



## **Technology Education - Grade 7**

**Course Information**

<b>Grade(s):</b>	7
<b>Discipline/Course:</b>	Technology Education
<b>Course Title:</b>	Technology Education
<b>Prerequisite(s):</b>	N/A
<b>Course Description:</b> <i>Program of Studies</i>	<p>The seventh grade Technology Education course gives students an educational experience and understanding of manufacturing/construction, communication and engineering technologies. In a hands-on collaborative environment incorporating project-based learning, students engineer, evaluate, and modify projects, based on national Standards for Technological and Engineering Literacy (STEL).</p> <p>Students explore design, tool manipulation, measurement, use of math skills, proper and safe use of tools, problem solving abilities and the creative experience. Students leave this course with completed projects in each area of technology, which reflects their abilities and newly attained technological and hands-on knowledge. This course is intended to provide a preview of 8th grade electives available to students in their final year of middle school.</p>
<b>Course Essential Questions:</b>	<ul style="list-style-type: none"> <li>● What is technology?</li> <li>● How can we choose the best tools to use for a particular task or to solve a problem?</li> <li>● What steps can we take to solve a complex problem that seems to have many solutions?</li> <li>● How can we work together to solve problems?</li> <li>● How does knowledge from other content areas (Math, Science, the Arts), help us solve problems?</li> </ul>
<b>Course Enduring Understandings:</b>	<ul style="list-style-type: none"> <li>● Technology and engineering design is a fundamental human activity requiring a range of skills.</li> <li>● Technology and engineering are interdisciplinary, requiring the application of knowledge and skills related to science, math, and the arts.</li> <li>● All technologies are composed of interconnected parts and are embedded within larger systems (e.g., ecosystems) that impose constraints upon them.</li> </ul>

	<ul style="list-style-type: none"> <li>The Universal Systems Model is an iterative process; there is often no single correct solution and designs can always be improved and refined.</li> </ul>
<b>Duration:</b> <b>Credit:</b>	10 weeks 0 Credit(s) (Middle School Course)
<b>Course Materials/Resources:</b>	Equipment and Consumables
<b>FPS Course Academic Expectation(s):</b>	EU - Exploring and Understanding CC - Creating and Constructing
<b>Year at a Glance (Units)</b>	Unit 1 – Manufacturing Introduction (4 weeks) Unit 2 – Graphic Communications Introduction (3 weeks) Unit 3 – Engineering Introduction (2 weeks)

<b>Unit Number and Title:</b>	Unit 1 – Manufacturing Introduction and Project
<b>Duration:</b>	4 weeks
<b>Resource(s):</b>	Equipment & Consumables
<b>Unit Overview:</b>	This hands-on unit allows students to build and finish an actual product given specifications and constraints. In doing so, students will learn and practice safety considerations in the manufacturing lab in order to use hand and power tools appropriately. They will continue to develop their understanding of the Universal Systems Model, consisting of inputs, processes, outputs, and feedback. They will apply content knowledge and new learning to measure, plan, and make their finished product.
<b>Learning Goals</b>	
<b>Standard(s):</b>	ITEEA (International Technology and Engineering Educators Association) Standards for Technological and Engineering Literacy (STEL) STEL-2M. Differentiate between inputs, processes, outputs, and feedback in technological systems. STEL-3G. Explain how knowledge gained from other content areas affects the development of technological products and systems STEL-7N. Practice successful design skills. STEL-7O. Apply tools, techniques and materials in a safe manner as part of the design process. STEL-7Q. Apply the technology and engineering design process. STEL-7R. Refine design solutions to address criteria and constraints. STEL-7T. Assess design quality based upon established principles and elements of design. STEL-7U. Evaluate the strengths and weaknesses of different design solutions. STEL-7V. Improve essential skills necessary to successfully design.
<b>Essential Question(s):</b>	<ul style="list-style-type: none"> <li>● What is technology?</li> <li>● How can we choose the best tools to use for a particular task or to solve a problem?</li> <li>● How does knowledge from other content areas (Math, Science, the Arts), help us solve problems?</li> </ul>

<b>Enduring Understanding(s):</b>	<ul style="list-style-type: none"> <li>● Making is an inherent part of technology and engineering design.</li> <li>● Technology and engineering design is a fundamental human activity requiring a range of skills.</li> <li>● Technology and engineering are interdisciplinary, requiring the application of knowledge and skills related to science, math, and the arts.</li> </ul>
<b>Learning Goal(s):</b> <i>Students will know and will be able to use their learning to:</i> (Content/ Skills)	<p><b>Content:</b> (Students will know...)</p> <ul style="list-style-type: none"> <li>● safety rules for using hand and power tools.</li> <li>● basic measurements to ¼ inch</li> <li>● technology is people using tools, resources, and processes to solve problems or to extend their capabilities .</li> </ul> <p><b>Skills:</b> (Students will be able to...)</p> <ul style="list-style-type: none"> <li>● create an orthographic drawing to communicate their product design.</li> <li>● select, measure, and use appropriate materials.</li> <li>● safely and correctly use hand &amp; power tools to build a project to specifications.</li> <li>● finish a product to standards.</li> </ul>

