Hands – On Science with NOAA

TITLE: Boat Building Contest

OVERVIEW:

Students use aluminum foil to make "boats" and then test their design by seeing how many pennies or paperclips they can hold.

MATERIALS:

Sheets of aluminum foil (30 cms X 30 cms)
Tub of water
Pennies or paper clips

INSTRUCTIONS:

1. Provide each student with a 30 cm X 30 cm sheet of aluminum foil.
2. Design and build a boat with the sheet of foil to float as many paper clips or pennies as possible.
3. Float the boat in a tub of water and add pennies or paper clips one at a time into the boat.

SCIENCE EXPLANATION:

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.

EXTENSION IDEAS

- Calculate the boat hull's surface area and compare/graph to the number of pennies held.
- Design and build sail boats and use a fan for wind.
- Participate in the Sea Perch Challenge (http://seaperch.org/seaperch_challenge)

EXPLORE FURTHER

Boat Building Challenge
http://celebrating200years.noaa.gov/edufun/book/BoatBuildingChallenge.pdf
NOAA Research Ships
http://www.moc.noaa.gov/
http://oceanexplorer.noaa.gov/technology/vessels/vessels.html