

# CURIOSITY AT HOME

## BOATS AFLOAT



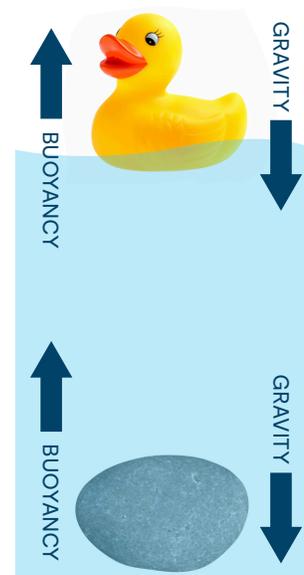
Buoyancy is the upward force of a fluid (liquid or gas) on an object that is fully or partially submerged in

Gravity is the downward force of a body or planet (Earth) has that pulls objects towards its center.

*Using the Engineering Process of Design, Test, and Redesign, explore buoyancy and gravity by designing a boat.*

### MATERIALS

- Aluminum foil
- Scissors
- Shallow plastic or glass container (preferably clear)
- Pennies or metal washers
- Water



### PROCEDURE

1. Fill the shallow plastic or glass container at least halfway with water.
2. Cut three to four 5 in. x 5 in. sheets of aluminum foil.
3. Try floating a flat sheet of aluminum foil on the water. Observe what happens. Record your results in the chart.
4. Can the aluminum foil sheet hold any weight? Add a penny or two to find out.

Trial #	Boat Design	Does it Float?	# of Pennies Carried	Observations
1	Flat sheet of aluminum foil			
2				
3				
4				
5				

*Experiment continued on next page...*



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**Challenge:** Build a boat that as hold as much cargo (pennies) as possible.

### 5. Design

- a. Think about the boats you have seen.
- b. Using a 5 in. x 5 in. sheet of aluminum foil, design and build a boat that can carry as much cargo (pennies) as possible.

### 6. Test

- a. Place your boat in the water to see if it floats.
- b. Add pennies until the boat begins to sink.
- c. Record your results in the chart below.

### 7. Redesign

- a. Redesign your boat to see if you can hold more cargo.
- b. Things to think about.
  - i. Does the shape of the bottom of the boat change how much weight it can hold?
  - ii. Does the shape of the bottom of the boat change how stable the boat is?
  - iii. How does the placement of the weight affect the boat?
  - iv. Are there materials that you could add to the aluminum foil to make the boat float better?

*Experiment continued on next page...*



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### 3–5 GRADE EXPLORATION

- Are there materials that you can find to make a boat that carries even more pennies?
- Engineers design materials and objects to serve a certain purpose. What are four different ways that boats are used?
- How does their use affect how they are designed?
- On a separate piece of paper draw each boat design you tried. Under each picture write what you changed and why you made that change.



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