

Sink or Float?

OBJECTIVES

Students observe how different objects behave in water and then predict whether various objects will sink or float.

The students

- operationally define *sink* and *float*
- predict and observe whether various objects sink or float
- sort objects as sinkers or floaters
- modify the shape of a sinker to make it a floater

SCHEDULE

About 40 minutes

VOCABULARY

float
sink

➤ All materials will be ready and waiting in the lab!

MATERIALS

For each student

- 1 Activity Sheet 10

For each team of two

- 1 button, any shape/color
- 1 container, fluted, 1-pt
- 1 cork
- 1 piece foam
- 1 marble
- 1 paper clip, large
- 1 rock, rough

- 1 rubber band
- 1 shell
- 1 spoon, plastic
- 1 tray, sorting
- 1 washer, small

For the class

- 3 bags, plastic, resealable*
- 1 balloon
- 1 bag clay (from Activity 9)*
- 3 sticks clay
- 1 knife, dull*
- 1 sheet paper, scrap*
- paper towels*
- 1 pair scissors*
- water, tap*
- 1 wood samples, p/16

*provided by the teacher

PREPARATION

- 1 ~~Make a copy of Activity Sheet 10 for each student.~~
- 2 ~~Cut the clay into sixteen 3-cm (1-in.) cubes with the dull knife. Cut a piece of scrap paper into sixteen 3-cm (1-in.) squares.~~
- 3 ~~Blow up the balloon with air and fill the fluted 1-pt containers two-thirds to three-quarters full of tap water.~~
- 4 You will need a fluted container partially filled with water, the balloon filled with air, and a rock for a class demonstration. Borrow the container and the rock from one of the teams. Keep paper towels on hand so that spills can be wiped up quickly.

- 5 Each team of two will need a fluted container with water and a sorting tray containing the following items: a button, a cube of clay, a cork, a piece of foam, a marble, a large paper clip, a rock, a rubber band, a plastic spoon, a scrap paper square, a shell, a small washer, and a wood sample (either light-colored or dark-colored).

BACKGROUND INFORMATION

Water is the most common substance on Earth. Nearly three-quarters of Earth's surface is covered with water.

When an object is placed in water, it either **sinks** or **floats**. A solid object made of material less dense than water floats. A solid object made of a material more dense than water sinks. (Density is a measure of mass per unit volume.) For example, ice is less dense than water— 1 cm^3 of ice weighs less than 1 cm^3 of water. Thus, ice floats in water. This explains why icebergs float in the ocean.

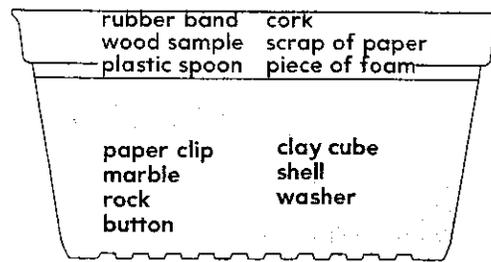
When an object is placed in water, it pushes away—or displaces—a certain amount of water. At the same time, the water pushes back upward with a force equal to the weight of water displaced. If the weight of the displaced water is equal to the weight of the object, the object will float. If the weight of the displaced water is less than the weight of the object, the object will sink.

Objects made of materials more dense than water can be made to float by reshaping them to increase the volume of water they displace, which in turn, increases the weight of the water displaced and the upward force of the water. Students discover this when they experiment with clay. Shaped as a ball or a cube, clay sinks. Reshaped as a boat, clay floats.

▼ Activity Sheet 10

Sink or Float?

1. Look at the objects on your tray. What objects do you think will sink in water? Draw a picture of them.
2. What objects do you think will float in water? Draw a picture of them.
3. Test the objects to see if they sink or float. Draw pictures to show the sinkers and the floaters.



Guiding the Activity

- 1 Point to the container of water at the front of the classroom. Hold up a rock. Ask, **What do you think will happen to this rock when it is placed in the water?**

Place the rock in the water. Ask, **What happened to the rock?**

Show students a balloon. Ask, **What do you think will happen to this balloon when it is placed in the water?**

Place the balloon in the water. Ask, **What happened to the balloon?**

- 2 ~~Write *sink* and *float* on the board and define the terms.~~ Tell students that if something **sinks**, it drops to the bottom of a container of water; if something **floats**, it rests on top of the water (see Figure 10-1).

