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
GENERAL ENGINEERING AND TECHNOLOGY CONCEPTS					
• Purpose • Engineering • Technology • Society	**ETE-1.1:** Illustrate the purpose of engineering and technology in society.	• Explain contributions of engineering and technology to society. • State examples of how engineering has improved the quality of your life. Defend these factors as "improvements".	• "What do engineers do?" worksheet	• Need • Want	Important
• Engineering & Technology - Individuals - Society - Environment	**ETE-1.2:** Identify how engineering and technology impacts individuals, society, and the environment.	• Explain historical and current impacts of engineering and technology. • Identify and defend positive and negative impacts of an invention. • Identify and explain possible ethical issues of engineering development area.	• "What do engineers do?" worksheet • Technological artifact research and presentation	• Engineer • Technologist • Controversial	Important

• Interdisciplinary Nature -Engineering -Technology	**ETE-2.1:** Analyze the interdisciplinary nature of engineering and technology.	• Explain connections of engineering and technology to other disciplines. • Show how engineering progress has depended on advances in science and mathematics.	• Technological artifact research and presentation • "Introduction to Engineering" notes and worksheet	• Disciplines	Important
• Knowledge & Skills - Science - Math - Language Arts - Fine Arts - Social Studies • Engineering • Technology	**ETE-2.2:** Apply knowledge and skills learned in science, mathematics, language arts, fine arts, and social studies classes when completing engineering and technology-based assignments.	• Use proper bibliography, layout, and meet standards of punctuation and grammar. • Analyze satisfaction of design requirements using statistical analysis. • Summarize the cultural effect of an engineering invention or innovation.	• Technological artifact research and presentation • Puzzle block solving analysis	• Mean • Standard deviation	Important
• Eras • History • Technological Innovations & Practices	**ETE-3.1:** Analyze how the eras in history are based on technological innovations and practices of the period.	• Explain historical eras and advances as they relate to chosen technological artifact. • Classify an era based on technology available at that time. • Name advances in science that needed to occur prior to a particular invention.	• Technological Artifact research and presentation	• Stone age • Bronze age • Iron age • Machine age • Oil age • Atomic age • Space age • Information age • Big Data age	Important

• Inventions & Innovations - Products - Processes - Materials - Tools	**ETE-3.2:** Investigate inventions and innovations of products, processes, materials, and tools.	• Research and present information about the historical progress of a technological artifact. • Explain why inventions and innovations were needed in other areas before your artifact could be invented or improved.	• Technological Artifact presentation	• Invention • Innovation	Important
• Technology - Inventions - Innovations • Positive & Negative Impacts - Society - Environment	**ETE-3.3:** Compare technology inventions and innovations and the positive/negative impacts on society and the environment.	• State and defend positive and two negative impacts of multiple technological artifacts.	• Technological Artifact presentation • Artifact presentation summary sheet	• Society	Important
ENGINEERING DESIGN AND DEVELOPMENT					
• Design Process	**ETE-4.1:** Apply the steps of the design process.	• State the steps of the engineering design process.	• Foot orthosis design reflection table	• Cerebral Palsy • Orthosis • Design process steps	Critical

• Design Process • Product • Real World	**ETE-4.2:** Use the design process to create a product that addresses a real world problem.	• Produce a solution to an open-ended design problem prior to being introduced to the engineering design process. • Solve real-world problems prior to being introduced to the engineering design process. • Build a prototype of a design solution given limited materials.	• Foot orthosis build and presentation • Design process reflection table	• Generate	Critical
• Technical Sketch • Design • Annotation	**ETE-4.3:** Create a technical sketch of a design with appropriate annotation.	• Create a front/right side/ top view drawing to match with orthnographic view. • Dimension a drawing according to engineering best practices. • Create an orthnographic drawing. • Create a thumbnail sketch.	• "A picture is worth a thousand words" multi-view sketching exercise. • Foam puzzle blocks dimensioned drawings.	• Orthnographic • Multi-view • Thumbnail	Critical
• Product • Design Process • Documentation	**ETE-4.4:** Develop a product using the design process, while maintaining appropriate documentation.	• Invent a product by following all steps of the design process.	• Foot orthosis build and presentation. • Design process reflection table.	• Documentation	Critical
Processing and Using Technology					
• Construction Systems - Residential - Industrial - Commercial - Civil	**ETE-7.1:** Investigate various types of construction systems including residential, industrial, commercial, and civil.	• Summarize residential, industrial, commercial, and civil construction systems.	• Presentation and discussion.	• Residential • Industrial • Commercial • Civil	Additional

• Construction Systems Utilization - Designs - Techniques - Tools - Processes	**ETE-7.2:** Utilize appropriate designs, techniques, tools, and processes for construction systems.	• Design and plan how to build a residential, industrial, commercial, or civil project.	• Powerpoint presentation	• Process	Additional
• Constructions Systems Models	**ETE-7.3:** Construct simulations, models, and/or structures for specific construction systems.	• Build a model of a construction system.	• Construction system model	• Structure	Additional
• Biotechnology Types - Agricultural - Genetic - Medical - Imaging	**ETE-9.1:** Investigate various types of biotechnologies including agricultural, genetics, medical, and imaging technologies.	• Outline various types of biotechnologies.	• Powerpoint presentation	• Biotechnology • Genetics • Imaging	Additional
• Engineering - Medical - Genetic	**ETE-9.2:** Examine appropriate designs, technologies, tools, and processes for medical or genetic engineering.	• Explain which tools, designs, and technologies are appropriate in various medical and genetic engineering situations.	• Powerpoint presentation	• Medical engineering • Genetic engineering	Additional
• Biotechnology Models	**ETE-9.3:** Construct simulations, models, and/or prototypes for specific biotechnology disciplines.	• Create a biotechnology model.	• Model and presentation	• Gene splicing	Additional

