Unit 1: Introduction to Engineering

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **5 days**
Status: **Published**

Summary

Students will gain an understanding of the field of engineering and a review of the engineering design process. Working both individually and cooperatively, students will learn what engineers do, what tools they use, and how they work in teams to design and develop solutions to problems. Students will set up their personal engineering notebooks that will be used throughout the course and will work collaboratively within assigned teams to develop a solution to a given design challenge.

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TECH.K-12.1.4.a	know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
TECH.K-12.1.4.c	develop, test and refine prototypes as part of a cyclical design process.
TECH.K-12.1.4.d	exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
CS.6-8.8.2.8.ED.1	Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.
CS.6-8.8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.
CS.6-8.8.2.8.ED.3	Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch).
CS.6-8.ED	Engineering Design
WRK.9.2.8.CAP	Career Awareness and Planning
TECH.9.4.8.CI	Creativity and Innovation
TECH.9.4.8.CI.2	Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).
TECH.9.4.8.CI.3	Examine challenges that may exist in the adoption of new ideas (e.g., 2.1.8.SSH, 6.1.8.CivicsPD.2).
TECH.9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.

Essential Questions/Enduring Understandings

Essential Questions:

Why is it important to have a plan when undertaking a problem?

How have developments and changes in technological design impacted our world?

What do engineers do?

How does engineering affect the world?

Enduring Understandings:

Technology is the human process of finding solutions to solve problems and meet needs.

Technology has both positive and negative effects on our lives and planet.

The process of design in engineering is one that does not end.

Engineering and technology have many areas.

Objectives

Students will know that the engineering design process is cyclical in nature.

Students will know how to identify constraints in a design problem

Students will know vocabulary as it applies to the design process: scientific method, alternate solutions, brainstorming, design brief, evaluation, safety, criteria, constraints, model, prototype, analysis.

Students will be skilled at demonstrating safe work habits when using tools, equipment, and technical processes.

Students will be skilled at explaining the role of trouble shooting, research and experimentation with regards to design.

Students will be skilled at explaining the reasoning behind their design.

Students will be skilled at using this process to solve a problem in technology.

Students will be skilled at explaining the difference between the scientific method and the engineering design process.

Students will be skilled at identifying the areas of engineering and technology.

Learning Plan

Areas of Engineering and Technology: Teacher will use Smart Board to present information on the various areas of technology and engineering including terminology, careers, and history.

Review of the Engineering Design Process: Teacher will present information including the definition of technology, engineering, the scientific method, and the 8 steps of the engineering design process. Students

should complete guided notes and/or complete a Google Slide/worksheet highlighting the steps of the process. Teacher will lead discussion on how this process is used in engineering. Concepts may be supported through showing videos that explain the process and how it has been used by engineering throughout history.

Overview of Design Challenge: Students will be provided with an overview of the unit's design challenge to establish understanding of the problem, its constraints, materials, and how the Engineering Design Process will be utilized. Working in small groups, students will complete the "Solving Everyday Problems Using the Engineering Design Process" activity where they will work through a given problem as a group. Students will be provided with a paper or online document where the steps taken to complete the process will be documented throughout the completion of the unit.

Desk Organizer Design Challenge Completion: Students will work individually or in small groups to research, design, build, and test a prototype to solve the problem of organizing a messy desk/locker. Teacher will oversee the process, encouraging iteration throughout and supplying materials. Students will work collaboratively to create a prototype that will be built using the given materials.

Evaluation and Redesign: Following testing, teacher will guide students through the process of self-evaluation and a written redesign of their solution.

Materials

Guided note packets/Google Docs (teacher developed)

Technology (student & teacher laptops, SmartBoard, document camera)

Google Slides/PowerPoints

Safety Equipment

Paper

Rulers

Tissue paper

Masking tape

Scissors

Popsicle sticks

Glue

Cool melt glue guns

Cardboard

Construction paper

Paper Clips

Integrated Accommodation and Modifications,

See attached document:

https://docs.google.com/spreadsheets/d/1bW0L5xhslCD9IsWWnzfbMJoRUI5vOFrgbQJ2saYTgLU/edit?usp=sharing