

Aluminum Boat

Thank you for downloading the science and mathematics activity packet! Below you will find a list of contents with a brief description of each of the items. This activity packet contains all the information (including any handouts) you will need to run this activity in your own classroom or at a science festival.

Please note: some activities might require the need for a facilitator to be present to oversee the activity. Activities that require a facilitator will be clearly noted.

-Community Resources for Science



Aluminum Boat

ACTIVITY PACKET CONTENTS

1. Organizer instructions for the person running the activity
 - Print suggestion: 1 for the facilitator
 - Includes information for setup prior to the event (e.g., materials prep)
 - Estimated cost for one set of supplies, excluding common household items
 - Estimated number of participants per one set of supplies
2. What's Going On? (tabletop sign/printout)
 - Print suggestion: 1 to put in a plastic sign holder
 - Explains the science and background information behind the activity
3. Participant Instructions (tabletop sign/printout)
 - Print suggestion: 1-2 to put in a plastic sign holder
4. Take home ½ sheet activity instructions for participants
 - Print suggestion: number of expected participants
 - Easy-to-follow materials list and instructions for participants to try the activity at their homes



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ORGANIZER INSTRUCTIONS

Grade(s): K-5

Next Generation Science Standards: Science and Engineering Practices

- **Developing and Using Models:** Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system
- **Constructing Explanations and Designing Solutions:** Use information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena

Objective: Test the buoyancy of an aluminum foil ball and an aluminum foil boat

Activity overview and background: Students will test and compare how different shaped objects float based on their differences in densities on the water

This activity requires the use of a facilitator to monitor and refill water, as needed

Estimated cost for one set activity supplies: \$6

Estimated number of participants per set of supplies: 37 (based on 75 sq ft roll of aluminum foil)

Materials

- Small bucket or large bowl (\$3)
- Water
- 20 coins of the same weight (e.g. pennies, nickels, washer weights)
- Scissors
- Aluminum foil, cut into 6-inch squares (\$3)
- Ruler

Setup:

1. Cut 6-inch foil squares; each participant gets 4 foil squares
2. Fill bucket or large bowl with water
3. Set out all materials on a table, including What's Going On sign and Instructions

Suggested Prep:

- Set up two containers of water to have two activities running simultaneously
- Make foil boat for participants to use as an example



What's Going On?

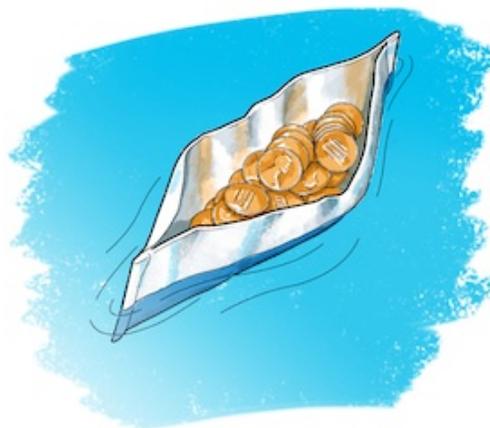
When you dropped the aluminum ball in the water, it had a completely different result than the aluminum boat!

- Both the ball and boat have the same weight, but because the ball takes up a smaller space than the boat, the ball has a higher density

Density: The amount of water pushed aside by an object equals the force of water pushing upward on the object

The larger boat pushes more water out of the way than the ball and creates enough upward force to cause it to float on the water.

- When you first put the boat on the water, it should float because its total density is less than that of water
- As you add pennies to the boat, its density increases and the boat floats lower. The boat sinks because its density approaches that of water



Instructions

1. Take 4 aluminum foil squares
2. Wrap one of the aluminum foil squares around 10 coins and squeeze the aluminum foil into a tight ball
3. Fold up the four edges of the second aluminum foil square to make a small boat
 - Make sure you seal each corner tightly so water cannot leak into the sides from below the boat.
 - Set the boat on the surface of the water in the bucket; place 10 coins in the boat
4. Place the ball on the surface of the water
5. What happens to the foil ball and the foil boat?
6. With the other 2 pieces of aluminum foil, design a boat that has a different shape than your original boat.
 - You can try making a circle, square or rectangle shape boat
7. Make another boat using the last piece of aluminum foil
 - Try one making one with high side barriers and one with low side barriers
 - Which boat can hold the most coins without sinking?

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TRY IT AT HOME!

What you'll need:

- Small bucket or large bowl
- Water
- 20 coins of the same weight (e.g., pennies, nickels)
- Scissors
- Aluminum foil, cut into two 6-inch squares
- Ruler

Instructions:

1. Measure with the ruler and cut out two 6-inch aluminum foil squares
2. Wrap one of the squares around 10 coins and squeeze the foil into a tight ball
3. Take second foil square and fold the four edges up to make a small boat
 - a. Make sure you seal each corner tightly so water cannot leak into the sides from below
4. Set the boat on the surface of the water in the bucket and place 10 pennies in the boat
5. Place the foil ball (wrapped coins) on the surface of the water. What happens?
6. Compare between the foil ball and the foil boat

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6. Compare between the foil ball and the foil boat