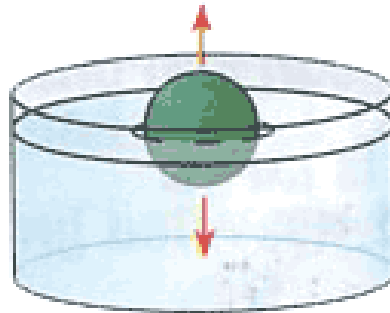


Topic: Sinking and Floating: Grades 4-6

Enormous aircraft carriers and large cruise ships float, yet a single screw will sink! When it comes to floating, size is not important. Whether or not something floats or not depends on the weight of the water that is pushed away by the object (**displacement**) when it sits in the water. If the displaced water weighs more than the object, then the object will float. When something floats, it is pushed up by a force (**upthrust**) that is equal to the weight of water that the object occupies that was previously occupied by the water.

Upthrust is the force pushing up on an object in water or air. Upthrust is much greater in water that is why heavy objects feel much lighter in water. The more water that is displaced (the denser the object), the greater the upthrust that is



what happens with large ships.

Generally, objects with higher density, sink and lower density, float. **Density** is the heaviness of an object compared to its size. Objects with low density have molecules that are far apart. For example -a cork.

Objects with high density, the molecules are closely compacted together. For example- a stone.

Demonstration:

- Supplies: modeling clay and large, clear container filled with water
- Take the modeling clay and make a compact ball.
- Ask if it will float or sink.

It sinks because of its density. It weighs more than the water it is able to displace.

- Now, take the modeling clay and shape it into a boat. Will it float or sink?

Its mass is the same, so it should sink again, right? No, it floats because now it is filled with air which is less dense.

- Supplies: square piece of tin foil and a large clear container filled with water
- Take the square of tin foil and gently lay it on the water. It floats.
- Now take the same square piece and shape it into a tight ball. Now, will it sink or float?

The mass is the same. The air is has been squeezed out and it is more dense than the water it is able to displace, so it sinks.

Demonstration:

- Supplies: lemons, oranges, apples peeled and unpeeled and a clear container of water
- Lemons- float, but if peeled- sink.

The peel of the lemon contains air bubbles. The air makes the lemon float in water. Oranges-same thing. Put the peel in the water and show it floats, too. Now, how about apples?

Simple Experiment: Dancing Raisins

- Supplies: tall glass container, club soda or any clear carbonated drink and raisins
- Fill the glass with the carbonated drink.
- Drop a few raisins in. Will they sink or float?

They sink, but after a few seconds, they float back to the top. Then they sink again!

Why? Raisins are denser than the carbonated drink, so they sink. But the carbon dioxide gas-filled bubbles stick to the surface of the raisins making them less dense and they rise. When the bubbles detach and pop, the raisin sinks again. After a while, the carbon dioxide gas is displaced or the soda “fizzes out”.