

# Can It Carry Cargo?

Grades 2-3

## Overview

The students will experiment with different objects to see which will float or sink in water. The children will also explore making boats out of aluminum foil, to see what shape boat will carry more pennies, when floated in a tub of water.

## Objective

- To help students understand how the shape of an object helps determine whether it will sink or float.
- To help students understand that the shape of a boat affects the amount of cargo it can carry.

## Materials

*For the presenter:*

- a tub or pan for floating small objects
- a bag with 10-12 small objects to use for floating test (paper clip, pencil, cube of wood, orange, etc.)
- paper towels (for spills)
- labels - **Float, Sink**
- 2 medium plastic bags to hold objects that sink or float

*For each group of 4 students:*

- Eight - 4"x 4" pieces of heavy duty aluminum foil
- a container of 60 pennies
- 1 small tub - filled 1/3 full of water for floating boats
- paper towels for spills



## Getting Ready

Place plastic tub 1/2 full of water in an area where all students will be able to see it from their desks. Have objects ready in a bag by the tub. These will be used for whole group lesson to see what objects will float. Label bags with *Sink* and *Float*. [They will hold objects that sink and float.]

Fill the tubs, that will be used for students to float boats, about 1/3 full of water. Each group of four children will use a tub with water, a container of pennies and paper towel for their activity. Make sure the foil is cut into 4"x4" pieces. Each student will receive 2 pieces of foil.



The class should be divided into groups of four. The students will be sharing a tub of water and will need to be seated near each other.

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### **Procedures**

Tell the students that they will be doing some experiments today to help them understand why some things float and some things sink. Use the questions below to get the students thinking and spark their interest.

#### **Activity 1: Sink or Float**

##### **Questions**

“What things can float? Why do some objects float and others do not? Does the shape of an object have anything to do with whether or not it floats?” Write *float* and *sink* on the chalkboard.

Hold up an object from your bag, ask the class to predict whether or not they think it will float. Choose one student at a time to put an object in the water to test for bouyancy. As the objects are tested, have the students place objects in appropriate bags labeled *Float* or *Sink*. Ask the students if they can find any similarities between the things that did float and the ones that did not.

#### **Activity 2: Building Boats**

Explain to the students that they are going to build boats today out of foil. Tell them to think about what they already know about floating when making their boat and that they will be using pennies for cargo in the boats.

Before handing out any materials, explain to the students what they will be doing.

*Discuss with the students the rules for using water.*

- ◆ Water is to remain in the tub.
  - ◆ Water is only for testing your boat.
  - ◆ If you spill water, please use paper towels for clean up.
  - ◆ Anyone not following the rules will not be allowed to test their boats.
1. You will be given 2 pieces of foil.
  2. Using one piece of foil, you will build a boat that can float.
  3. The tub of water will be for your group to test your boats.
  4. Use the pennies for cargo. See how many pennies your boat can hold. Your group will get a container of pennies to share.
  5. Use the second piece of foil to design a new boat that you think will be able to carry more cargo. Use what you learned building the first boat to help you decide how you want to build your second one.
  6. Ask three students to hand out 8 pieces of foil, 1 container of pennies and paper towels to each group. You will probably want to carry the tubs of water to the groups.

### **Discussion**

As you move around the classroom, ask the students how the shape of the boat affects the amount of cargo it can carry. “How can you change your boat so it will carry more cargo? Can you predict how many pennies your boat will hold?”

### **Closure**

Discuss with the children how the shape of a boat affects the amount of cargo it can carry. Ask students to share how many pennies their boats held without sinking.

### **Clean up**

Tell the students to put the pennies in the container and wipe off their work space. You collect the tubs of water. Ask two students to collect the penny containers for you.

**Float**

**Sink**