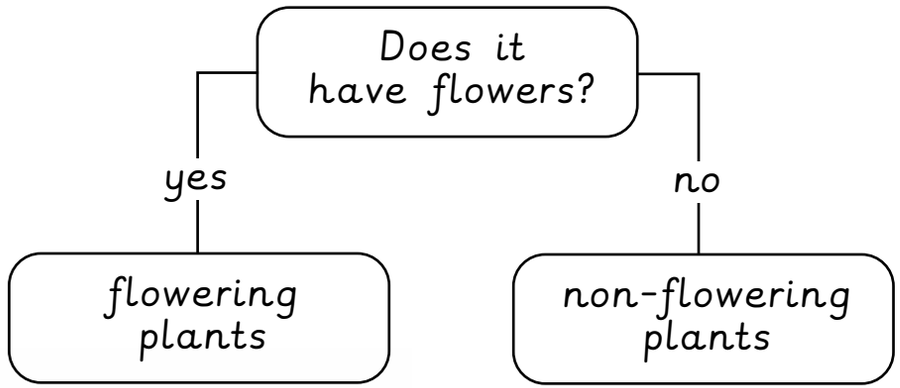
Science - Classification and changing habitats

Living things can be sorted and identified with a tool called a **classification key**, which uses a series of yes/no questions:



Taxonomists are scientists who sort, group, identify and name living things.

Habitats can change because of negative human impacts:

- Plastic pollution is building up in our seas, hurting animals that get trapped in or ingest it.
- Climate change, caused by human activities, is heating up the Earth, disrupting habitats and affecting species survival.
- Coral bleaching, resulting from increased sea temperatures, makes it difficult for coral and the animals that live there to survive.
- Deforestation involves cutting down large areas of forest, destroying the habitats of many plants and animals.

Habitats can change due to natural disasters:

- Earthquakes can make mountains change shape. They can also cause volcanoes to erupt, destroy animals' shelters and uproot plants.
- Wildfires can destroy large areas, burning all the plants. This can cause animals to die or lose their homes.
- Floods can make plants waterlogged or uproot them. They can wash away soil, destroy animals' shelters and cause animals to drown. Floods can also spread disease.

Science - Classification and changing habitats

Living things can be **classified** into different **groups** according to their shared **characteristics**:

Animals **without backbones** are classified as **invertebrates**. They include the following groups:

worms	snails and slugs	insects	spiders
			

Conservationists are scientists who protect and restore habitats. They are working to reverse negative human impacts.

Animals **with backbones** are classified as **vertebrates**. They include the following groups:

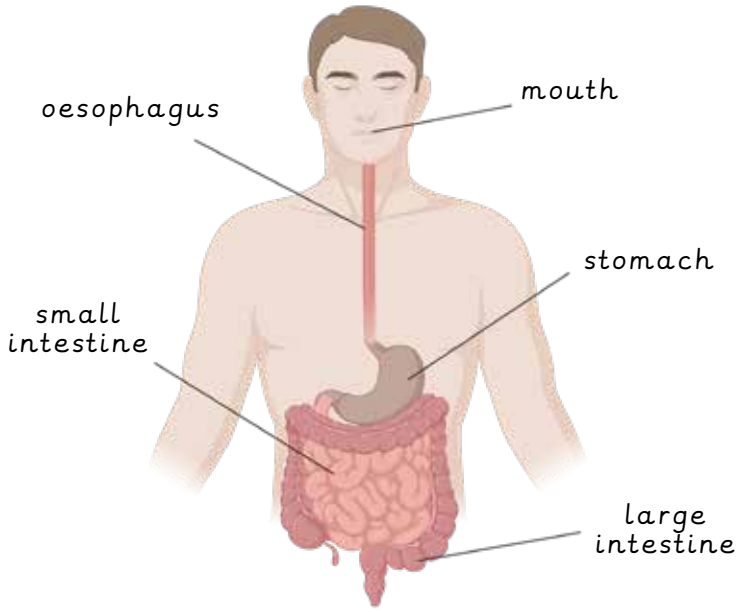
fish	amphibians	reptiles	birds	mammals
				

Conservationists help by:

- Studying nature.
- Protecting and restoring habitats.
- Cleaning up pollution.
- Fighting climate change.
- Helping endangered species.
- Making laws and rules to protect the environment.
- Educating others about the environment.

Science - Digestion and food

The human digestive system



Mouth: teeth are used for cutting and grinding and saliva softens and breaks up food.

Oesophagus: carries food from the mouth to the stomach.

Stomach: breaks up food using acid.

