

GRADE LEVEL: 7/8

SUBJECT: Introduction to Engineering

DATE: 2/2/17 2016-2017

GRADING PERIOD: 1 and 3

MASTER COPY: 3/24/17

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>GENERAL ENGINEERING AND TECHNOLOGY CONCEPTS</b>					
<ul style="list-style-type: none"> <li>• Purpose</li> <li>• Engineering</li> <li>• Technology</li> <li>• Society</li> </ul>	<b>ETE-1.1:</b> Illustrate the purpose of engineering and technology in society.	<ul style="list-style-type: none"> <li>• Explain contributions of engineering and technology to society.</li> <li>• State examples of how engineering has improved the quality of your life. Defend these factors as “improvements”.</li> </ul>	<ul style="list-style-type: none"> <li>• “What do engineers do?” worksheet</li> </ul>	<ul style="list-style-type: none"> <li>• Need</li> <li>• Want</li> </ul>	Important
<ul style="list-style-type: none"> <li>• Engineering &amp; Technology <ul style="list-style-type: none"> <li>- Individuals</li> <li>- Society</li> <li>- Environment</li> </ul> </li> </ul>	<b>ETE-1.2:</b> Identify how engineering and technology impacts individuals, society, and the environment.	<ul style="list-style-type: none"> <li>• Explain historical and current impacts of engineering and technology.</li> <li>• Identify and defend positive and negative impacts of an invention.</li> <li>• Identify and explain possible ethical issues of engineering development area.</li> </ul>	<ul style="list-style-type: none"> <li>• “What do engineers do?” worksheet</li> <li>• Technological artifact research and presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Engineer</li> <li>• Technologist</li> <li>• Controversial</li> </ul>	Important

<ul style="list-style-type: none"> <li>• Interdisciplinary Nature <ul style="list-style-type: none"> <li>-Engineering</li> <li>-Technology</li> </ul> </li> </ul>	<p><b>ETE-2.1:</b> Analyze the interdisciplinary nature of engineering and technology.</p>	<ul style="list-style-type: none"> <li>• Explain connections of engineering and technology to other disciplines.</li> <li>• Show how engineering progress has depended on advances in science and mathematics.</li> </ul>	<ul style="list-style-type: none"> <li>• Technological artifact research and presentation</li> <li>• “Introduction to Engineering” notes and worksheet</li> </ul>	<ul style="list-style-type: none"> <li>• Disciplines</li> </ul>	<p>Important</p>
<ul style="list-style-type: none"> <li>• Knowledge &amp; Skills <ul style="list-style-type: none"> <li>- Science</li> <li>- Math</li> <li>- Language Arts</li> <li>- Fine Arts</li> <li>- Social Studies</li> </ul> </li> <li>• Engineering</li> <li>• Technology</li> </ul>	<p><b>ETE-2.2:</b> Apply knowledge and skills learned in science, mathematics, language arts, fine arts, and social studies classes when completing engineering and technology-based assignments.</p>	<ul style="list-style-type: none"> <li>• Use proper bibliography, layout, and meet standards of punctuation and grammar.</li> <li>• Analyze satisfaction of design requirements using statistical analysis.</li> <li>• Summarize the cultural effect of an engineering invention or innovation.</li> </ul>	<ul style="list-style-type: none"> <li>• Technological artifact research and presentation</li> <li>• Puzzle block solving analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Mean</li> <li>• Standard deviation</li> </ul>	<p>Important</p>
<ul style="list-style-type: none"> <li>• Eras</li> <li>• History</li> <li>• Technological Innovations &amp; Practices</li> </ul>	<p><b>ETE-3.1:</b> Analyze how the eras in history are based on technological innovations and practices of the period.</p>	<ul style="list-style-type: none"> <li>• Explain historical eras and advances as they relate to chosen technological artifact.</li> <li>• Classify an era based on technology available at that time.</li> <li>• Name advances in science that needed to occur prior to a particular invention.</li> </ul>	<ul style="list-style-type: none"> <li>• Technological Artifact research and presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Stone age</li> <li>• Bronze age</li> <li>• Iron age</li> <li>• Machine age</li> <li>• Oil age</li> <li>• Atomic age</li> <li>• Space age</li> <li>• Information age</li> <li>• Big Data age</li> </ul>	<p>Important</p>