GRADE LEVEL: 7/8 **SUBJECT: Introduction to Engineering** **DATE: 2/23/17 2016-2017**

GRADING PERIOD: 2 and 4 **MASTER COPY: 3/24/17**

CONTENT	STANDARD INDICATORS	SKILLS	ASSESSMENT	VOCAB	PRIORITY
GENERAL ENGINEERING AND TECHNOLOGY CONCEPTS					
• Safety and Procedures • Tools • Equipment	**ETE-1.4:** Demonstrate safe practices and procedures with tools and equipment.	• Wear safety glasses when appropriate. • Demonstrate safe procedures when using tools and other equipment.	• Teacher observation • Air drag racer build • Drill Press/Scroll Saw Safety Procedures Assessment?	• Drill press • Scroll saw • Amputation	Important
ENGINEERING DESIGN AND DEVELOPMENT					
• Design Process	**ETE-4.1:** Apply the steps of the design process.	• Produce engineering designs by using a formal design process.	• Wind turbine design project. • Air drag racer design project. • Cerebral Palsy toy design and presentation • Rube Goldberg design project	• Cerebral Palsy • Orthosis • Aerodynamic • Turbine • Design process steps	Critical

• Design Process • Product • Real World	**ETE-4.2:** Use the design process to create a product that addresses a real world problem.	• Produce a solution to an open-ended design problem by utilizing all steps of the formal design process • Solve real-world problems by using the engineering design process. • Build a prototype of a design solution given limited materials.	• Cerebral Palsy toy design project	• Concept • Prototype	Critical
• Design Process • Product • Documentation	**ETE-4.4:** Develop a product using the design process, while maintaining appropriate documentation.	• Invent a product by following all steps of the design process. • Demonstrate that the design process is iterative through design documentation. • Document design progress and changes in engineering notebook.	• Engineering notebook. • Cerebral Palsy toy design project.	• Iterative	Critical

• Drawings • Models -Graphical -Physical -Mathematical • Prototypes • Solutions	**ETE-4.5:** Develop various types of models (graphical, physical, or mathematical) that help communicate solutions to peers.	• Communicate design solutions to peers through various means, including: graphical, physical, mathematical.	• 3D drawings of puzzle cube • Graphs and statistics of puzzle solving times using Geogebra • 2D drawings of foam block • 2D drawings of puzzle cube • 3D drawings of cerebral palsy toy design	• Autodesk 3D drawing terminology • Standard deviation	Critical
Energy and Power Technologies					
• Power System Types	**ETE-10.1:** Analyze a variety of power and energy technology systems.	• Compare various power and energy systems	• Presentation and Discussion	• Solar • Nuclear • Fossil Fuels • Fuel Cell	Additional
• Power System Solution	**ETE-10.2:** Solve a simple power and energy challenge and create an efficient solution.	• Design, evaluate, and improve a model wind turbine.	• Wind turbine project	• Turbine • Rotor • Stator	Important
• Power System Design - Techniques - Tools - Processes	**ETE-10.3:** Utilize appropriate designs, techniques, tools, and processes for energy and/or power systems.	• Explain the process used in developing a power system solution.	• Wind turbine project presentation	• Drill press • Scroll saw • Amputation	Important

• Power system model	**ETE-10.4:** Design and construct simulations, models, and/or prototypes for specific power systems.	• Wear safety glasses when appropriate. • Demonstrate safe procedures when using tools and other equipment.	• Wind turbine project	• Drill press • Scroll saw • Amputation	Important
• Communication System Parts	**ETE-11.1:** Evaluate the parts of a communication system.	• Explain parts of the communication system.	• Class discussion	• Communication	Additional
• Communication System Types - Analog - Digital	**ETE-11.2:** Investigate various types of communication technologies including analog and digital technologies.	• Explain various types of communication technologies.	• Class discussion	• Analog • Digital	Additional
• Communication Systems Models	**ETE-11.3:** Design and construct simulations/models/prototypes for specific communication systems.	• Create a model of a communication system.	• Communication poster project	• Network	Additional
• Information Technology	**ETE-11.4:** Analyze how information technology impacts modes of communication.	• Explain the impact of information technology on communication.	• Class discussion	• Information Technology	Additional

Engineering and Technology Careers					
• Career Opportunities - Engineering - Technology	**ETE-12.1:** Investigate careers in engineering and technology pathways.	• Investigate engineering and related career opportunities.	• Engineering career research presentation	• Pathway	Additional
• Career Requirements - Education - Skills	**ETE-12.2:** Analyze education and skill requirements for engineering and technology professions.	• Explain skill requirements for engineering and related career opportunities.	• Engineering career research presentation	• Accredited • Bachelor's degree • Master's degree	Additional
• Career Outlook - Demand - Wages	**ETE-12.3:** Report the outlook, demand, and projected wages for engineering and technology careers.	• Estimate the projected demand and wage potential for engineering and related career opportunities.	• Engineering career research presentation	• Outlook	Additional