

Unit 1: The History of Engineering

Content Area: **Applied Technology**
Course(s):
Time Period: **Marking Period 1**
Length: **8 Days**
Status: **Published**

Summary

As a result of this unit, students will explore how the concept of engineering has existed since ancient times and is still transforming the way people live and interact with their world today, as they explore basic principles of engineering to develop useful tools and objects.

Revision date: July 2023

SCI.MS.ETS1.A	Defining and Delimiting an Engineering Problem
SCI.MS.ETS1.B	Developing Possible Solutions
SCI.MS-ETS1	Engineering Design
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.6-8.8.2.8.ED.5	Explain the need for optimization in a design process.
CS.6-8.8.2.8.ED.7	Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches).
CS.6-8.ED	Engineering Design
WRK.9.2.8.CAP.1	Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest.
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).

Essential Questions/Enduring Understandings

Why should we learn about the history of engineering?

Where did engineering begin?

What were some of the barriers that needed to be overcome in the beginning, including impacts on groups of people from different social classes or statuses?

What are the different fields of engineering?

What are some of the early engineering wonders of the world, particularly from early river civilizations?

Who were some of the early innovators in engineering?

Learning about the history of engineering helps us to understand the world we live in and how we might change things in the future.

The Industrial Revolution is seen as a boom in engineering developments that marked a turning point from the old to the modern world.

Objectives

Students will know the beginnings of engineering were efforts to survive and improve the quality of life.

Students will know that language barriers, lack of transportation, and limited education based on social hierarchies were some of the obstacles to early developments in engineering.

Students will know the many different fields of engineering.

Students will know the many engineering marvels throughout ancient to modern history, including but not limited to: pyramids, obelisks, irrigation systems, temples, siege weaponry, bridges, forms of flight, boats/ships, etc.

Students will be skilled at using researching skills to compare and contrast ancient and modern engineering marvels.

Students will be skilled at using the Engineering Design Process to create their own irrigation system.

Learning Plan

Pioneers in Engineering: Students will create a Google Slide on a pioneer in engineering. People researched can be from any time in history, ancient through present day. Students will include details about obstacles the person faced, their early versus later in life inventions, define what field of engineering they were in, and how their invention impacted society. Students will then share their Google Slides with the class.

Engineering Timeline: Students will work with a partner to develop an engineering timeline where they research one ancient, one modern, and one NJ based engineering feat (for example, the building of the Great

Pyramid at Giza, the Burj Khalifa building in Dubai, and the George Washington Bridge) and tell why they are considered a great feat, what obstacles they had to overcome, and their impact on their societies and the world. Students will present their findings to the class.

Irrigation System: Students will explore how technological innovations in irrigation systems affected the status and social class of different groups of people in early river valley civilizations. Students will explore different types of irrigation systems used in ancient and modern history. Students will work in a small group and use the materials supplied to create their own irrigation system using either a level or pulley system. Students' goal will be to move water from one container to another using their irrigation system. Students will complete a reflection on their process.

Assessment

Formative:

Do Nows

Exit tickets

Class discussions

Worksheets

Summative:

Irrigation system project and reflection

Benchmark:

Pioneers in Engineering project

Engineering Timeline project

Alternative:

Checklists

Verbal discussions

Materials

Google Slides

Google Docs

YouTube

Gizmos

Chromebooks

Projector

Mini cups

Popsicle sticks

Rubber bands

Glue

Two bins to hold water

Bottle caps

Straws

String

Toothpicks

Water pitcher

Timer

Integrated Accommodation and Modifications, Special Ed, ELLs, At-Risk, G & T, Career Education, 504s

See attached document:

<https://docs.google.com/spreadsheets/d/1pzkODxxGOSxESwthnE0jQW8hVfMaZ9ygEBg5QsKBcDA/edit?usp=sharing>