<ul style="list-style-type: none"> <li>• Inventions &amp; Innovations             <ul style="list-style-type: none"> <li>- Products</li> <li>- Processes</li> <li>- Materials</li> <li>- Tools</li> </ul> </li> </ul>	<p><b>ETE-3.2:</b> Investigate inventions and innovations of products, processes, materials, and tools.</p>	<ul style="list-style-type: none"> <li>• Research and present information about the historical progress of a technological artifact.</li> <li>• Explain why inventions and innovations were needed in other areas before your artifact could be invented or improved.</li> </ul>	<ul style="list-style-type: none"> <li>• Technological Artifact presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Invention</li> <li>• Innovation</li> </ul>	<p>Important</p>
<ul style="list-style-type: none"> <li>• Technology             <ul style="list-style-type: none"> <li>- Inventions</li> <li>- Innovations</li> </ul> </li> <li>• Positive &amp; Negative Impacts             <ul style="list-style-type: none"> <li>- Society</li> <li>- Environment</li> </ul> </li> </ul>	<p><b>ETE-3.3:</b> Compare technology inventions and innovations and the positive/negative impacts on society and the environment.</p>	<ul style="list-style-type: none"> <li>• State and defend positive and two negative impacts of multiple technological artifacts.</li> </ul>	<ul style="list-style-type: none"> <li>• Technological Artifact presentation</li> <li>• Artifact presentation summary sheet</li> </ul>	<ul style="list-style-type: none"> <li>• Society</li> </ul>	<p>Important</p>
<p><b>ENGINEERING DESIGN AND DEVELOPMENT</b></p>					
<ul style="list-style-type: none"> <li>• Design Process</li> </ul>	<p><b>ETE-4.1:</b> Apply the steps of the design process.</p>	<ul style="list-style-type: none"> <li>• State the steps of the engineering design process.</li> </ul>	<ul style="list-style-type: none"> <li>• Foot orthosis design reflection table</li> </ul>	<ul style="list-style-type: none"> <li>• Cerebral Palsy</li> <li>• Orthosis</li> <li>• Design process steps</li> </ul>	<p>Critical</p>

<ul style="list-style-type: none"> <li>• Design Process</li> <li>• Product</li> <li>• Real World</li> </ul>	<b>ETE-4.2:</b> Use the design process to create a product that addresses a real world problem.	<ul style="list-style-type: none"> <li>• Produce a solution to an open-ended design problem prior to being introduced to the engineering design process.</li> <li>• Solve real-world problems prior to being introduced to the engineering design process.</li> <li>• Build a prototype of a design solution given limited materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Foot orthosis build and presentation</li> <li>• Design process reflection table</li> </ul>	<ul style="list-style-type: none"> <li>• Generate</li> </ul>	Critical
<ul style="list-style-type: none"> <li>• Technical Sketch</li> <li>• Design</li> <li>• Annotation</li> </ul>	<b>ETE-4.3:</b> Create a technical sketch of a design with appropriate annotation.	<ul style="list-style-type: none"> <li>• Create a front/right side/ top view drawing to match with orthnographic view.</li> <li>• Dimension a drawing according to engineering best practices.</li> <li>• Create an orthnographic drawing.</li> <li>• Create a thumbnail sketch.</li> </ul>	<ul style="list-style-type: none"> <li>• “A picture is worth a thousand words” multi-view sketching exercise.</li> <li>• Foam puzzle blocks dimensioned drawings.</li> </ul>	<ul style="list-style-type: none"> <li>• Orthnographic</li> <li>• Multi-view</li> <li>• Thumbnail</li> </ul>	Critical
<ul style="list-style-type: none"> <li>• Product</li> <li>• Design Process</li> <li>• Documentation</li> </ul>	<b>ETE-4.4:</b> Develop a product using the design process, while maintaining appropriate documentation.	<ul style="list-style-type: none"> <li>• Invent a product by following all steps of the design process.</li> </ul>	<ul style="list-style-type: none"> <li>• Foot orthosis build and presentation.</li> <li>• Design process reflection table.</li> </ul>	<ul style="list-style-type: none"> <li>• Documentation</li> </ul>	Critical
<b>Processing and Using Technology</b>					
<ul style="list-style-type: none"> <li>• Construction Systems <ul style="list-style-type: none"> <li>- Residential</li> <li>- Industrial</li> <li>- Commercial</li> <li>- Civil</li> </ul> </li> </ul>	<b>ETE-7.1:</b> Investigate various types of construction systems including residential, industrial, commercial, and civil.	<ul style="list-style-type: none"> <li>• Summarize residential, industrial, commercial, and civil construction systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Presentation and discussion.</li> </ul>	<ul style="list-style-type: none"> <li>• Residential</li> <li>• Industrial</li> <li>• Commercial</li> <li>• Civil</li> </ul>	Additional

