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| **Activity title** |
| **Make your own lava lamp at home** |
| **Stay safe** |
| Whether you are a scientist researching a new medicine or an engineer solving climate change, safety always comes first. An adult must always be around and supervising when doing this activity. You are responsible for:    • ensuring that any equipment used for this activity is in good working condition  • behaving sensibly and following any safety instructions so as not to hurt or injure yourself or others    Please note that in the absence of any negligence or other breach of duty by us, this activity is carried out at your own risk. It is important to take extra care at the stages marked with this symbol:⚠ |
| **Time required** |
| 30 minutes |
| **Activity summary** |
| You’re going to love making your very own lava lamp at home. Prepare to be amazed!  We have prepared some simple, step-by-step instructions to guide you through the process. Follow them carefully and you’re sure to achieve a brilliant result.  In this activity you will learn about density of different materials, get creative and have lots of fun! |
| **What equipment will you need?** |
| * Large, clean, label-free, empty jar with a tight-fitting lid * Sunflower oil * Water * Food colouring * Bicarbonate of soda (or an effervescent tablet) * Torch * Biodegradable glitter (optional) |
| **How to do it** |
| **Step 1: Pour the oil into the jar**   * Carefully pour the sunflower oil into the jar until it’s half full   **Step 2: Add food colouring**   * Carefully add small droplets of food colouring – don’t just pour it in!   **Step 3: Add water**   * Fill up the rest of the jar with water * To create the effect of a lamp, turn on your torch and place it behind the jar, so that the light shines through the liquid   **Step 4: Understand the science – part 1**   * Water is more dense than oil, so it sinks to the bottom of the jar – has that happened in your jar? * Food colouring is water-based too, so it also sinks to the bottom – has that happened? * Oil and water don’t mix. Can you see the separation boundary between the two?   **Step 5: Start fizzing!**   * Add a teaspoon of bicarbonate of soda (or an effervescent tablet) to the jar⚠ * Screw on the lid very tightly * Watch the fizz!   **Step 6: Understand the science – part 2**   * The bicarbonate of soda (or effervescent tablet) reacts with the water * It produces bubbles of carbon dioxide gas (CO₂) – can you see that happening? * The gas bubbles stick to the water droplets * The gas bubbles are less dense than oil, so they rise to the top of the jar   **Step 7: Understand the science – part 3**   * Once the gas bubbles reach the top of the liquid, they pop – can you see that happening? * The gas escapes into the air, leaving the dense water, which then sinks back down to the bottom again – is that happening in your jar?   **Step 8: Create a special effect!**   * Turn on your torch and take your lava lamp into a dark room * Shine your torch through the side of your jar – are the bubbles creating a spectacular moving shadow on the wall? * Try shining your torch underneath your jar to make a bubble pattern on your ceiling   We hope you enjoyed making your lava lamp. Were you surprised by the oil floating to the top? And weren’t there a lot of bubbles! |
| **Three Christmas kisses and a wish** |
| It’s always great to reflect on a job well done. Show your lava lamp to a friend or family member and ask them to tell you three good things about it, and one thing that could be improved.  You could then use their feedback on your design to make another lava lamp that’s even better than the first. Do some more scientific experiments, such as:   * using a different colour for the droplets? * adding some glitter, for a sparkly effect (make sure you use biodegradable glitter, to protect the environment) * adding more bicarbonate of soda (or more effervescent tablets) to accelerate the fizz!   Practice makes perfect… |
| **Festive fun** |
| After all that hard work, here are some cracking jokes to make you smile:   * **What do you call a boat that floats on lava?**   A vol-canoe   * **Where do volcanoes go to the toilet?**   In the lavatory   * **What is a volcano’s favourite dessert?**   Baklava |

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| **Bonus activity – How to make oil-and-water prints** |
| Making an oil-and-water print is brilliant fun. And the amazing thing about it is that no two prints are ever the same! |
| **Here’s what you’ll need:** |
| * Wipeable work surface (things could get a bit messy!) * Kitchen towel * Plastic container that’s slightly bigger than your paper * Watercolour paper * Water * Vegetable oil * Three different colours of water-soluble paint (like acrylic) or food colouring * Four little pots or glasses |
| **Let’s get started…** |
| **Step 1: Prepare your pots**   * Use a wipeable work surface – check with an adult before you start ⚠ * Pour 3cm of vegetable oil into one of your pots or glasses * Add a generous squirt of paint to another pot, then top it up with water to a depth of around 5cm * Repeat the process with your other two paint colours   **Step 2: Wet your paper**   * Pour water into your container so that it’s around 5cm deep * Immerse a sheet of watercolour paper in the water * Take it out and place it on some kitchen paper   **Step 2: Add some tiny oil droplets**   * Add five or six tiny oil droplets to the watercolour paper – experiment to find the best method. You might like to try the following   + - Dip your finger into the oil pot, then letting it drip onto the paper     - Repeat the process using a spoon handle     - Use an unwanted eye dropper (ask an adult)   **Step 3: Add some colour**   * Use a teaspoon to drop small splashes of the watered-down paint onto the paper * Repeat the process with the other two colours   **Step 4: Leave your artwork to dry**   * Leave it to dry – you’ll find that the patterns become stronger as the paper dries out   **Step 5: Display your creation**   * Hang up your unique artwork or use it to make a card or cover a book   And there you have it – a simple and stylish oil-and-water artwork, made in a matter of minutes! |
| **Bonus activity - Make a delicious dipping sauce** |
| Amaze your parents by making a delicious dipping sauce from olive oil and balsamic vinegar. And make sure you tell them that you’re not just making them a snack – you’re also conducting a scientific experiment to demonstrate that oil and water do not mix. |
| **Here’s what you’ll need:** |
| * 60ml olive oil * 2 tbsp balsamic vinegar * Shallow dish or ramekin for the oil (white works best) * Bread (rustic or ciabatta bread works really well) * Serving dish |
| **Lets get started…** |
| **Step 1: Get prepared**   * Wash your hands with soap and water * Dry them well   **Step 2: Prepare your bread**   * + Slice ⚠or tear up your bread into large chunks   + Lay the bread chunks on the serving plate   **Step 3: Add the oil and vinegar**   * Pour 60ml of olive oil into the small dish or ramekin * Add two tablespoons of balsamic vinegar to create a beautiful effect * Make a space in the middle of your bread-filled serving plate * Carefully place the small dish or ramekin onto your serving plate * Your snack is ready to serve! |
| **Did you know?** |
| 1. The Earth has around 1,500 potentially active volcanoes. 2. The hot liquid rock inside a volcano is called magma. 3. When magma erupts to the surface of the volcano, we call it ‘lava’. 4. The temperature of lava can reach 1,250℃! 5. If there’s a lot of pressure, the lava sometimes spurts out of the volcano and up into the air. 6. Sometimes lava flows out of a volcanic vent (which could be underground). 7. Lava can be thick (viscous) or fluid (thin). 8. Hotter, thinner lava flows travel the farthest. 9. Once lava settles, it hardens into black igneous rock. 10. Hawaii’s [Mauna Loa](https://www.usgs.gov/volcanoes/mauna-loa) is the Earth’s largest active volcano – it is more than 4km above sea level. |