



Boat building challenge

Use aluminum foil to make boats and then test designs by seeing how many pennies or paperclips they can hold.

Background

- When an object is in the water, gravity pulls the object down and displaces some of the water, which means some of the water is pushed aside.
- Gravity pulls the displaced water down, and causes an upward force on the object, called buoyancy.
- The amount of water displaced depends upon the volume of the object. A higher volume causes more fluid to be displaced, which means more buoyancy.
- Boat designers have to consider buoyancy as well as friction when deciding on the shape of a boat's hull. A boat designed for speed must have enough displacement to stay afloat, but surface area has to be minimized to decrease the effects of friction.
- On the other hand, an object designed to carry a heavy weight, such as a cargo ship, must be designed with greater displacement.

Materials

- Sheets of aluminum foil (30 x 30 cm)
- Tub of water
- Pennies or paper clips

Instructions

- Design and build a boat with one sheet of foil.
- Float boat in the tub of water.
- Add pennies or paper clips one at a time into the boat.
- Design a new boat to hold more weight!

Extensions

- Calculate the boat hull's surface area and compare/graph to the number of pennies held.
- Design and build sailboats and use a fan for wind.
- Participate in the Sea Perch Challenge: <https://www.seaperch.org/challenge>

Related resources

- Boat building challenge: <http://celebrating200years.noaa.gov/edufun/book/BoatBuildingChallenge.pdf>
- NOAA fleet: <https://www.oma.noaa.gov/learn/marine-operations/ships>
- Observation platforms: Vessels: <https://oceanexplorer.noaa.gov/technology/vessels/vessels.html>