Civil Engineering

Day 2

Lesson Overview

This lesson introduces students to the field of Civil Engineering, particularly focusing on bridges. Students will first learn what civil engineers do, and different fields they engage in. Students will also learn basic concepts such as force, points of failure, and stability, and will apply these concepts in a hands-on activity where they build a popsicle stick bridge. The lesson emphasizes teamwork, efficient use of materials, and understanding structural stability.

Lesson Objectives

By the end of this lesson, students will be able to:

- Understand what civil engineering is.
- Explain key civil engineering concepts: force, points of failure, stability, and trusses.
- Understand the strengths and weaknesses of truss bridges.
- Design and construct a bridge using limited resources, applying the concepts they have learned.

Vocabulary

1. **Force:** The push or pull exerted on an object, affecting its motion and stability.
2. **Truss:** A structural framework that supports a load, often used in bridges and roofs.
3. **Point of Failure:** The specific part or component of a structure where failure or collapse is most likely to occur.

Lesson Plan

CIVIL ENGINEERING PRESENTATION 	**Objective**: Provide an overview of Civil Engineering and introduce key topics that students will use during the activity. **Materials**: PowerPoint Presentation ("Day 2 - Civil Engineering.pptx")

	Topics covered: Civil Engineering profession, forces, points of failure, stability of structures, bridges
BRIDGE BUILDING 	**Objective**: Students will work in teams to construct a bridge using limited materials. Materials: ● Popsicle sticks ● Hot glue guns and glue sticks ● Scale (to measure weight) ● Stackable weights Instructions: ● Encourage students to apply what they just learned in the presentation. ● Guide students as needed Encourage creative problem-solving. ● Specifics found on the PowerPoint
COMPETITION & REFLECTION 	**Competition**: Test the strength of each bridge using increasing weight until the bridge breaks. Reflection: ● Ask students to identify where the point of failure most likely was. ○ Why was this the case? ● Ask students what they think they could have improved on if they were to do it again.

Additional Resources

- Use the following links to show examples of truss bridges:
  - Video 1
  - Video 2
  - Video 3 (for instructor inspiration)