ADULT SUPERVISION REQUIRED

TNHA Science Department

Science: please try at home.

Mrs Browns Egg Shell Geodes

Equipment:

- clean eggshells
- water
- a variety of soluble solids: table salt, rock salt, sugar or baking soda
- spoons
- food colouring
- egg cartons and wax paper or mini-muffin tins

How does it work?

Dissolving the crystals in hot water created what is called a “super-saturated solution.” As the solution cooled, the water lost its energy and the crystals are forced from the solution to become a solid again. Since this happens slowly along with the evaporation, the crystals have time to grow larger than they were when the experiment started. Natural geodes in rock are form in much the same way as mineralized water seeps into air pockets in rock. This is also how rock candy crystals are formed.

Method

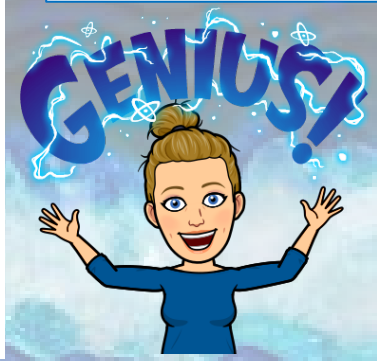
1. Crack the eggs
2. Place the eggs in hot water to clean them.

(The hot water cooks the lining and allows you to pull the skin (egg membrane) out of the inside of the egg using your fingers once cool) .

3. Make sure to remove all the egg membrane

(if any membrane stays inside the shell it is possible that your eggshell will grow mold and your crystals will turn black)

4. Use an egg carton lined with waxed paper to hold the eggs upright.
5. Use a saucepan to heat the 100ml of water to boiling.
   add about a 25g cup of your chosen salt to the water.
6. Stir it until it dissolves.
7. When the initial amount of solid is dissolved continue adding small amounts of the solid until the water is super-saturated. (Super-saturated simply means the water has absorbed all it is able to absorb and any solid you add will not dissolve.)
8. Add a few drops of food colouring.
9. Carefully pour your solution into the eggshell, filling it as full as possible without over-flowing it or causing it to tip.
10. Find a safe place to put your shells while the water evaporates. Crystals will form inside the eggshells as the water evaporates.



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Physics Fun in the Kitchen with Miss Mills

Supervision needed, grab an adult to help with hot water.

Let's stick some glasses together – without glue!

You will need:

- 2x identical plastic cups
- Kitchen towel
- Hot water (not boiling)

Follow these steps:

1. Make the kitchen towel wet with your hot water, but don't scrunch it up.
2. Swish hot water around one glass and then lay the kitchen towel over the top.
3. Swish hot water around the other glass. Pour it out and place the second glass upside-down over the first.
4. Try picking up the top glass.

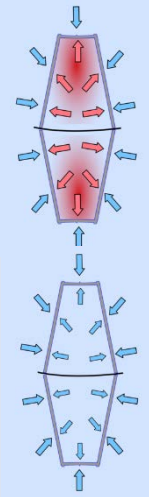
For more help on setting up the experiment, listen and watch here:

You should find that when you pick up the top glass, the bottom one is stuck to it quite firmly.

The science bit…

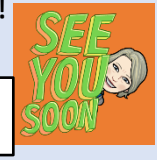
When you swish the hot water around the glasses it heats up the air inside. This air expands and some escapes. When you let the air cool down its pressure will drop also. However, the glasses are sealed together with the damp paper and no more air can get in.

This means that the pressure inside the glasses is lower than outside and the glasses are pushed together.



As the air cools its pressure reduces so it is less than that of the surrounding air and the two cups are pushed together!

WARNING:
Take care with hot water.
Mop up any spills too.



