

Penny Boats

Summary

In this activity, we will be completing an engineering challenge. By using the engineering process, can you build a boat that both floats and holds a cargo of pennies?

Materials

- Several pennies
 - *Other same-sized coins may be used as well.*
 - *If you aren't using coins, it is best to use objects that are the same size and weight.*
- Aluminum foil
 - *Any size sheet will due, as long as it can hold your chosen items.*
- Small bin filled with water
 - You may also use a sink or bathtub filled with enough water for your boat to fully sink under the surface.
- Trays and paper towels for cleanup.

Steps to Follow *(All activities must be done with adult supervision)*

1. *What kind of objects sink, and what kind float? Can you think of some examples?*
 - a. *If the object is denser than the water it is in, it will begin to sink. If it is lighter, it will become buoyant, and float on the surface. Think of a rock versus a feather.*
2. Cut a piece of aluminum foil to whatever size you would like. Fold and shape it to look like a boat or something that can hold pennies.
 - a. *What would be a good boat shape to keep out water and hold pennies?*
3. Once your boat is built, place it in the water and wait a few seconds to make sure that it does not sink.
4. Place the pennies into the boat one by one and count how many it holds before it finally begins to take on water and sink.
 - a. Before you get to the point of sinking your ship, observe what happens every time you place a penny in the ship.
 - i. *All matter takes up space and has mass. When you place a penny in the ship, it begins to dip lower because of the extra mass. This is displacement.*
 - ii. *Imagine getting into a full bathtub and seeing all the water be pushed out of your way as you sit down and cause a giant mess!*
 - iii. *If you are too dense and cannot push aside enough water to equal your weight you sink.*
5. Use another piece of foil and make a new design. *Can this boat hold more pennies? What other boat shapes can you think of?*

- a. *Large shipping vessels weight a lot, but their shape helps move more water and they have large empty spaces to lower their overall density.*

Ohio Early Learning and Development Standards

Cognition and General Knowledge/Cognitive Skills/Reasoning and Problem Solving

Cognition and General Knowledge/Mathematics/Number Sense/Number Sense and Counting

Cognition and General Knowledge/Science/Science Inquiry and Application/Inquiry

Ohio Learning Standards

K.CC.4, K.CC.5. 3.PS.1

New Generation Science Standards

K-2-ETS1-2, K-2-ETS1-3, 3-5-ETS1-3, MS-ETS-1