Science Experiments



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Ice cream in a bag

You will need:

- A large bag of ice
- Salt
- Milk
- 1 small sealable plastic bag
- 1 large sealable plastic bag
- Tea towel

Instructions

Pour a cup of milk into the small sealable plastic bag. Tightly seal the bag.

Half fill the bigger sealable bag with ice. Add two tablespoons of salt.

Put the small bag into the large bag and shake. Roll the ice over the milk, keeping the milk in contact with the ice as much as possible.

Make sure the smaller bag doesn't split or open - the ice cream won't taste very nice if it is full of salt.

Wrap the bag in a tea towel to protect your hands if it gets too cold to touch.

Check the milk after 5 minutes. If it is not ready yet, keep going. You want the milk to have a similar consistency to ice cream.

The Science

Ice cream is made of droplets of fat from milk jumbled up with millions of tiny crystals of ice and pockets of air.

Adding salt to ice lowers the freezing point of ice by a few degrees. When salt is added to ice in the outer bag, the ice (which is at 0°C) is now above its freezing point, and starts to melt. Melting requires energy, which in this case is taken from the milk in the inner bag, causing the milk to freeze.



Chocolate welding

You will need:

- 3 to 6 bars of chocolate
- A heatproof glass bottle or jar with a lid
- A kettle

Instructions

Boil the kettle and pour the water into the glass jar. Be very careful - get a grownup to help you.

Have wipes and towels handy as this gets messy!

Break the chocolate into pieces. Hold the edge against the jar containing the hot water. The chocolate will melt, allowing you to stick pieces of chocolate together. You will need to hold the pieces together for a few seconds to make sure they stick.

Make a house, a vehicle, anything you like!

The Science

The hot water causes the chocolate to melt. As it cools down again, it solidifies and retains its form, creating a secure bond between the chocolate pieces.



Celebration cannons

You will need:

- A toilet roll middle
- Tape
- A balloon
- Scissors

Instructions

Tie the balloon in a knot. Cut off the top and stretch the balloon over the toilet roll middle. Secure with tape.

Add homemade confetti or flower petals.

Pull the knotted end of the balloon back and let go!

The Science

This experiment is all about kinetic energy. When the elastic balloon is stretched, energy is transferred from the user. The balloon then has high potential energy and wants to return to its standard shape. When you release it, the kinetic energy propels the confetti out of the cannon.



Rainbow Skittles

You will need:

- Skittles
- A plate
- Warm water

Instructions

Arrange the skittles in a circle on the plate.

Carefully pour warm water into the middle of the plate.

Watch as the colour of the sweets begins to creep towards the centre of the plate.

The Science

Skittles are made with colourful dyes and sugar. The warm water dissolves this dye and sugar and they move towards a place where there is less dye and sugar, in this case, the middle of the plate.

This process is called diffusion. Diffusion is the movement of particles (in this case, sugar) from a space of higher concentration (the outer curve of the plate) to a place of lower concentration (the middle of the plate).





Turn milk into plastic

You will need:

- Milk
- Vinegar
- Measuring cups
- Strainer

Instructions

Put 1 cup of milk in a microwaveable bowl and heat it in the microwave for about one and a half minutes. The milk should be hot but not boiling.

Mix in 4 tablespoons of vinegar. Stir for about one minute: the milk will begin to clump.

Strain the milk using a strainer. All of the clumps will remain in the strainer. Push hard on the clumps to remove all of the liquid.

Next, move the clumps to some paper towels and attempt to squish all of the remaining fluid from the plastic milk.

Finally, form and shape the plastic milk into anything you like. You can even colour it with food colouring if you wish.

Let the plastic dry for two days until it is completely hardened.

The Science

Milk contains molecules of a protein called casein. When vinegar is added to milk, the pH of the milk changes. The pH change causes the casein molecules to unfold and reorganise into long chains, curdling the milk. The curds can then be kneaded and moulded into a material similar in look and feel to plastic.



Invisible ink

You will need:

- A lemon
- Cotton buds
- A small bowl
- Paper
- Heat source (e.g. a candle, lightbulb, radiator or iron)

Instructions

Squeeze the lemon juice into a bowl.

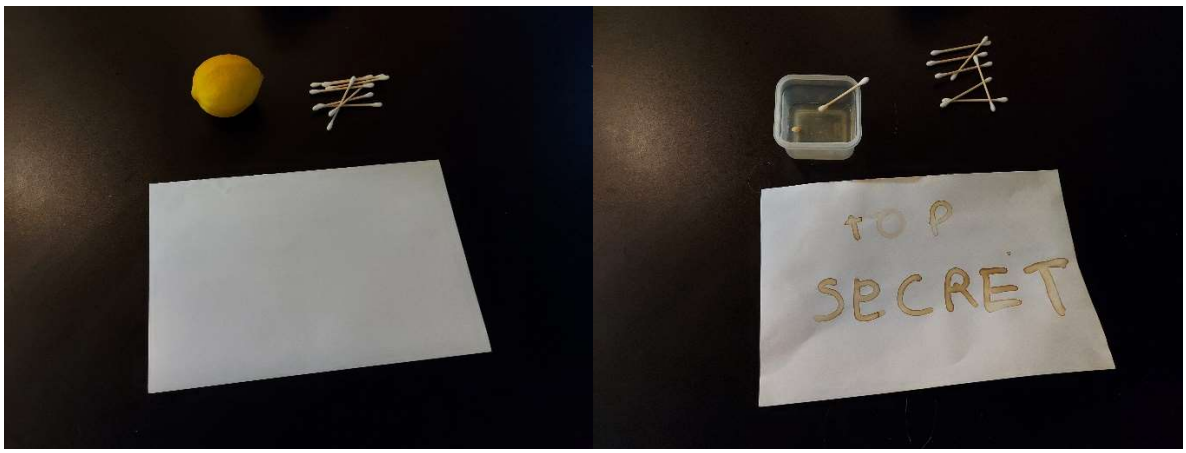
Dip the cotton bud into the juice and write your message on the paper. Leave to dry completely.