<ul style="list-style-type: none"> <li>• Construction Systems Utilization <ul style="list-style-type: none"> <li>- Designs</li> <li>- Techniques</li> <li>- Tools</li> <li>- Processes</li> </ul> </li> </ul>	<p><b>ETE-7.2:</b> Utilize appropriate designs, techniques, tools, and processes for construction systems.</p>	<ul style="list-style-type: none"> <li>• Design and plan how to build a residential, industrial, commercial, or civil project.</li> </ul>	<ul style="list-style-type: none"> <li>• Powerpoint presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Process</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Constructions Systems Models</li> </ul>	<p><b>ETE-7.3:</b> Construct simulations, models, and/or structures for specific construction systems.</p>	<ul style="list-style-type: none"> <li>• Build a model of a construction system.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction system model</li> </ul>	<ul style="list-style-type: none"> <li>• Structure</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Biotechnology Types <ul style="list-style-type: none"> <li>- Agricultural</li> <li>- Genetic</li> <li>- Medical</li> <li>- Imaging</li> </ul> </li> </ul>	<p><b>ETE-9.1:</b> Investigate various types of biotechnologies including agricultural, genetics, medical, and imaging technologies.</p>	<ul style="list-style-type: none"> <li>• Outline various types of biotechnologies.</li> </ul>	<ul style="list-style-type: none"> <li>• Powerpoint presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Biotechnology</li> <li>• Genetics</li> <li>• Imaging</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Engineering <ul style="list-style-type: none"> <li>- Medical</li> <li>- Genetic</li> </ul> </li> </ul>	<p><b>ETE-9.2:</b> Examine appropriate designs, technologies, tools, and processes for medical or genetic engineering.</p>	<ul style="list-style-type: none"> <li>• Explain which tools, designs, and technologies are appropriate in various medical and genetic engineering situations.</li> </ul>	<ul style="list-style-type: none"> <li>• Powerpoint presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Medical engineering</li> <li>• Genetic engineering</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Biotechnology Models</li> </ul>	<p><b>ETE-9.3:</b> Construct simulations, models, and/or prototypes for specific biotechnology disciplines.</p>	<ul style="list-style-type: none"> <li>• Create a biotechnology model.</li> </ul>	<ul style="list-style-type: none"> <li>• Model and presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Gene splicing</li> </ul>	Additional

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SUBJECT: Introduction to Engineering

