-based education. Objective 4 Participate in activity based				

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	learning activity to explore construction technologies. Some examples are: a. Participate in an architectural modeling activity. b. Participate in a basic interior design activity. c. Participate in a bridge design and construction/truss design and construction activity. d. Participate in a materials testing activity. e. Participate in a tower design activity. f. Participate in an urban planning activity. Standard 9 Students will explore how math and science				

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	are used in engineering and engineering technologies in our world through activity-based education. 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 architectural modeling activity. c. Participate in an aviation/aeros				

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	pace 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 a restraint systems (crash) activity.				

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	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.					
General Shop Safety *(Week 3, 3 Weeks)*	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	• 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 behavior impact you and other	**Basic Safety Rules and Shop Behavior** • Shop organization and cleanup • Safety apparel • Professional conduct • When you can use shop machines and tools	• Demonstrate professional conduct • Wear proper safety attire • Follow shop rules	• Safety Zone • Margin of safety • Safe Practices	**Safety Test** **Common: Test: Common** General safety test. **Shop Observation** **Common: Other: Teacher Observation** Observe behavior, safe practices and attire.

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	through activity-based education. Objective 1 Learn and use basic safety rules for the tools, the equipment, and the facilities that will be used in the course.	individuals safety?				
Measuring *(Week 4, 1 Week)*	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	• Why do most countries use the metric system and not the standard system of measuring? • What careers require the use of measure ments? • Can you think of any product that does not use a form of	• How to read and use a ruler to measure an object. • Know the difference between standard (SAE) and metric measuring systems • How to use fractions of an inch (add, subtract, reduce). • fraction to decimal equivalency for halves and quarters	• use a ruler to correctly measure an object accurately to 1/16th inch. • draw and measure the length of a line accurately to 1/16th inch. • add, subtract, and reduce ruler-based fractions	• metric system • Standard system • SAE • numerator • denominator • dimension	**Measuring worksheet** **Formative: Written: Informative** measurement worksheet **The Ruler Game** **Summative: Performance: Skill Demonstration** practice measuring using halves, quarters, eighths, and sixteenths (online application)

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	through activity-based education. Objective 2 Learn and use measuring skills.	measuring ?				
Design and Modeling *(Week 4, 7 Weeks)*	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.	• What do you think you would like more, designing a sky scraper or a sports car? Why? • What are some of the key engineering elements that you used in the design of your air dragster? • As you review your design activity and project, what did you do well and what	• sketching • orthographic projection (multi-view) • pictorials • read a ruler • add and subtract parts of an inch • plan dimensioning • The six steps of the design processes. • How the six steps relate and flow with each other.	• design (draw) and build a project • evaluate their final project • problem solve • research and evaluate • synthesize ideas and incorporate into design • use equipment/tools safely and efficiently • work independently and in groups	• design process • CAD • dimensions • specifications • proportions • isometric • orthographic • views (front,top, and side) • sketching • extrude	**Plan evaluation** **Performance: Authentic Task** evaluate project design **Project Creation Performance: Lab Assignment** Evaluate the project

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	Objective 3 Learn basic design skills: i.e. sketching orthographic drawings, sketching pictorial drawings, creating a materials list. Standard 5 Students will explore information and communication technologies in our world through activitybased education. Objective 4 Participate in activity based learning activity to explore information and communication technologies. Some examples are: a. Participate	would you change or improve? • How can following the six steps in the design process help you create your best effort? • If you are not documenting your work, how will you prove that it is your work?				

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	in an animation activity. b. Participate in an architecture design activity. c. Participate in a CAD/drafting activity. d. Participate in a Desk Top Publishing activity. e. Participate in a digital activity. - Audio - Still photography - Video f. Participate in a film photography activity. g. Participate in a printing activity. h. Participate in a silk screening activity. i. Participate in a telecommunication activity. j. Participate in a web design and exploration activity.				

