

ACTIVITY 18: HOW DO BOATS FLOAT?

Goal: To recognize that the shape of something can determine whether it sinks or floats
To find a way to make something that usually sinks be able to float

Skills: Observing, classifying, designing, experimenting, drawing conclusions

Materials: Water

For each group of students:

container that will allow a large surface area of water

modeling clay—half a stick

paper towels

2 squares of aluminum foil—about 10 cm. (4") square

8–10 marbles

Preparation: Fill the containers with water and place them on tables around the room,
one container per group.

Preparation Time: 5 minutes

Lesson Time: 25–30 minutes

— Procedure and Questioning Strategy —

Divide the students into groups. Give each group half a stick of clay and a paper towel.

1. What do you think would happen if you rolled your clay into a ball and dropped it into the water?

(Students usually say that it would sink.)

2. Have one member of your group try it.

(The clay ball sinks.)

3. Why do you think it sank?

It's heavy.

4. Dry your clay with the paper towel. Now see if you can do something with your clay so it would float. Then test it in the water.

(Most students flatten out the clay or make some object that will not float.)

Give the students time to test their clay designs, then to redesign them and test again. If they don't design a shape that floats, give them more clues. For example:

5. What shape did you make your clay?

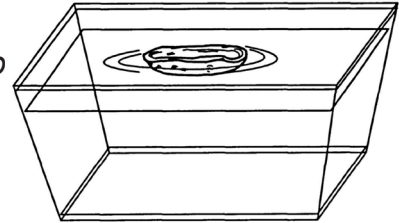
(Answers will vary.)

6. Can you think of anything that is made of heavy material that floats in the ocean or on a lake?

A boat or a ship or a canoe.

7. Try designing something like that.

Each group should design a boat-like vessel. After each group designs a shape that floats, discuss their designs.



8. What did you do to make your clay float?

Made it in the shape of a boat.

9. Let's compare and contrast our boats. Which boats seem to float higher in the water?

The boats with thinner sides and bottoms. The boats that are longer or wider.

10. Carefully dry off your clay boats and put them on the table. We'll use them again later.

— Connections With Everyday Life —

Give each group a square of aluminum foil and a marble.

1. What do you think would happen if you dropped a marble into the water?

It would sink.

2. Try it.

3. What do you think the aluminum foil would do if you dropped it into the water just like it is?

It would float.

4. Try it.

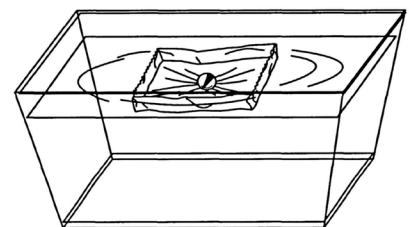
5. See if you can make something with the foil that will help the marble float. Wait to test yours in the water until all the groups have finished making theirs.

(Students usually curve the aluminum foil around the marble.)

6. Okay, let's test them.

(The marble and foil usually sink during the first trial.)

Give the students another piece of foil and a chance to design another shape that will help the marble float. Have them test this new shape. If they have not made their foil into a boat shape, tell them to think about what they did with the clay. Discuss with them the designs that seem to float the marble the best. Compare and contrast those that floated with those that sank.



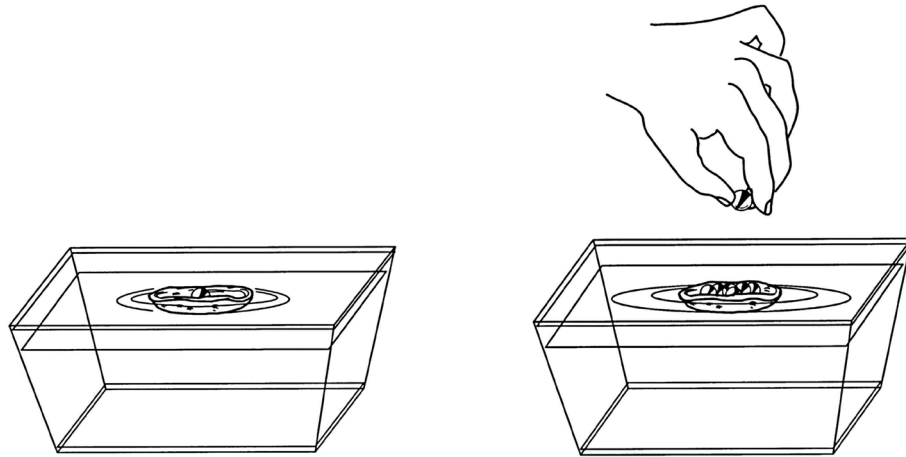
7. Now, put your clay boat back in the water. See what happens if you put a marble in the boat.

It sinks lower in the water.

8. Add more marbles. See how many your boat can hold without sinking.

9. What happened to the boat as the marbles were added?

It floated lower and lower in the water.



10. Many boats carry people and supplies like food, cars, and oil. What do you think happens as more people and supplies are loaded onto a boat?

It floats lower in the water.

