

Float or Sink – What Do You Think? Page 1 of 2

It is wrong to think that light things float on water while heavy things sink. For example, a heavy log will float down a river, but a light grain of sand will sink. How heavy an object is does have something to do with whether it will float or sink. But there is more to the story. Try this activity to find out what causes an object to float or sink in water.

Materials:

- Pencil
- Masking tape
- Metric ruler
- Two tea light candles
- Clay
- Water
- Cups

Procedures:

1. Tape the pencil down as shown. Roll two small pieces of tape so that the sticky side is out.
2. Stick each piece of tape to the opposite end of the ruler. Remove both candles from their metal containers. Place an empty metal container on each piece of tape. Lay the ruler on the pencil so that it is as balanced as possible.
3. Look at the number on the ruler that is directly over the center of the pencil. Write this number down as your balance point.
4. Carefully place one of the candles back into its metal container on one end of the ruler. Make sure the same balance point is directly over the center of the pencil.



5. Slowly and carefully, add water to the container on the other end of the ruler until the container is full.
6. Which is heavier, the wax or an equal amount of water? Do you think wax will float or sink in water? Why? Try it and see.
7. Reset your ruler on the balance point with an empty container on each end. This time, instead of putting wax in one of the containers, put clay in the container until it is filled. Place your ruler on the balance point and slowly add water to the empty container at the other end.
8. Which is heavier, the clay or an equal amount of water? Do you think clay will float or sink in water? Why? Try it and see.



Think about this ...

To find out if an object will sink or float in water, you have to compare the weight of the object to the weight of an equal amount of water. Let's take a grain of sand as an example: Since a grain of sand sinks in water, do you think that the grain of sand weighs more or less than a tiny amount of water, the same size as the grain of sand?

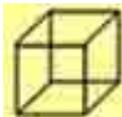
How about a gigantic tree trunk? Since a tree trunk floats in water, do you think that the tree trunk weighs more or less than an amount of water the same size as the tree trunk?

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Where's the Chemistry?

When scientists want to know if a substance or object will sink or float, they check its density. The density of a substance is the weight of a standard amount of the substance.

The amount that scientists usually use is the cubic centimeter or cm^3 . A cubic centimeter is a little cube that is one centimeter long, 1 centimeter wide and 1 centimeter deep.



If a cubic centimeter of a substance weighs more than a cubic centimeter of water, the substance will sink. If a cubic centimeter of a substance weighs less than a cubic centimeter of water, the substance will float.

A cm^3 of water weighs 1 gram. A cm^3 of lead weighs about 11 grams. Will lead float or sink in water? A cm^3 of oak wood weighs about $\frac{3}{4}$ of a gram. Will oak float or sink in water?



The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".