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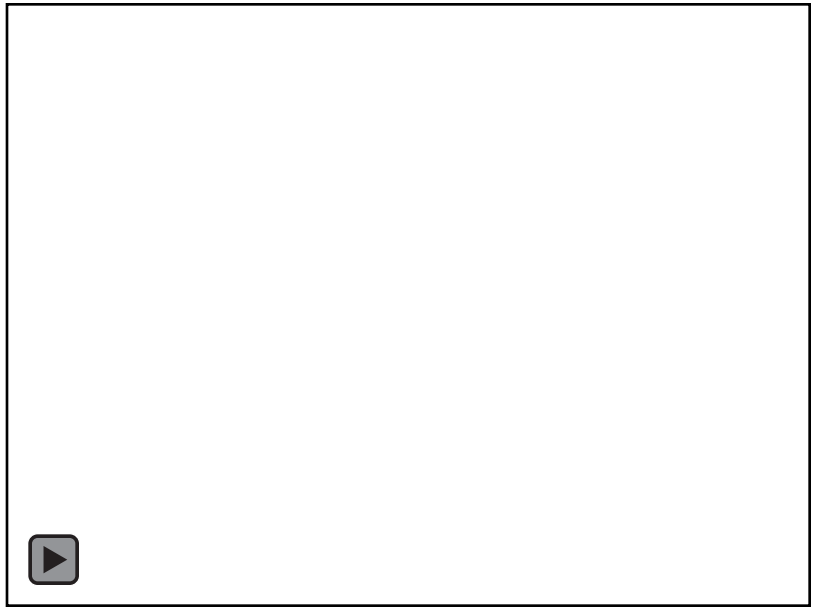

Mr Henderson's Density Challenge

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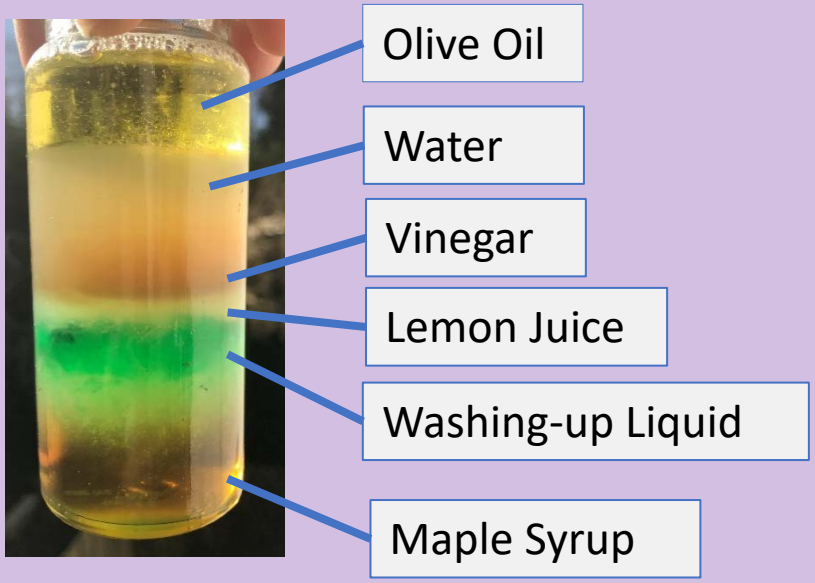
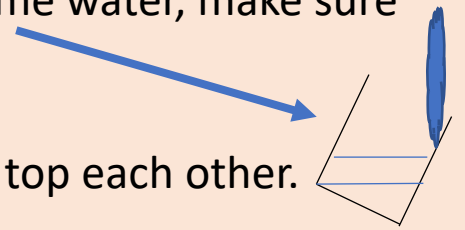
You will need:

- A see-through container, like a glass or a bottle. (The taller and thinner the better)
- Sunflower oil or olive oil
- Washing up liquid
- Water
- Syrup or runny honey



Instructions:

1. Find a suitable container, I used the bottle from a pepper grinder. The smaller and thinner the container is, the less you need of each liquid.
2. Carefully pour a small amount of syrup or runny honey into the bottom of your container, make sure it doesn't touch the sides.
3. Do the same thing with a small amount of washing up liquid.
4. Tilt the container to the side to carefully add some water, make sure you don't make the washing up liquid foam up.
5. Repeat this with the oil
6. You should now have a column of liquids sat on top each other.



