#FontanaTogether

# Build a Boat that Floats

Have you ever wondered how a ship made of steel can float? Or better yet, how can a steel ship carry a heavy load without sinking? In this activity you will make little "boats" out of aluminum foil to investigate how their size and shape affects much weight they can carry and how this relates to the density of water.

Build boats to carry pennies and figure out how much weight is too much!

## Materials:

- 6 squares of aluminum foil
- Pennies
- Clear container – a plastic storage container works great!
- Water
- Ruler
- Paper
- Pencil or other writing tool

## Instructions:

1. Fill the clear container with water, almost to the top. It should be large enough to fit the boat you'll build.
2. Create a boat with one sheet of the aluminum foil, by folding up the edges.
3. How many pennies will the boat float? Use the paper and pencil to make notes of your guesses.
4. Now, put it to the test! Place your boat in the water and slowly add pennies, one at a time. Do this until the boat sinks.
5. How many pennies sunk your boat? Make a note of how many pennies it took.
6. Redesign the boat and make note of your changes. Try adding more layers or making different shapes. How many pennies will sink it now?
7. Record your guesses – or hypotheses – and compare them to how long it actually takes the boat to sink. Use the ruler to measure the thickness of the boat. Does that make a difference? Does boat length make a difference?

- As a boat floats in the water it pushes aside water making space for the boat. This is displacement. The water then pushes back on the sides and bottom of the boat. The Archimedes principle states that if the weight of an object being placed in water is less than the weight of the water, the object will float. This is also called buoyancy.

- Expand on the experiment by making large 12-inch boats out of tinfoil. How many pennies can they float? What other materials can you use to make a boat? Try additional waterproof materials to explore ways to create different shaped boats that float using straws, plastic cups or popsicle sticks. Bon Voyage!

- Use other materials for building the boat hulls. For example, waxed half-gallon cartons (for milk or juice) can be cut open and unfolded to produce sheets of waterproof material. To make folds to create the desired hull shape, first score the material with a blunt stylus—the classic Bic pens with the blue plastic caps have a great shape for this. Keep the cap on and use it to score the waxed paperboard before folding.