

ACTIVITY

6

CHEMISTRY AT HOME

LIVELY LAVA LAMPS

●○○ EASY



5-12



30 MINS



1

Learn about
simple
chemical
reactions

2

Find out
why oil
floats on
water

3

Discover the
benefits of
bioluminescence

ENCOURAGING TOMORROW'S CHEMISTS TODAY

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LIVELY LAVA LAMPS

Bioluminescence is produced by a chemical reaction which creates light. It is light given off by living organisms. Animals use bioluminescence for attracting mates, to scare off predators and, for some marine animals, as a camouflage technique.

Female glow worms, for example, light up at night to attract a mate. The males have specially adapted eyes to help them spot females in the darkness.

This ability to light up also helps save them by warning potential predators that they are toxic to eat!

We can't replicate this easily, but we can use a different chemical reaction to make a bubbly lava lamp and then make it glow in the dark using a torch.

You will need

Tall transparent container

Water

Food colouring

Teaspoon

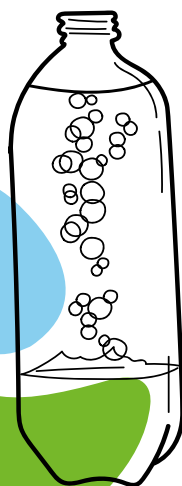
Vegetable oil

Fizzy tablet e.g. effervescent vitamin tablet or alka seltzer

Eco glitter *Optional*

Torch

Timer *Optional*



Safety

An adult should supervise this activity.

Wash hands after touching the alka-seltzer.

Take care with food colouring as this may stain clothing and furniture.

Instructions

Activity 1 Fizzy lava lamp

- Pour water into transparent container until it is about one quarter full.
- Drop a couple of drops of food colouring into the water and mix well using the spoon. If you wish to add eco glitter, add a teaspoon now.
- Fill the container to about 1 cm from the top with vegetable oil.
- You'll notice that the oil sits on top of the water.
- Give the layers a couple of minutes to settle and then drop an effervescent vitamin tablet or alka seltzer into to the container.
- Watch as the bubbles rise and fall.
- Once the reaction has stopped you can add another alka seltzer or effervescent vitamin tablet and the lava lamp will bubble again.

Activity 2 Oil and water test

If your container has a lid, close the lid and gently shake the jar to mix the oil and water and place it back on a flat surface. Watch as the oil and water separate again!

Activity 3 Glow in the dark

Place a torch behind the lava lamp and turn off the lights! The lava lamp should light up!

Challenge

Farah wants to make her lava lamp bubbles last longer. She thinks that splitting her alka seltzer in half and adding the second half once the first reaction is starting to fade might work. Can you test this to see if she is correct?

Things to keep the same

- Amount of oil and water
- Type of fizzy tablet used

Things to change

- Amount of fizzy tablet added at one time

What to measure

- How long the lava lamp bubbles for
- Using the lava lamp you made earlier add a whole fizzy tablet and time how long it takes for it to stop bubbling. Record the time.
- Now repeat the experiment adding half the fizzy tablet and start the timer. When the bubbling slows add the second half of the tablet. Record the time.
- Which method keeps it bubbling for longer?
- What do you think will happen if you break the tablet in to even smaller pieces?

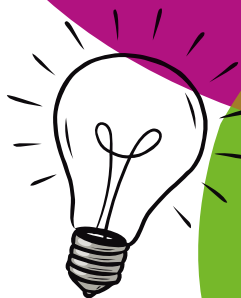
What's happening?

The fizzy tablet releases carbon dioxide gas as it reacts with the water. The bubbles of gas attach to some of the coloured water pulling it upwards with them.

Water is denser than oil so sinks to the bottom of the jar. Density refers to how much mass there is in a particular space. The carbon dioxide and coloured water mix is less dense than the oil and the water so rises up to the top where it bursts releasing the carbon dioxide. Once the bubbles burst the water sinks back through the oil.

When you shake the oil and water they mix and separate again. Water is a polar molecule. It has a positive charge on one end and a negative charge on the other end. Water molecules stick together as the positive end of one water molecule is attracted to the negative end of another water molecule.

Oil molecules are non polar. When oil and water are mixed the water molecules are more attracted to each other than the oil so the two don't mix! When you shake oil and water forcing them to mix they temporarily form what is called an emulsion, but soon separate again.



Did you know

Glow-worm larvae have a toxic bite that paralyses slugs and snails before dissolving their body for the glow-worm to drink!

Most bioluminescent organisms are found in the ocean!