<b>Unit Number and Title:</b>	Unit 2 – Graphic Communications Introduction
<b>Duration:</b>	3 weeks
<b>Resource(s):</b>	Computer access
<b>Unit Overview:</b>	Students will be exposed to a variety of technology tools to assist them in designing communications for specific audiences and purposes. These include (but are not limited to) Computer Assisted Design (CAD ), 3D printing, drawing, design, photo-editing, and animation tools.
<b>Learning Goals</b>	
<b>Standard(s):</b>	<p>ITEEA (International Technology and Engineering Educators Association) Standards for Technological and Engineering Literacy (STEL)</p> <p>STEL-1J. Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.</p> <p>STEL-1M. Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p> <p>STEL-2S. Defend decisions related to a design problem.</p> <p>STEL-2M. Differentiate between inputs, processes, outputs, and feedback in technological systems.</p> <p>STEL-3G. Explain how knowledge gained from other content areas affects the development of technological products and systems</p> <p>STEL-7N. Practice successful design skills.</p> <p>STEL-7O. Apply tools, techniques and materials in a safe manner as part of the design process.</p> <p>STEL-7Q. Apply the technology and engineering design process.</p> <p>STEL-7R. Refine design solutions to address criteria and constraints.</p> <p>STEL-7T. Assess design quality based upon established principles and elements of design.</p> <p>STEL-7U. Evaluate the strengths and weaknesses of different design solutions.</p> <p>STEL-7V. Improve essential skills necessary to successfully design.</p>

<b>Essential Question(s):</b>	<ul style="list-style-type: none"> <li>• How can we choose the best tools to use for a particular task or to solve a problem?</li> <li>• How does knowledge from other content areas (Math, Science, the Arts), help us solve problems?</li> <li>• How can we work together to solve problems?</li> </ul>
<b>Enduring Understanding(s):</b>	<ul style="list-style-type: none"> <li>• Communication design is influenced by the intended audience, the medium used to communicate, and the nature of the message.</li> <li>• There are universal principles and elements of design</li> <li>• Making is an inherent part of technology and engineering design.</li> <li>• Technology and engineering design is a fundamental human activity requiring a range of skills.</li> <li>• Technology and engineering are interdisciplinary, requiring the application of knowledge and skills related to science, math, and the arts.</li> </ul>
<b>Learning Goal(s):</b> <i>Students will know and will be able to use their learning to:</i> (Content/ Skills)	<b>Content:</b> (Students will know...) <ul style="list-style-type: none"> <li>• basic universal design principles and elements</li> </ul> <b>Skills:</b> (Students will be able to...) <ul style="list-style-type: none"> <li>• design and create communications for a specific audience and purpose.</li> <li>• select and utilize appropriate software and/or hand tools.</li> </ul>

<b>Unit Number and Title:</b>	Unit 3 – Engineering Introduction
<b>Duration:</b>	2 weeks
<b>Resource(s):</b>	Computer access and consumables
<b>Unit Overview:</b>	Student introduction to the engineering design process.
<b>Learning Goals</b>	
<b>Standard(s):</b>	<p>ITEEA (International Technology and Engineering Educators Association) Standards for Technological and Engineering Literacy (STEL)</p> <p>STEL-1J. Develop innovative products and systems that solve problems and extend capabilities based on individual or collective needs and wants.</p> <p>STEL-1M. Apply creative problem-solving strategies to the improvement of existing devices or processes or the development of new approaches.</p> <p>STEL-2M. Differentiate between inputs, processes, outputs, and feedback in technological systems.</p> <p>STEL-2N. Illustrate how systems thinking involves considering relationships between every part, as well as how the system interacts with the environment in which it is used</p> <p>STEL-3G. Explain how knowledge gained from other content areas affects the development of technological products and systems</p> <p>STEL-7Q. Apply the technology and engineering design process.</p> <p>STEL-7T. Assess design quality based upon established principles and elements of design.</p> <p>STEL-7U. Evaluate the strengths and weaknesses of different design solutions.</p>
<b>Essential Question(s):</b>	<ul style="list-style-type: none"> <li>● How can we choose the best tools to use for a particular task or to solve a problem?</li> <li>● What steps can we take to solve a complex problem that seems to have many solutions?</li> <li>● How can we work together to solve problems?</li> <li>● How does knowledge from other content areas (Math, Science, the Arts), help us solve problems?</li> </ul>



<b>Enduring Understanding(s):</b>	<ul style="list-style-type: none"> <li>• All technologies are composed of interconnected parts and are embedded within larger systems (e.g., ecosystems) that impose constraints upon them.</li> <li>• The Universal Systems Model is an iterative process; there is often no single correct solution and designs can always be improved and refined.</li> </ul>
<b>Learning Goal(s):</b> <i>Students will be able to use their learning to:</i> (Content/ Skills)	<p><b>Content:</b> (Students will know...)</p> <ul style="list-style-type: none"> <li>• the technology and engineering design process is an iterative process to solve design challenges.</li> </ul> <p><b>Skills:</b> (Students will be able to...)</p> <ul style="list-style-type: none"> <li>• research, design and construct a model utilizing a simple machine based on a design challenge.</li> <li>• produce orthographic and isometric plans of their designs using CAD software.</li> <li>• design within provided criteria and constraints and make appropriate trade-offs for optimization.</li> <li>• revisit steps in the design process to avoid fixation on a single solution.</li> <li>• evaluate design solutions based on design principles, constraints and criteria.</li> </ul>