Section 3

Understanding Matter and Energy



Float or Sink

Investigate what makes objects float or sink.

When an object is placed in water and it goes down, we say it sinks. If it stays on top of the water, we say it floats. If we drop a rock and a beach ball into the water, what will happen? The rock will sink and the ball will float. But what makes the rock go straight down to the bottom of the water while the ball stays afloat even if you try pushing it under the water? What forces are at work when this happens?



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Float or Sink

Try this experiment to learn how buoyant forces work and how they relate to density.

Materials:

honey

- oil
- blue food colouring (optional)
- a coin
- a grape
- water
- a cork
- a tall jar



Tilt the jar and pour the honey, water, and oil slowly into it. It helps make three distinct layers.



Steps:

- 1. Fill a third of the jar with honey, another third with water, and the rest with oil. Wait one minute and let all three liquids settle.
- 2. Drop the coin, the grape, and the cork into the jar one at a time.
- 3. Observe.

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The three liquids, as well as the items, settled based on their densities. The honey, which had the highest density, settled at the bottom. The oil, which had the lowest density, floated on top of the water. As for the items, the coin had the highest density. It sank to the bottom, whereas the cork, with the lowest density, stayed afloat on the topmost layer.

What is buoyancy?

Buoyancy is the upward force on an object that is produced by a surrounding liquid, such as water or oil. When the downward force of gravity is greater than the force of buoyancy exerted by the liquid, an object sinks; otherwise, it floats. The effect of buoyancy is also related to the density of the object as compared to the density of the surrounding liquid. If the density of an object (whether it is a liquid or a solid) is lower than that of the surrounding liquid, it floats.

