

How to Grow a Rainbow

You will need:

- Kitchen roll/paper towel
- Felt tip pens
- Two small bowls of water
- Paper clip
- Thread



1. Cut your kitchen roll into the shape of a rainbow.
2. Colour a rainbow with felt tips about 2 cm up on both sides.
3. Attach your paper clip to the top and tie a piece of thread to it. This will give you something to hold your rainbow with.
4. Fill each small container with water.
5. Hold your rainbow with the ends slightly submerged in the water then watch your rainbow grow!



THE SCIENCE

A brief introduction to 'capillary action'! Water molecules like to stick to things - including themselves. Sticking to things is called *adhesion* and sticking to itself is called *cohesion*. The fibres in kitchen roll make lots of little holes. Water is 'sucked' through the holes because of adhesion (liking to stick to other things) and cohesion (liking to stick to itself) means the rest of the water follows. The water pressure will eventually slow down and the pressure of gravity will mean it stops moving.

@MrsBpriSTEM

Invisible Ink

You will need:

- Lemon juice
- Cotton bud or a paint brush
- Cup
- Paper
- Candle



1. Add about 1 tablespoon of lemon juice to the cup. Fresh squeezed or bottled juice will work just fine.
2. Soak the cotton bud or paint brush in lemon juice and use it to write a message on your paper.
3. Once it is dry, it will be invisible.
4. CAREFULLY hold your paper over a lit candle to reveal your message – try not to set fire to the paper. Get an adult to help you and make sure you have a bowl of water next to you just in case!

You can also “iron” your paper but don’t use the steam setting. Put a dry cloth between the paper and iron to protect the iron’s surface.

THE SCIENCE

The paper discolours before the rest of the paper gets hot enough to do so. Lemon juice contains carbon compounds which are colourless at room temperature. Heat breaks down these compounds and releases the carbon. When carbon comes in contact with air (specifically oxygen), oxidation occurs and the substance turns light or dark brown.

Try different fruit juices – or milk! – and compare the results.

@MrsBpriSTEM

The Leakproof Bag

You will need:

- Sharpened pencils or skewers
- A sealable bag
- Water

1. Make sure your pencils are sharp before you begin.
2. Fill three quarters of your bag with water and seal it.
3. Holding the top of the bag with one hand, use the other hand to push a pencil right through to the other side. Like magic, there are no leaks!
4. Repeat with several pencils – making sure they are pushed through in different places on the bag.

Test how many pencils your bag can hold!

Do pencils with flat or round edges work best?

Try different thicknesses of bag to see which works best.



THE SCIENCE

The Science for this one is quite complicated! The bag is made out of a polymer which has lots of molecules attached together in long chains (think strands of cooked spaghetti!). The tip of the pencil can easily push apart the flexible strands of spaghetti but the strands' flexible property helps to form a temporary seal against the edge of the pencil. When the pencil is removed, the hole in the plastic bag remains because the molecules were pushed aside permanently and the water leaks out.

@MrsBpriSTEM

DIY Lava Lamps

You will need:

- Vegetable/sunflower oil
- Vinegar
- Food colouring
- Bicarbonate of soda
- Tall glass or bottle
- Spoon
- Small cup



1. Add three spoons of bicarbonate of soda into the tall glass or bottle.
2. Fill two thirds of the container with oil – but don't mix!
3. In the small cup, add some vinegar and several drops of food colouring.
4. Slowly add drops of your coloured vinegar into your oil/bicarb mixture and watch your lava lamp come to life!

Why not try adding different colours to your lava lamp?

THE SCIENCE

Oil and vinegar do not have the same density (how heavy something is for its size). Vinegar is more dense than this type of oil - that's why it sinks to the bottom of the container.

Once the vinegar touches the bottom of the container, it reacts with the bicarb. This chemical reaction creates bubbling carbon dioxide which rises – these are the bubbles you see within the container.

@MrsBpriSTEM

Framing Nature

You will need:

- Cereal box
- Scissors
- Camera



1. Cut out a cardboard frame from a cereal box. Ask an adult to help with the centre!
2. On a walk or in the garden, use your frame to capture nature.
3. Take a photograph and create a nature collage!



EXTENSION

Why don't you draw or paint what you have captured in your frame?

Use your images to create a book about nature. Label each flower, plant or tree and add a description.

Start a project about cloud formations and use your frame to capture the different cloud formations.

Take time to notice and appreciate the beauty of nature around you.

@MrsBpriSTEM

Grow your own Hanging Crystals

You will need:

- Two glass jars
- Hot water
- Bicarbonate of soda
- Two paper clips
- String or wool
- Small plate

1. Pour hot water into the two jars and stir in bicarbonate of soda until no more will dissolve (about 6 teaspoons). When a layer forms at the bottom of the jars, this means no more will dissolve.
2. Tie a paper clip to each end of the piece of wool or string and place each end in each jar so it hangs between.
3. Put a small plate underneath the wool between the jars.
4. Leave the jars for a week. Crystals will begin to form along the wool - hanging down like stalactites. You may even get crystal stalagmites forming on the plate!

THE SCIENCE

You've created a super-saturated solution. Hot water can hold more dissolved bicarb than cold water because the molecules are further apart. When the water cools, the bicarb can no longer 'fit' in the water and 'clings' to the wool. As the water evaporates, crystals form. These crystal strings get longer as more water drips down.



@MrsBpriSTEM

Recycling Crayons

You will need:

- Old broken crayons
- Baking tray (silicone is better)
- Oven

1. Peel off the wrappers of your crayons and break them in to the moulds of the baking tray. Make sure you mix up the colours to make a more interesting effect!



2. Pre-heat the oven to 90°C and ask an adult to pop the baking tray in. Leave it for about 10 to 15 minutes.

3. Check on them – hopefully they will have melted in to a colourful liquid.



4. Wait for the liquid to cool, then tip your recycled crayon discs out of the tray. Now use them for you own drawings or to take leaf rubbings outside!



The Science

There are three states of matter. The crayons were initially solid. Because they have been heated, the forces holding the particles together inside them become weak so they melt. As they cool, the forces become strong enough again to hold the particles together to make a solid.

They started off solid, the heat melts them in to liquid, and then they return to solid as they cool.