

Mini Lava Lamps

This science activity will require a few items from your kitchen and an adult to help. Many thanks to **Sue Martin** for this amazing kitchen science lesson.

For the grown ups

Making 'lava lamps' seems like a difficult proposition for a group of primary school children – but it couldn't be easier! Gather together some readily available materials and they will be up and running in minutes. Now your children are learning about immiscible liquids, chemical reactions, dissolving; and having fun!

What you need

- Large jar or bottle with screw lid
- Cooking oil
- Alka-seltzer™ or effervescent vitamin C tablet
- Food colouring (optional)
- Water

What you do

1. Pour cooking oil into the test tube until it is approximately $\frac{3}{4}$ full.
2. Top up the tube or beaker with water. Leave about 1cm of space at the top to prevent overflowing. Notice that the water falls to the bottom of the bottle.
3. Break an Alka-seltzer or effervescent vitamin C tablet into around 6-8 small pieces and drop a piece into the test tube. Again, watch as it travels through the oil and into the water at the bottom. The water will begin to fizz and your mini lava lamp erupts into action.
4. As fizzing stops, add further pieces of tablet, until all bubbling ceases.
5. With a lid screwed on you can tip the jar or bottle back and forth, watching waves appear. (Be careful not to screw a lid onto the bottle or jar when the tablet is still active as pressure will build up in the container, either forcing the contents out as you open it or blowing the top off).



What's happening?

Water and oil are immiscible (they don't mix). Water is also denser than oil (i.e. for the same volume of each, water is heavier than oil). So the water sinks below the oil, which floats on top. Alka-seltzer and effervescent Vitamin C tablets contain chemicals that can only react together when they are wet. They are denser than both oil and water, so fall to the bottom of the test tube.

As soon as a piece comes into contact with the water layer, a reaction occurs between the chemicals, producing carbon dioxide (CO₂) gas. These CO₂ bubbles attach themselves to 'blobs' of the water like floats, causing them to rise to the surface, through the oil layer. There, the gas bubbles pop, the water loses its float and sinks back through the oil to the bottom of the test tube.

This process can continue whilst the tablet continues to react and produce CO₂. When the reaction stops, the two layers settle back. If you use Vitamin C tablets, dye (food colouring) is often also present in the tablet. This dissolves in the water layer and produces coloured 'lava'. The children may observe that this occurs over a short period of time rather than immediately. Dissolving is a physical change, which is reversible. The dye is simply dispersed in the water. A few drops of any food colouring may also be added to the bottle if colourless tablets such as Alka-selzer are used and will be observed to dissolve only in the water layer, to create coloured 'lava'.

Once the reaction is over, with a lid on the test tube you can observe the motion of oil and water as you rotate the test tube – the oil layer remains above the water. Even if it is shaken, mixing only occurs

Draw and label how you set up your experiment in the step boxes below:



<p>Step 1</p>	<p>Step 2</p>
<p>Step 3</p>	<p>Step 4</p>
<p>Results – What happened? What have you learnt from this experiment?</p>	