Explanation:

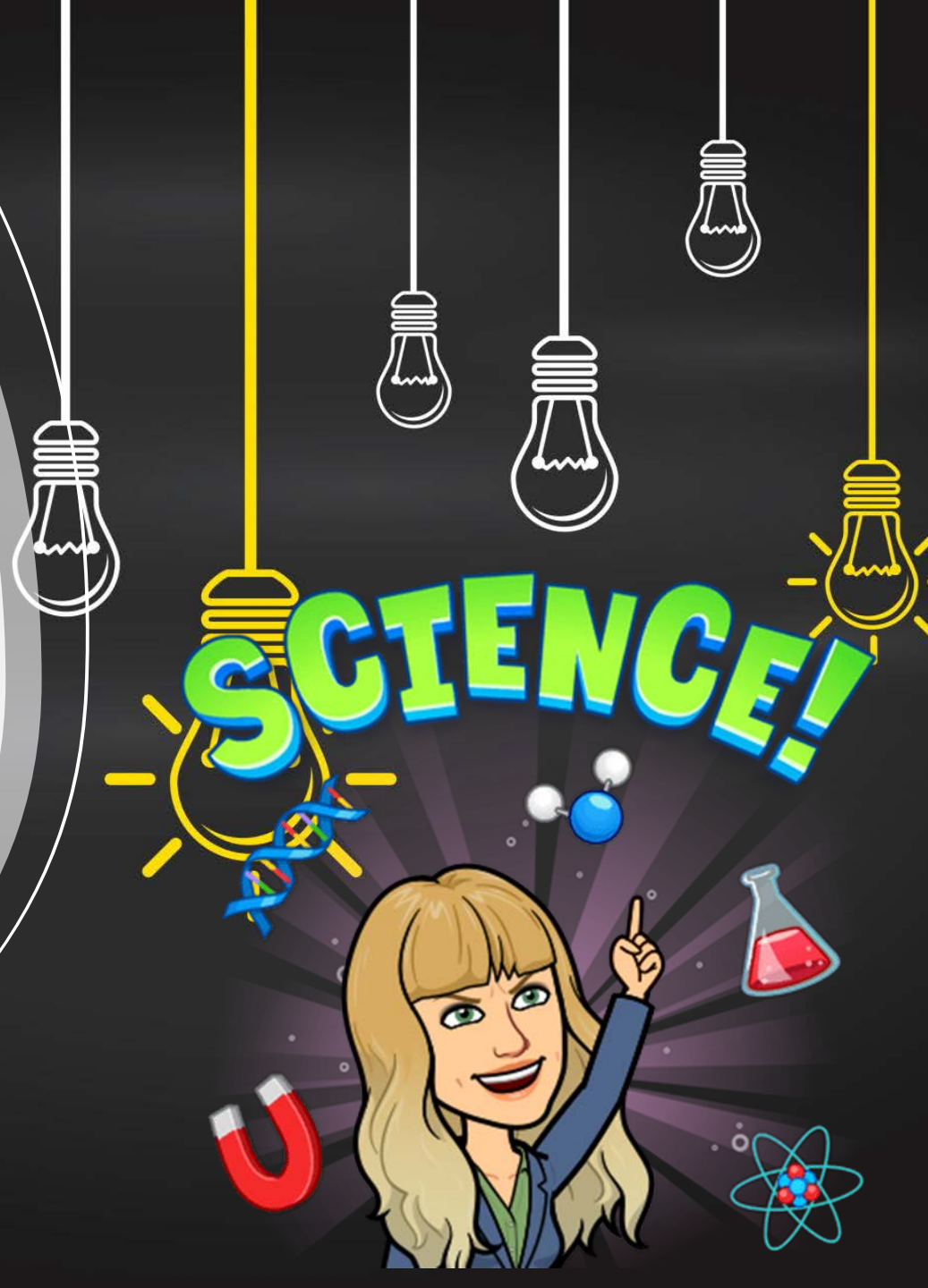
Each of the different liquids has a different density. That means that the same amount of liquid weighs a different amount. Less dense things float on top of more dense things. This is why oil floats on water, but a rock sinks, it's all about the density of each substance

Extra Challenge: Experiment with other liquids and small floating objects, I tried adding vinegar, lemon juice, ground pepper and sesame seeds. See which layer each one ends up on.
Make sure to send in a picture to show me what you have tried.

Mrs Rushton's Science challenge

You will need:

- Milk;
- Washing-up Liquid;
- Food Colouring;
- A small plate;
- A cotton bud or cocktail stick;



Method:

Kindly demonstrated by my son

Pour

Pour enough milk into the plate to cover it.

