

Design Challenge: Build a Penny Boat

Description:

Students will build a boat that can support multiple pennies without sinking.

Objective(s):

Students will utilize the EDP to create a finished product.

ISTE/NGSS Standards:

4c: Students develop, test and refine prototypes as part of a cyclical design process.

5c: Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

MS-ETS-1.1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS-1.2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

Teq Lesson Plan Activity

Essential Question(s):

How does math and physics impact engineering?

Materials:

- Tin Foil
- Scissors
- Pennies
- Tank of water
- EDP Graphic Organizer

<https://docs.google.com/document/d/1UYqqzT3aMgdNVb6-zog02Q4mY686WuM-2iHSEfsyLps/edit>

<https://www.youtube.com/watch?v=q7R7JYAdYIY>

Do Now:

Discuss what makes some objects float while others sink, which should dovetail into a discussion of density and volume.

Lesson:

1. Students will work on their own or in groups to design a boat that will be able to hold the most pennies without their boats sinking.
2. Students will utilize the EDP Graphic Organizer to plan and design their boats.
3. The class will test their boats and record their results.

Closure:

The class will complete the reflection activity in their graphic organizers.

Extension:

Class will discuss the equation for Density ($D = m/v$) and how it could be applied to maximize the capacity of their boats.