SUPER SCIENCE

Girlguiding has teamed up with Rolls-Royce, a world-leading provider of power systems and services for use on land, at sea and in the air, to bring you three amazing experiments to awaken the scientists in your Brownies.

Science is for everyone! So get excited about science and achieve your Science investigator badge by trying out these super science experiments in your unit and learn about motion, magnetism and how light helps us to see. Maybe you have some future scientists in the room?

Working in partnership with

WE DISCOVER, WE GROW Girlguiding

Brownies

All about me

Make a pinhole viewer

This activity shows how light works inside the eye.

You will need:

- cardboard tube (eg kitchen roll, snack container)
- knife
- sticky tape
- greaseproof paper
- tin foil
- pin
- collage material, such as coloured paper and glue (optional)
- a lamp

Be safe

Take care when using a sharp knife.

What to do:

1. Cut off 2cm from the end of the cardboard tube.
2. Cover one end of the shorter piece of tube with greaseproof paper and the other end with tin foil. (If the tube already has a tin base, you don't need to cover it with foil.) Secure both ends with sticky tape.
3. Make a small hole in the centre of the tin foil base with the pin.
4. Using sticky tape, attach the longer piece of tube back on top of the smaller tube, keeping the greaseproof paper in the centre.
5. Cover the outside of the tube with tin foil.
6. Put the lamp on a desk and place an object in front of it. Turn out the lights and point the end of the tube with the pinhole at the object.
7. Look through the open end and write down what you see.

The science bit!

Did you know that our eyes see things upside-down? Our brain has to flip the image the right way up again. In super science terms, light is absorbed or reflected when it hits an object. When light passes through the pinhole, the image is projected upside-down on to the greaseproof paper.

Take it further:

The girls can decorate their pinhole viewers with collage material.

Result:

When Brownies look through their tubes, the picture coming through the pinhole will appear upside down.

Build it

Forces and motion

Ever wonder what keeps us from floating off into space? Or why when you roll a ball down a hill it moves faster than if you roll it on flat ground? It's all down to science - or more specifically, two big ideas - motion and force.

Forces are at work all around us, all the time! They can be big forces that make the earth circle the sun or small forces that make a ball move through the air when you throw it.

And if you were wondering, it's the force of gravity that keeps us on the Earth and stops us from floating off into space. It's like a magnet and never stops working!

Balloon-powered car

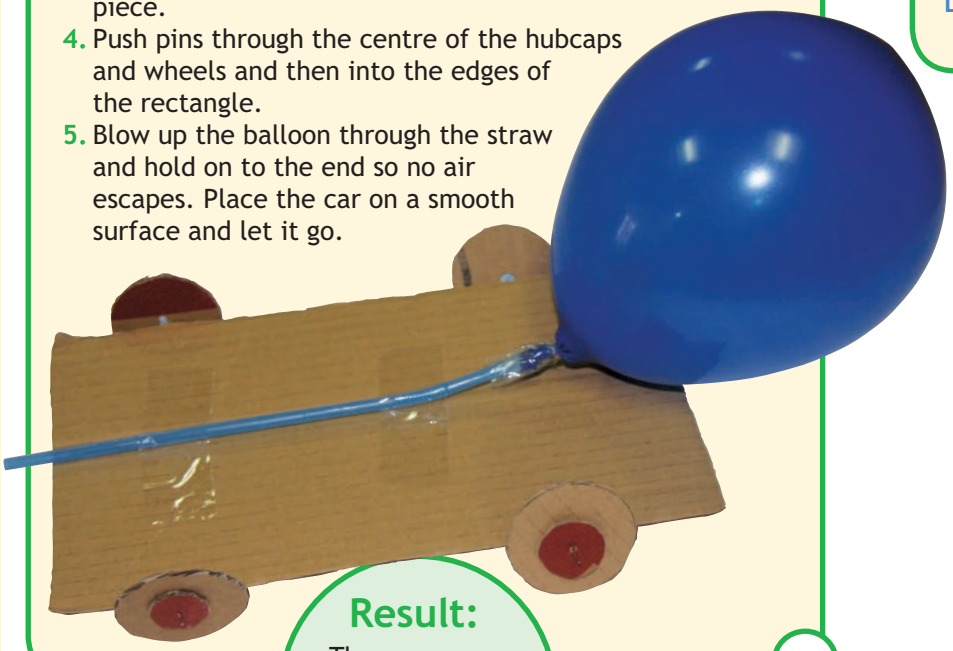
This activity teaches about different forces and motion.

You will need:

- 4 dressmaking pins
- sheet of corrugated cardboard
- sticky tape
- flexible straw
- scissors
- paper cup
- small, round party balloon

What to do:

1. Draw a rectangle (24cm long and 14cm wide), 4 wheels, and 4 hubcaps (small circles) on the sheet of corrugated cardboard.
   You can use the bottom of a paper cup to help you draw the wheels.
2. Cut out the shapes.
3. Tape the balloon to the short end of a flexible straw and then tape the straw to the top of the rectangle piece.
4. Push pins through the centre of the hubcaps and wheels and then into the edges of the rectangle.
5. Blow up the balloon through the straw and hold on to the end so no air escapes. Place the car on a smooth surface and let it go.



