Home Lava Lamps

Materials:

- Glass jar / plastic bottle / clear vase
- Vegetable oil 400 mL
- Water
- Food colouring (optional)
- Salt
- Alka Seltzer / any fizzing tablet

Method:

1. Fill your clear jar to ¾ full with water
   Question: When you add the oil, will it sink or float?

   Write your 'hypothesis' (what you think will happen) below:

   _____

   _____

2. Fill final ¼ with vegetable oil
   Observation: Write what happened below.

   _____

   _____

   _____

3. Add a couple of drops of food colouring
   Observation: Write below.

   _____

   _____

If you share any photographs or short video clips of your experiments on **Twitter**, please tag **@OpenLPLearning**

4. Slowly start adding salt or fizzing tablet, a little bit at a time!
   Observation:

   _____

   _____

   What could you do differently if you did this experiment again?

   _____

   _____

   _____

   _____

THE SCIENCE BEHIND IT

These lava lamps work because oil and water have different densities and polarities therefore, they don't mix.

DENSITY

Oil is less dense, and water is more dense. That means for the same volume, the water has more mass (weight) than oil. Since oil is less dense, it floats on top of water.

Density = mass/ volume

POLARITY

The second reason oil and water don't mix is because of polarity. Polarity means a molecule has a positive charge at one end and a negative charge at the other. Water is a polar molecule.

Oil molecules are non-polar and only have a shell of negative charges.

Only other polar molecules can dissolve in water because polar molecules dissolve only in polar solvents and non-polar molecules dissolve only in non-polar solvents. And so non-polar oil will not dissolve or mix into polar water.

ADDING SALT

When salt is added to the top of the oil, it is heavier than the oil and water and sinks to the bottom of both layers. As it passes through the oil layer, oil sticks to the crystals and is carried as a blob through the water layer to the bottom of the jar. As the water dissolves the crystalline salt, the oil is released and, because it is less dense than the water, it floats back up, creating the lava lamp effect.

ADDING ANTACID TABLETS

In the other lava lamp, the heavy antacid tablet sinks to the bottom where it reacts with water to produce carbon dioxide gas. These gas bubbles rise to the top and take some of the coloured water along for the ride. The gas escapes when it reaches the top and the coloured water falls back down.

The antacids fizz because they contain citric acid and sodium bicarbonate (baking soda), the two react with water to form sodium citrate and carbon dioxide gas bubbles.