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	k. Participate in a 3D modeling activity. Standard 6 Students will explore transportation technologies in our world through activity-based education. Objective 4 Participate in activity based learning activity to explore transportation technologies. Some examples are: a. Participate in an aviation / aerospace activity. b. Participate in a boat hull (hydroplane or hydrofoil) activity. c. Participate in a CO2 cars activity. d. Participate in a hover				

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	craft activity. e. Participate in a mouse trap cars activity. f. Participate in a restraint systems (crash) activity. g. Participate in a rockery activity. h. Participate in a wind tunnel activity. Standard 9 Students will explore how math and science are used in engineering and engineering technologies in our world through activity-based education. Objective 4 Participate in activity based learning activity to explore engineering				

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	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 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				

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	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 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.				
Drafting/ CAD	UT: CTE: Technical	• Identify five man-made items in	• The different views of an orthographic drawing.	• Draw isometric and orthographic drawings.	• CAD • dimensions	**Isometric Truck** **Pre-Assessment:** **Performance:** **Authentic Task**

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(Week 6, 2 Weeks)	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 2 Learn and use measuring skills. Objective 3 Learn basic design skills: i.e. sketching orthographic drawings, sketching pictorial drawings,	this room that were not drafted. • Is drafting now days only done on the computer or do drafters still use T-squares and triangles? • Why do we still use the "standard" system of measuring instead of the metric system of measuring --even though the metric system of measuring seems easier?	• How to use constraints command with the Inventor software. • How to read a standard ruler to and accuracy of 1/16".	• Create a simple 3-d drawing using a CAD program.	• proportions • isometric • orthographic • views (front,top, and side) • sketching • extrude • constraints	Using isometric graph paper students draw a truck. The truck is shown in the upper right corner of the graph paper. **Orthographic Projection** **Formative:** **Performance:** **Authentic Task** Worksheet where students match surfaces between isometric and orthographic projection drawings. **Pegboard toy** **Formative:** **Performance:** **Authentic Task** Using the CAD program (Inventor) students design a pegboard toy following the guidelines given in the handout. **Air car dragster / Mag lev vehicle** **Formative:** **Performance:** **Authentic Task** Students use the CAD program (Inventor) to design their dragster / vehicle. Following the specifications.

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	creating a materials list. Standard 5 Students will explore information and communication technologies in our world through activitybased education. Objective 4 Participate in activity based learning activity to explore information and communication technologies. Some examples are: a. Participate in an animation activity. b. Participate in an architecture design activity. c. Participate				

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	in a CAD/drafting activity. d. Participate in a Desk Top Publishing activity. e. Participate in a digital activity. - Audio - Still photography - Video f. Participate in a film photography activity. g. Participate in a printing activity. h. Participate in a silk screening activity. i. Participate in a telecommunication activity. j. Participate in a web design and exploration activity. k. Participate in a 3D modeling activity. Standard 9 Students will explore how math				

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	and science are used in engineering and engineering technologies in our world through activity-based education. 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 architectural modeling activity. c. Participate in an				

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	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 a restraint systems (crash)				

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	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.					
SA-Problem Solving *(Week 7, 4 Weeks)*		• What is the most important engineering problem of our time? • What are some of the engineering and science problems of our time that they have been able to solve? • What is stronger--the triangle shape or the	What are the basics of engineering design?	- use the basics of engineering design to design a strong and efficient bridge.	• Tension • Compression • Sheer • Torsion • Force • Stress • Engineering Design	**STEM Academy Problem Solving Pre-test** **Formative: Test: Written**

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		square shape? Why is it stronger?				
Coding (Hour of Code) *(Week 10, 3 Weeks)*						
Machine Safety *(Week 9, 9 Weeks)*	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	• 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 working in the shop?	• How to operate the following machinery correctly and safely: scroll saw, disc sander, drill press, router • How to work safely in the engineering lab.	• Pass a written safety test with a score of 100 percent. • Work safely in the engineering lab. • Use tools and machinery properly and safely.	scroll saw disc sander drill Press router machine safety margin of safety blades,bits,cutters RPM	**Machine Safety Test** **Formative: Test: Written**

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	through activity-based education. Objective 1 Learn and use basic safety rules for the tools, the equipment, and the facilities that will be used in the course. Objective 2 Learn and use measuring skills.	why or why not?				
Science and Technology *(Week 10, 9 Weeks)*	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	• Why is science so cool or so boring? • What is the difference between science and technology? • How have you used science today? • if energy cannot be created or destroyed, why do we need	• The six steps in the Design Process • Six simple machines	• build, test, and evaluate a model of a design problem (roller coaster, tower, paper cars, etc.) • demonstrate safe practices while working with tools and machinery	• science • physics • force • resistance • kinetic energy • potential energy	

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	be introduced to related careers through activity-based education. Objective 1 Learn and use basic safety rules for the tools, the equipment, and the facilities that will be used in the course. Objective 2 Learn and use measuring skills. Objective 3 Learn basic design skills: i.e. sketching orthographic drawings, sketching pictorial drawings, creating a materials list. Objective 4 Explore related careers. Standard 4 Students	to be concerned about our energy sources?				

