

Float My Clay Boat

Grade Level: 4, 5, 6, 7, 8

Duration: 30-45 minutes

Classification: Classroom AND/OR STEM Spark

Subject(s): Materials Engineering, Physics

Categories (STEM): Science, Engineering

Keywords: Design, Tensile Strength, Density, Buoyancy

Introduction

- Summary: Students will learn the engineering design process by creating and modifying a model capable of floating on water under different amounts of weight.
- Description: Students will build a model capable of floating on water using clay. By modifying their original design students will learn the importance of the engineering design process and choosing materials for sustaining structures and buildings.

Online Resource: <http://teachers.egfi-k12.org/activity-float-a-clay-boat/>

Vocabulary

- **Density:** mass of a given volume (measure of compactness)
- **Buoyancy:** the ability of something to float in water
- **Tensile strength:** the resistance of a material to breaking under tension

Materials

Materials	Quantity	Reusable?
Play Doh	1 container per 3-4 students	Yes
Bag of Pennies	~ 100 pennies per classroom	Yes
Paper Towels	1 roll per classroom	No
Wax Paper	1 roll per classroom	No
Tubs for water	2 per classroom	Yes

Directions

- Make groups of 3-4 students.
- Give each group a container of Play Doh to create their clay boat at their desks. The goal is to float on top of the water while carrying as many pennies as possible.
- Using the containers in the front of the room, test how many pennies each boat is able to hold.
- Place boats on a sheet of wax paper to dry. Materials must be dried between trials.

Activity Extension

- Have students make models to support different amounts of pennies (25, 50, 75, 100, etc) and challenge their modification of the design process by adding weights.

Discussion Questions

- What model/boat design worked best?
- How did you use your tape?
- What changes did you make to hold weight (pennies)?
- How does building a clay boat relate to the design process for engineering?

What is happening?

- Students will make a clay boat model that will float on water and withstand the force of weight when pennies are added. Students will learn the engineering design process as their models are modified and revised to add more weight.

Applications:

- Majors
 - Industrial Engineering
 - Construction Engineering
 - Materials Engineering
 - Architecture
 - Physics
- Jobs
 - Inventors
 - Independent Contractors
 - Architects
 - Design Engineer
- Hobbies
 - Remote control boat racing
- Real world applications
 - Compressibility, Resistance, Tensile Strength
 - Engineering Design Process
 - Scientific Method
 - Choosing materials, polymers, materials for buildings
 - Density, Buoyancy
 - Force Diagrams



This activity was last updated in fall 2020 by Student Role Models.