DATE: 2/23/17 2016-2017

GRADING PERIOD: 2 and 4

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CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
<b>GENERAL ENGINEERING AND TECHNOLOGY CONCEPTS</b>					
<ul style="list-style-type: none"> <li>• Safety and Procedures</li> <li>• Tools</li> <li>• Equipment</li> </ul>	<b>ETE-1.4:</b> Demonstrate safe practices and procedures with tools and equipment.	<ul style="list-style-type: none"> <li>• Wear safety glasses when appropriate.</li> <li>• Demonstrate safe procedures when using tools and other equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher observation</li> <li>• Air drag racer build</li> <li>• Drill Press/Scroll Saw Safety Procedures Assessment?</li> </ul>	<ul style="list-style-type: none"> <li>• Drill press</li> <li>• Scroll saw</li> <li>• Amputation</li> </ul>	Important
<b>ENGINEERING DESIGN AND DEVELOPMENT</b>					
<ul style="list-style-type: none"> <li>• Design Process</li> </ul>	<b>ETE-4.1:</b> Apply the steps of the design process.	<ul style="list-style-type: none"> <li>• Produce engineering designs by using a formal design process.</li> </ul>	<ul style="list-style-type: none"> <li>• Wind turbine design project.</li> <li>• Air drag racer design project.</li> <li>• Cerebral Palsy toy design and presentation</li> <li>• Rube Goldberg design project</li> </ul>	<ul style="list-style-type: none"> <li>• Cerebral Palsy</li> <li>• Orthosis</li> <li>• Aerodynamic</li> <li>• Turbine</li> <li>• Design process steps</li> </ul>	Critical

<ul style="list-style-type: none"> <li>• Design Process</li> <li>• Product</li> <li>• Real World</li> </ul>	<p><b>ETE-4.2:</b> Use the design process to create a product that addresses a real world problem.</p>	<ul style="list-style-type: none"> <li>• Produce a solution to an open-ended design problem by utilizing all steps of the formal design process</li> <li>• Solve real-world problems by using the engineering design process.</li> <li>• Build a prototype of a design solution given limited materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Cerebral Palsy toy design project</li> </ul>	<ul style="list-style-type: none"> <li>• Concept</li> <li>• Prototype</li> </ul>	Critical
<ul style="list-style-type: none"> <li>• Design Process</li> <li>• Product</li> <li>• Documentation</li> </ul>	<p><b>ETE-4.4:</b> Develop a product using the design process, while maintaining appropriate documentation.</p>	<ul style="list-style-type: none"> <li>• Invent a product by following all steps of the design process.</li> <li>• Demonstrate that the design process is iterative through design documentation.</li> <li>• Document design progress and changes in engineering notebook.</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering notebook.</li> <li>• Cerebral Palsy toy design project.</li> </ul>	<ul style="list-style-type: none"> <li>• Iterative</li> </ul>	Critical

<ul style="list-style-type: none"> <li>• Drawings</li> <li>• Models <ul style="list-style-type: none"> <li>-Graphical</li> <li>-Physical</li> <li>-Mathematical</li> </ul> </li> <li>• Prototypes</li> <li>• Solutions</li> </ul>	<b>ETE-4.5:</b> Develop various types of models (graphical, physical, or mathematical) that help communicate solutions to peers.	<ul style="list-style-type: none"> <li>• Communicate design solutions to peers through various means, including: graphical, physical, mathematical.</li> </ul>	<ul style="list-style-type: none"> <li>• 3D drawings of puzzle cube</li> <li>• Graphs and statistics of puzzle solving times using Geogebra</li> <li>• 2D drawings of foam block</li> <li>• 2D drawings of puzzle cube</li> <li>• 3D drawings of cerebral palsy toy design</li> </ul>	<ul style="list-style-type: none"> <li>• Autodesk 3D drawing terminology</li> <li>• Standard deviation</li> </ul>	Critical
<b>Energy and Power Technologies</b>					
<ul style="list-style-type: none"> <li>• Power System Types</li> </ul>	<b>ETE-10.1:</b> Analyze a variety of power and energy technology systems.	<ul style="list-style-type: none"> <li>• Compare various power and energy systems</li> </ul>	<ul style="list-style-type: none"> <li>• Presentation and Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Solar</li> <li>• Nuclear</li> <li>• Fossil Fuels</li> <li>• Fuel Cell</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Power System Solution</li> </ul>	<b>ETE-10.2:</b> Solve a simple power and energy challenge and create an efficient solution.	<ul style="list-style-type: none"> <li>• Design, evaluate, and improve a model wind turbine.</li> </ul>	<ul style="list-style-type: none"> <li>• Wind turbine project</li> </ul>	<ul style="list-style-type: none"> <li>• Turbine</li> <li>• Rotor</li> <li>• Stator</li> </ul>	Important
<ul style="list-style-type: none"> <li>• Power System Design <ul style="list-style-type: none"> <li>- Techniques</li> <li>- Tools</li> <li>- Processes</li> </ul> </li> </ul>	<b>ETE-10.3:</b> Utilize appropriate designs, techniques, tools, and processes for energy and/or power systems.	<ul style="list-style-type: none"> <li>• Explain the process used in developing a power system solution.</li> </ul>	<ul style="list-style-type: none"> <li>• Wind turbine project presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Drill press</li> <li>• Scroll saw</li> <li>• Amputation</li> </ul>	Important



