

# Bubbling lava

## Materials

- Test tube and test tube rack (a tall glass or bottle will also work well)
- White vinegar (acetic acid)
- Food colouring
- Vegetable oil
- Spoon
- Bicarb soda (sodium bicarbonate)



## Instructions

1. Add some white vinegar to the test tube, filling it by about one third.
2. Add a few drops of food colouring to the vinegar and swirl to mix.
3. Pour vegetable oil into the test tube until it is almost full.
4. Use the spoon to add a small amount of bicarb soda to the test tube. You may need to tap the test tube to make the bicarb sink down through the oil.

## What happens?

Vegetable oil and white vinegar (which is mostly water) do not mix very well and there are two layers in the test tube, with oil on the top and the coloured vinegar on the bottom. The oil floats on top of the vinegar because it has a lower density than the vinegar. Density is the amount of mass in a given volume and it is a measure of how tightly packed the matter is inside a particular material.

When the bicarb is added to the test tube, it sinks down through the two liquids because it has a higher density than both of them. When the bicarb mixes with the vinegar, a chemical reaction occurs between the bicarb and the vinegar. Bicarb, or sodium bicarbonate, reacts with the acetic acid in vinegar to form sodium acetate, (a type of salt), water and carbon dioxide gas. It is the carbon dioxide gas that makes the bubbling lava activity work.

As bubbles of carbon dioxide gas rise up through the vinegar and the oil, they carry with them small droplets of vinegar which rise up to the top of the oil. When the droplets reach the surface, the bubbles of gas pop, and the droplets of vinegar sink back down through the oil.

## Why does it matter?

Chemical reactions similar to the one in this activity are very common. They are known as acid-base reactions and in this case vinegar is the acid and bicarb is the

base. For example, fizzy tablets such as Berocca contain an acid and a base in powder form which react with each other when they contact water.

A serious example of oil floating on water is when there is an oil spill, such as the BP oil spill in the Gulf of Mexico in 2010. Floating barriers are often used to try to contain oil from spreading further and their design relies on the fact that oil floats on water.

### **Related activities**

A similar activity uses a fizzy tablet such as Berocca instead of bicarb and water instead of vinegar. Break the tablet into 4 pieces and drop one piece in at a time to get the best results.

### **Health and safety considerations**

- Children should not play with fizzy tablets. Fizzy tablets should be only used in a demonstration performed by an adult.