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 document the steps of the Engineering Design Process while working collaboratively within assigned teams to develop a solution to a given design challenge.

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L.SS.8.1	Demonstrate command of the system and structure of the English language when writing or speaking.
9.4.8.CI.2	Repurpose an existing resource in an innovative way (e.g., 8.2.8.NT.3).
9.2.8.CAP.2	Develop a plan that includes information about career areas of interest.
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).
9.2.8.CAP.3	Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
9.4.8.CI.4	Explore the role of creativity and innovation in career pathways and industries.
L.KL.8.2	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
3.3	Demonstrate an understanding of the need for mutual respect when viewpoints differ
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.
9.2.8.CAP.16	Research different ways workers/employees improve their earning power through education and the acquisition of new knowledge and skills.
TECH.K-12.1.4.d	exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
8.1.8.AP.6	Refine a solution that meets users' needs by incorporating feedback from team members and users.
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.
8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.
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).

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.

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

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 Engineering Design Process.

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 troubleshooting, 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 the Smart Board to present information on the various areas of technology and engineering including terminology, careers, and history.

Review of the Engineering Design Process: The teacher will present information including the definition of technology, engineering, and the 8 steps of the Engineering Design Process. Students should complete guided notes and/or document the information by completing a Google Slide, worksheet, or similar activity highlighting the steps of the process. The teacher will lead a 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 in engineering throughout history.

Overview of Paper Drop 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 "Paper Drop Challenge" using the Engineering Design Process. 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.

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

Safety Equipment

Paper

Masking tape

Rulers

Index Cards

Scissors

Paper Clips

Glue

Construction paper

Assessment

Formative Assessments:

Google Forms

Guided notes

Paper/Digital Engineering Notebook

Brainstorming Sketches

Graphic Organizer

Benchmark Assessments:

Design Challenge Documentation

Design Challenge Prototype

Summative Assessment:

Evaluation and Redesign written assignment/Google Form

Alternative Assessment:

Checklist

Questioning

Discussion

Integrated Accommodation and Modifications,

See attached document:

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