<ul style="list-style-type: none"> <li>• Power system model</li> </ul>	<p><b>ETE-10.4:</b> Design and construct simulations, models, and/or prototypes for specific power systems.</p>	<ul style="list-style-type: none"> <li>• Wear safety glasses when appropriate.</li> <li>• Demonstrate safe procedures when using tools and other equipment.</li> </ul>	<ul style="list-style-type: none"> <li>• Wind turbine project</li> </ul>	<ul style="list-style-type: none"> <li>• Drill press</li> <li>• Scroll saw</li> <li>• Amputation</li> </ul>	Important
<ul style="list-style-type: none"> <li>• Communication System Parts</li> </ul>	<p><b>ETE-11.1:</b> Evaluate the parts of a communication system.</p>	<ul style="list-style-type: none"> <li>• Explain parts of the communication system.</li> </ul>	<ul style="list-style-type: none"> <li>• Class discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Communication</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Communication System Types <ul style="list-style-type: none"> <li>- Analog</li> <li>- Digital</li> </ul> </li> </ul>	<p><b>ETE-11.2:</b> Investigate various types of communication technologies including analog and digital technologies.</p>	<ul style="list-style-type: none"> <li>• Explain various types of communication technologies.</li> </ul>	<ul style="list-style-type: none"> <li>• Class discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Analog</li> <li>• Digital</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Communication Systems Models</li> </ul>	<p><b>ETE-11.3:</b> Design and construct simulations/models/prototypes for specific communication systems.</p>	<ul style="list-style-type: none"> <li>• Create a model of a communication system.</li> </ul>	<ul style="list-style-type: none"> <li>• Communication poster project</li> </ul>	<ul style="list-style-type: none"> <li>• Network</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Information Technology</li> </ul>	<p><b>ETE-11.4:</b> Analyze how information technology impacts modes of communication.</p>	<ul style="list-style-type: none"> <li>• Explain the impact of information technology on communication.</li> </ul>	<ul style="list-style-type: none"> <li>• Class discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Information Technology</li> </ul>	Additional

<b>Engineering and Technology Careers</b>					
<ul style="list-style-type: none"> <li>• Career Opportunities <ul style="list-style-type: none"> <li>- Engineering</li> <li>- Technology</li> </ul> </li> </ul>	<b>ETE-12.1:</b> Investigate careers in engineering and technology pathways.	<ul style="list-style-type: none"> <li>• Investigate engineering and related career opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering career research presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Pathway</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Career Requirements <ul style="list-style-type: none"> <li>- Education</li> <li>- Skills</li> </ul> </li> </ul>	<b>ETE-12.2:</b> Analyze education and skill requirements for engineering and technology professions.	<ul style="list-style-type: none"> <li>• Explain skill requirements for engineering and related career opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering career research presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Accredited</li> <li>• Bachelor's degree</li> <li>• Master's degree</li> </ul>	Additional
<ul style="list-style-type: none"> <li>• Career Outlook <ul style="list-style-type: none"> <li>- Demand</li> <li>- Wages</li> </ul> </li> </ul>	<b>ETE-12.3:</b> Report the outlook, demand, and projected wages for engineering and technology careers.	<ul style="list-style-type: none"> <li>• Estimate the projected demand and wage potential for engineering and related career opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering career research presentation</li> </ul>	<ul style="list-style-type: none"> <li>• Outlook</li> </ul>	Additional