

6. Magic Diver

Find out how changes in pressure can affect the density and buoyancy of an object.

Apparatus

A 2- or 3-litre plastic drink bottle, with cap

Sachets of ketchup/sauce*

Water



** This success of this experiment depends on how much air is trapped in the sauce sachet, which varies from sachet to sachet. Heinz ketchup often works. If the experiment doesn't work first time, try different sachets until you find one that will float. Try different brands and sauces.*

Experiment

Put a sauce sachet into the bottle, and fill to the top with water. Screw the cap on firmly.

Does the sachet float or sink?

Now squeeze the bottle with your hands. Hold it for a few seconds, then let go.

What happened to the sachet when you squeezed the bottle?
What happened when you let go?

If something is heavy for its size, scientists say that it is **dense**, or has **high density**. If it is light for its size, scientists say it has **low density**. If something is less dense than water, it floats in water. If it is more dense than water, it sinks.

The sachet contains air as well as sauce. Initially the whole thing – the sachet and the sauce and air it contains – is less dense than water, so it floats.

But air is easy to squash (compress). When you squeeze the bottle, the pressure compresses the air inside the sachet and makes it take up less space. The sachet weighs the same as before, but it is now smaller. Its density has increased.

The increased density means it is now denser than water, so it sinks.

Concepts for the curious

Buoyancy. Archimedes' Principle.