Result:

The car moves around the room until the balloon is fully deflated.

Be safe

Be careful when using sharp scissors.

Be aware of any latex allergies or genuine fear of balloons.

Leaders should help Brownies to inflate balloons if necessary.

The science bit!

The air you blow into the balloon becomes stored energy. When you let go of the balloon, this energy (air) starts to escape. As the air rushes out, the car moves forward. It moves in the opposite direction of the escaping air at the same speed. In super science terms, for every action there is an equal and opposite reaction.

All around me

Make a compass

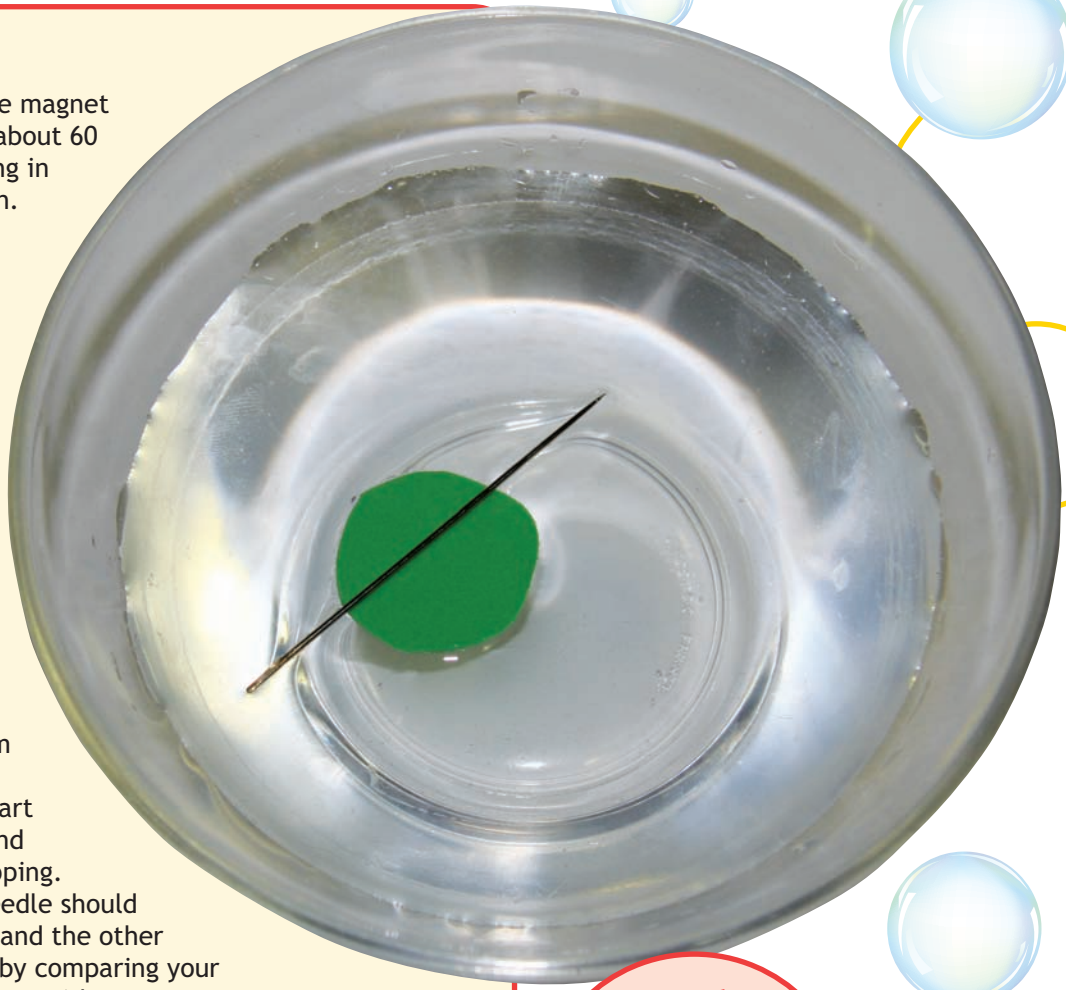
This activity explains how magnetism works.

You will need:

- large sewing needle
- small bar magnet
- small coloured foam disc
- drinking glass or bowl
- water
- compass

What to do:

1. Run one end of the magnet along the needle about 60 times, always going in the same direction. The experiment will not work if the magnet is rubbed back and forth along the needle.
2. Float the disc in the bowl of water. Make sure that there is no other metal or compass nearby.
3. Carefully place the needle on the centre of the foam disc.
4. The disc should start to gently spin round before finally stopping. One end of the needle should be pointing north and the other south. Check this by comparing your home-made compass with a proper one.



Result:

You now have a compass that will point you north, no matter how many times you spin it around!

The science bit!

By rubbing the magnet on the needle you are giving the needle a magnetic charge. In super science terms, you have magnetised it! As the needle is made of iron it can now act as a magnet itself. The Earth's magnetic field is strong enough to affect the needle which you have temporarily magnetised.

By floating the needle on the water you are allowing it to move freely until one end of the needle points to the North Pole and the other end points to the South Pole, known as magnetic north-south. Even if you turn the bowl or the foam, the needle should still spin back to align north-south.

Take it further:

You can use this activity to work towards the Science investigator badge.