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	will explore energy and power technologies in our world through activity-based education. Objective 1 Explore the nature of energy and power technologies. Objective 2 Explore how energy and power technologies affect our society. Objective 3 Use basic design concepts in an energy and power technologies activity. Objective 4 Participate in activity based learning activity to explore energy and power technologies.				

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	Some examples are: a. Participate in an electronics/electricity activity. b. Participate in an energy conversion and storage activity. c. Participate in a fluid power activity. d. Participate in an internal combustions engines activity. e. Participate in a solar power activity. f. Participate in a steam power activity. g. Participate in a water power activity. h. Participate in a wind power activity. Standard 6 Students will explore transportation technologies in our world through				

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	activity-based education. Objective 1 Explore the nature of transportation technologies. Objective 2 Explore how transportation technologies affect our society. Objective 3 Use basic design concepts in a transportation technologies activity. Standard 7 Students will explore manufacturing technologies in our world through activity-based education. Objective 4 Participate in activity based learning activity to				

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	explore manufacturing technologies. Some examples are: a. Participate in a copyright and patent activity. b. Participate in a CNC activity. c. Participate in a custom production activity. d. Participate in a material processes activity. e. Participate in a mass production/sheet metal car / quality control activity. f. Participate in a robotics / work cell activity.				
	Standard 8 Students will explore construction technologies in our world through activity-				

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	based education. Objective 1 Explore the nature of construction technologies. Objective 2 Explore how construction technologies affect our society. Objective 3 Use basic design concepts in a construction technologies activity. Objective 4 Participate in activity based learning activity to explore construction technologies. Some examples are: a. Participate in an architectural modeling activity. b. Participate in a basic interior design activity. c. Participate in a bridge				

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	design and construction/truss design and construction activity. d. Participate in a materials testing activity. e. Participate in a tower design activity. f. Participate in an urban planning activity. Standard 9 Students will explore how math and science are used in engineering and engineering technologies in our world through activity-based education. Objective 1 Explore the nature of engineering technologies.				

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	Objective 2 Explore how engineering technologies affect our society. Objective 3 Use basic design concepts in an engineering activity to explore engineering technologies. 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 architectural modeling activity.				

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	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 a restraint				

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	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.					
SA-Exploring Engineering *(Week 13, 3 Weeks)*					• Scientist vs Engineer • Engineering Technologist • mold • casting • data	
Problem Based Learning *(Week 15, 4 Weeks)*	UT: CTE: Technical and Engineering UT: Grades 6-8 Exploring Technology	• If you had the ability to invent/build any mechanical object, what would it be? • What invention	• how to safely operate tools and equipment • basic safety practices • how to interact positively with other students • how to communicate	• apply the concepts of quality and craftsmanship • use tools and machinery safely to construct a project	• quality of work/craftsmanship • maintenance • production •	**Project construction** **Formative:** **Performance: Lab Assignment** Construct a quality project

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	Standard 9 Students will explore how math and science are used in engineering and engineering technologies in our world through activity-based education. 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	ideas do you have? • Is it still possible to build a better mouse trap?	effectively with others			

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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				

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	activity. l. Participate in 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.					
Lab Maintenance *(Week 19, 1 Week)*	UT: CTE: Technical and Engineering UT: Grades 6-8 Exploring Technology Standard 1 Students will learn and use safe practices, learn basic design	• 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?	• the importance of a well-maintained facility • basic machine and shop maintenance • lock out/tag out safety procedures	• complete the items on the facility and machinery maintenance schedule	• Student responsibility • maintenance • preventive maintenance • lock out/tag out	**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.

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	skills, and be introduced to related careers through activity-based education. Objective 1 Learn and use basic safety rules for the tools, the equipment, and the facilities that will be used in the course.	• If you tripped on some garbage in your dad's garage and then broke your arm, who would be liable/responsible?				