★ Explain that whether an object sinks or floats is another property of objects that students will investigate today.

Return the balloon and the rock to the correct tray.

- 3 ~~Distribute a sorting tray with materials to each team and a copy of **Activity Sheet 10** to each student.~~

After students have examined the objects, ask them first to predict which objects will float and which will sink. Students should record their predictions in questions 1 and 2 of their activity sheets.

When students have made their predictions, distribute a container of water to each team and have students test the objects to see whether they sink or float. Allow time for teams to test each of their objects.

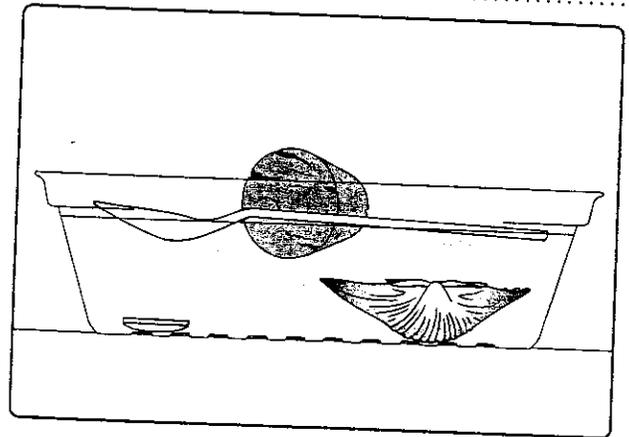
Additional Information

Students will probably say that the rock will sink or fall to the bottom of the container. Accept all predictions.

Students should say that the rock went below the surface of the water and dropped to the bottom of the container; it sank.

Accept all predictions.

Students should say that the balloon stayed on top of the water or was held up by the water; it floated.



▲ *Figure 10-1. Testing to see whether objects sink or float.*

Give students time to handle and examine the objects on their tray.

Help students read the instructions on their activity sheets.

Tell students to wipe up any water spills immediately with a paper towel.

Guiding the Activity

Have students draw a picture of each object they test on their activity sheets. The ones that float should be drawn at the water's surface and the ones that sink should be drawn along the bottom of the container.

- 4 When teams have finished their investigations, ask, **Which objects were sinkers? Which were floaters?**

Then ask, **What makes an object sink? What makes an object float?**

- 5 Help students understand that the shape of an object can affect whether an object floats or sinks (see Figure 10-2). Hold up one of the teams' cube of clay. Ask, **Did the cube of clay float or sink?**

Challenge students to figure out a way to make the cube of clay float. If students shape the clay like a flat boat, the clay should float. After students have worked on this problem for a while ask, **Was anyone able to make the clay float? If so, what did you do to the cube of clay to make it float?**

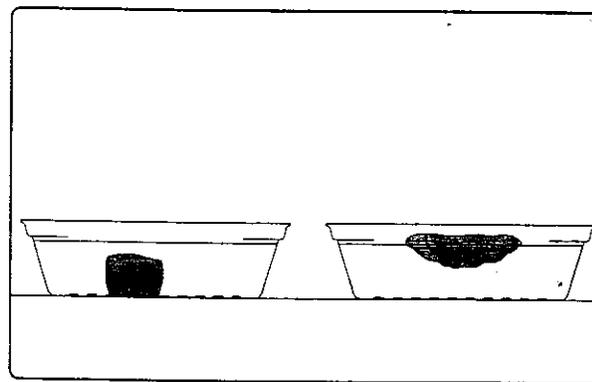
If students have not figured out how to make the clay float, ask, **What other things do you know that float on water? or, How do people travel across water?**

Additional Information

Students should say that the button, the ball of clay, the marble, the rock, the paper clip, the shell, and the washer were sinkers. The cork, the piece of foam, the scrap paper square, the plastic spoon, the rubber band, and the wood sample were floaters.

Students might say that heavy objects sink while light objects float. Some students might realize that shape affects whether an object sinks or floats.

Students should recall that it sank.



▲ **Figure 10-2.** Solid clay sinks. Clay boats float.

Students should say that they molded the cube of clay into a boat-like shape and that the newly shaped clay now floats.

Students should say that boats float on water. This should give them the idea of forming the clay into a boat shape.