Move the heat source close to the paper and the message will magically appear!

The Science

Lemon juice is mostly made of a variety of sugars, acids, and water. It looks clear to the naked eye.

However, heating up lemon juice causes some of its sugars to oxidise (react with oxygen in the air), which turns these sugars brown.



DIY compass

You will need:

- Sewing needle
- A bowl filled with water
- Magnets
- A cork or a leaf

Instructions

Stroke the magnet one way down the needle a few times.

Stick the needle in the cork (or place it on top of the leaf).

Put the cork or leaf into the bowl of water and watch as the needle turns to point north.

The Science

The magnetised needle is affected by the earth's magnetic field. It will move to point towards magnetic north.



Volcano

You will need:

- 10ml washing up liquid
- 100ml warm water
- 400ml white vinegar
- Food colouring
- Half a cup of baking soda
- Half a cup of water
- Empty 2l soda bottle

Instructions

Do this outside - it gets messy!

Mix the washing up liquid,warm water, white vinegar and food colouring inside the empty soda bottle.

Combine the half cups of baking soda and water and mix until it is all a liquid.

Quickly pour the baking soda mixture into the soda bottle and step back to watch the fun!

The Science

A chemical reaction between vinegar and baking soda creates a gas called carbon dioxide. Carbon dioxide is the same type of gas used to make the carbonation in sodas. The gas tries to spread out - there is not enough room in the bottle so it leaves through the opening very quickly!





Egg drop challenge

You will need:

- Raw eggs
- Containers, e.g. cardboard boxes or tubes
- Protection materials, e.g. balloons, elastic bands, craft sticks, straws
- Padding, e.g. fabric, packing materials, paper
- Pen or pencil
- Paper
- Tape
- Scissors

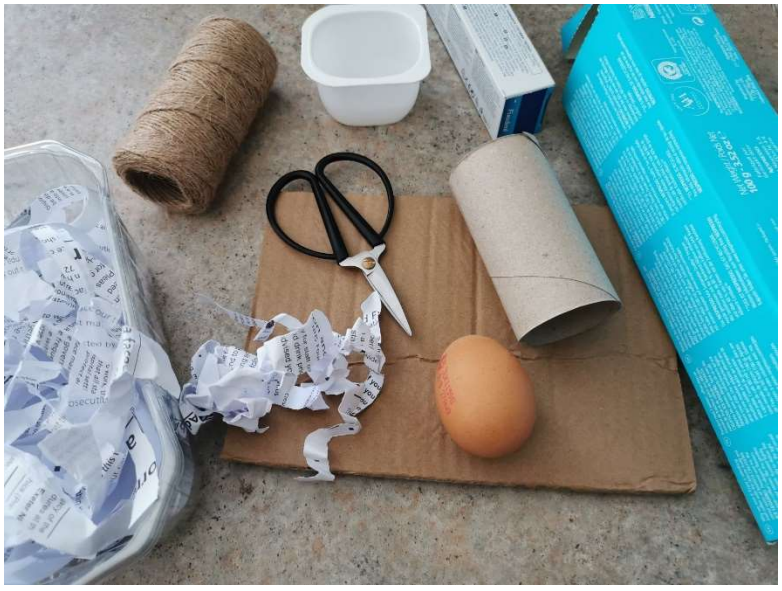
Instructions

Design a container that will protect your egg from breaking when dropped from a height. If the egg cracks, modify the design and try again. If the egg stays whole, congratulations! You have succeeded!

Design your idea on paper, and try out different kinds of packaging and materials.

The Science

When you drop your egg, gravity pulls it to the ground. The internal padding that surrounds your egg cushions the payload inside the container, like airbags in a car that protect passengers. The external protection on the outside of the container protects the egg by absorbing the impact felt when the container hits the ground.



Crystal growing

You will need:

- Salt
- A glass
- Warm water
- A piece of string

Instructions

Pour warm water into a glass until it is about half full.

Add a few spoonfuls of salt to the water and stir until the salt dissolves.

Cut a piece of string that is long enough to reach from the bottom of the glass to the top, and tie one end to a pencil or stick. Dip the free end of the string into the salt water, making sure it is completely submerged, resting the pencil or stick across the top of the glass so that the string hangs down into the water.

Leave the glass in a warm, dry place and watch over the next few days as the water evaporates and salt crystals start to form on the string.

The Science

The salt dissolves in the heated water. As the water cools, it becomes less able to hold the salt. The salt then clings to the string and forms crystals.