Add

Add little drops of food colouring into the milk. Use different colours if you like for more colourful results!

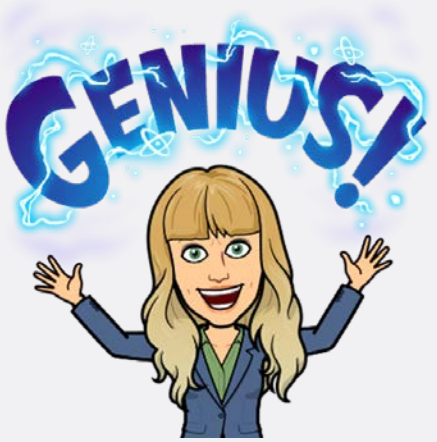
Dip

Take a cotton bud/cocktail stick and dip it in washing-up liquid and touch it into the milk.

Observe

Observe what happens: the colours will spread in the milk, and create strange patterns and shapes. Try different combinations of food colouring to create different patterns!

But why?



This experiment can be a little tricky to understand, but it all involves a property of water called Surface Tension. Water molecules are attracted to one another but not in the air. The water molecules will try to make the surface as small as they possibly can to be close to one another; this is what surface tension is. Milk is in fact mostly water, so it, too, has surface tension.

The washing-up liquid is designed to break up the surface tension of water so it can dissolve and clean fats and grease in the kitchen. As a result, we can use washing up liquid's surface tension-breaking ability to break up the surface tension of the milk!

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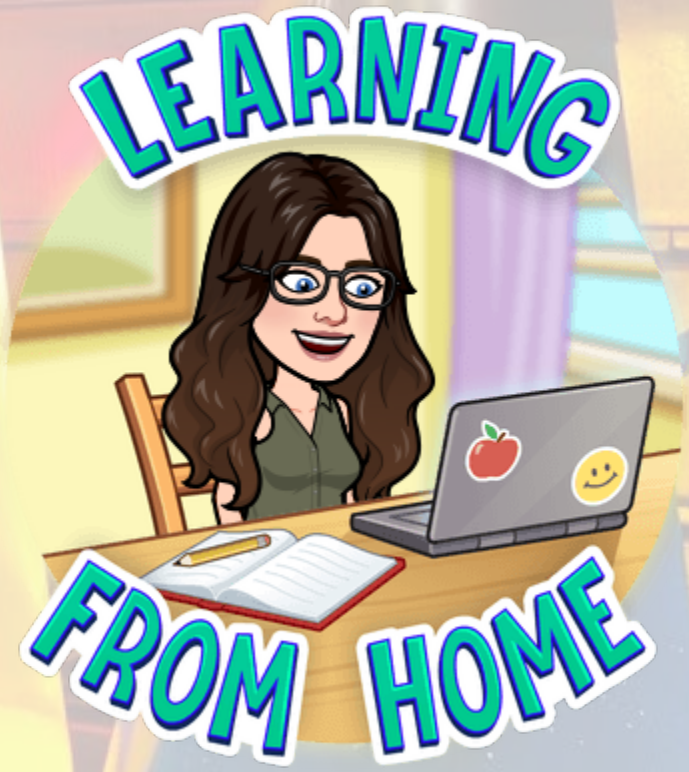
Make your own Lava Lamp with Mrs Clark!



<u>Do you know what a lava lamp is?</u>

Lava lamps are lamps that cause blobs of colourful liquid to move around. They are so interesting and quite calming to watch!

Why not try to make your own!

Watch the experiment done here…
https://www.youtube.com/watch?v=U7dO22EFf_s

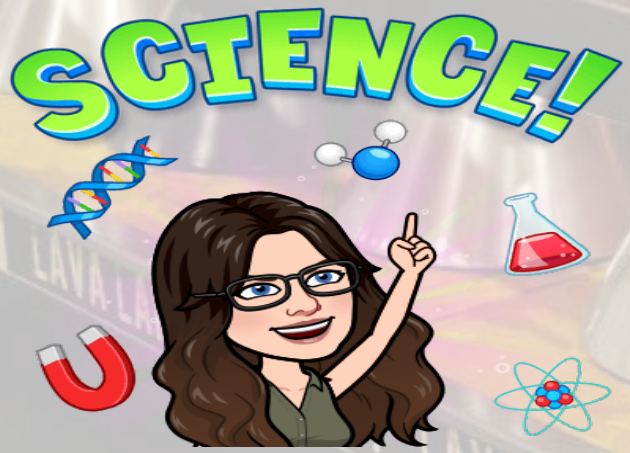
What you will need:

- A clean 1l bottle
- 3/4 cup of water
- 1l vegetable oil
- 1 fizzing tablet (beroca/alca seltzer)
- 1 tbsp food colouring

1. Pour the water into the bottle.
2. Use a measuring cup or funnel to slowly pour the vegetable oil into the bottle until it's **almost** full. You may have to wait a few minutes for the oil and water separate.
3. Add the food colouring by pouring it in drop by drop. The drops will pass through the oil and then mix with the water below.
4. Break a fizzing tablet in half and drop both haves into the bottle. Watch it sink to the bottom and let the blobby greatness begin!
5. To keep the effect going, just add another tablet piece. For a true lava lamp effect, shine a flashlight through the bottom of the bottle.

How does it work??

To begin, the oil stays above the water because the oil is lighter than the water or, more specifically, less dense than water. The oil and water do not mix because of something called “intermolecular polarity.” That term is fun to bring up in dinner conversation. Molecular polarity basically means that water molecules are attracted to other water molecules. They get along fine, and can loosely bond together (drops.) This is similar to magnets that are attracted to each other. Oil molecules are attracted to other oil molecules, they get along fine as well. But the structures of the two molecules do not allow them to bond together.



When you added the tablet piece, it sank to the bottom and started dissolving and creating a gas. As the gas bubbles rose, they took some of the coloured water with them. When the blob of water reached the top, the gas escaped and down went the water. Cool huh?

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MISS WATSONS SCIENCE EXPERIMENT

You will need:

- ✓ A packet of skittles
- ✓ A white plate
- ✓ Warm water
- ✓ Cold water

How to:

1. Arrange the Skittles in a circle around the edge of the plate. I arranged mine in a nice pattern
2. Gently pour the warm water into the centre of the plate, pour enough water to cover the bottom of the Skittles. Do not add too much water, you don't want the Skittles to float out of position.
3. Wait a few seconds. The colours from the Skittles will start to spread slowly towards the middle of the plate.

Optional: Time how long it takes for the colours to meet in the middle of the plate.

4. Continue observing until the colours meet in the middle. Think about why the colours don't mix
5. At the end of the activity, check out the bottom half of the Skittles – what do you notice?

Extension Ideas…

Once the colours have met in the middle predict what will happen if you place a sugar cube in the middle of the plate. Test your prediction.

Retry the experiment with both M&Ms and Smarties. What similarities or differences do you observe?

Try hot water versus cold water and observe any resulting differences. Test alternative liquids such as vinegar, soda water, milk and cola.

The science-y bit…

This experiment explores the chemistry concept known as the ***concentration gradient*** – that is, that chemicals move from areas of higher concentration to areas of lower concentration in an attempt to equalise the concentration.

The science-y bit (continued)…

As the Skittles start to dissolve in the water, they send the coloured sugar outwards in an attempt to equalise the concentration of sugar in the water. The colours do not mix however as the same amount of sugar has dissolved from each Skittle – the concentration of sugar is already equal.

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Science Practical

Self Inflating Balloon

What you need

1. A used washed fizzy drinks bottle
2. Balloon (thinner the better)
3. Elastic band
4. Measuring Jug
5. Yeast
6. Sugar
7. Water

MR MALLETT'S LAB

What to Do: Place 2 teaspoons of yeast, 1 teaspoon of sugar and one cup of water into the bottle. Put the balloon over the top of the bottle and secure with the elastic band. Leave, but keep an eye on it.

What's happening? Yeast is actually a micro-organism. The yeast is 'eating' the sugar and respiring. A product of respiration is Carbon Dioxide, which slowly fills up the balloon.

Next? Experiment with different temperatures, different types of sugar, or different amounts of sugar to see how quickly you can blow up the balloon. What is the best combination?

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