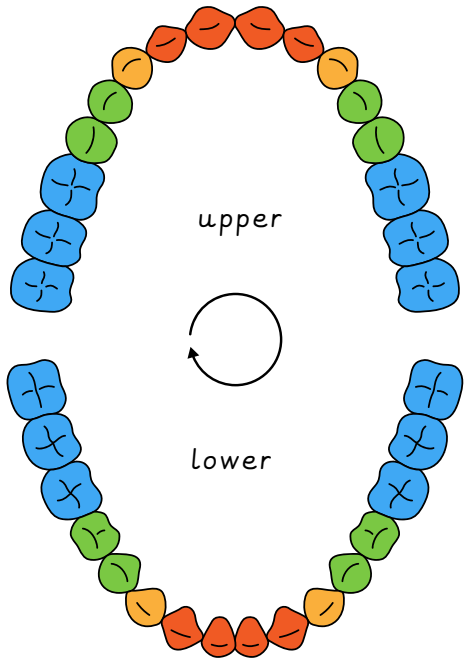
Small intestine: breaks up food and absorbs nutrients into the blood.

Large intestine: absorbs water into the blood.

Teeth in different animals

Animals have different shaped teeth depending on their diet.
Carnivores tend to have much larger canines to help catch and tear their prey.
Herbivores tend to have larger, flatter molars to grind and crush the plants they eat.

Human teeth



Incisor: a tooth at the front of the mouth, useful for cutting.

Canine: a pointed tooth, useful for tearing.

Premolar: a tooth in front of the molars, useful for grinding.

Molar: a tooth at the back of the mouth, useful for grinding.

Science - Digestion and food

Evidence scientists use

X-rays are used to produce images of inside the body. They help doctors and dentists to find and treat problems.

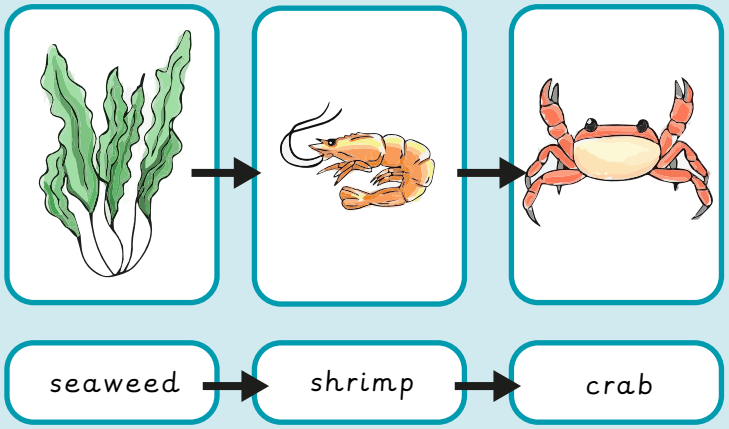
Fossils are the remains or traces of an animal or plant that lived long ago. Fossilised teeth can give clues about an animal's diet by comparing their teeth to those of modern animals.

Faeces are the solid waste from the **digestive system**. The contents of the faeces can show what an animal has eaten and if it is living nearby.

Further vocabulary

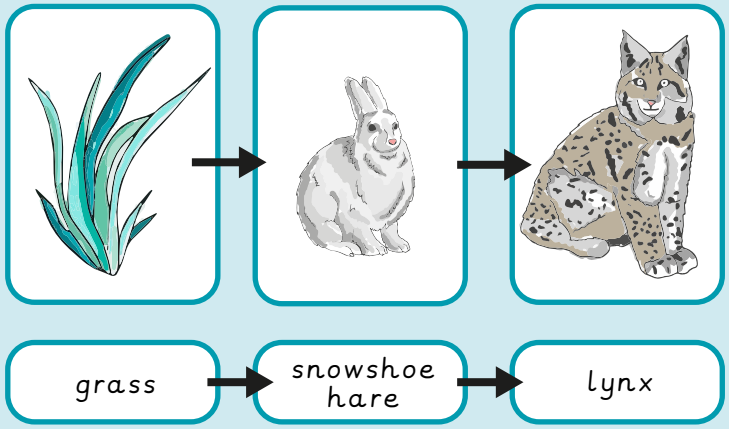
absorb	To take in or soak up.
digest	To break up food into smaller pieces.
predator	Something that hunts and kills its food.
prey	Something that is hunted and killed for food.
producer	A living thing that makes its own food.
saliva	The liquid added to the mouth to help chewing, swallowing and digestion.

Food chains show the energy being passed between living things in a habitat



Food chains usually contain three or four living things.

Food chains always start with a **producer** (plant), followed by an animal that eats the plant (**herbivore** or **omnivore**) and an animal that eats other animals (**carnivore** or **omnivore**).



Science - Electricity and circuits

Electrical appliances

Electrical appliances are found all around us.





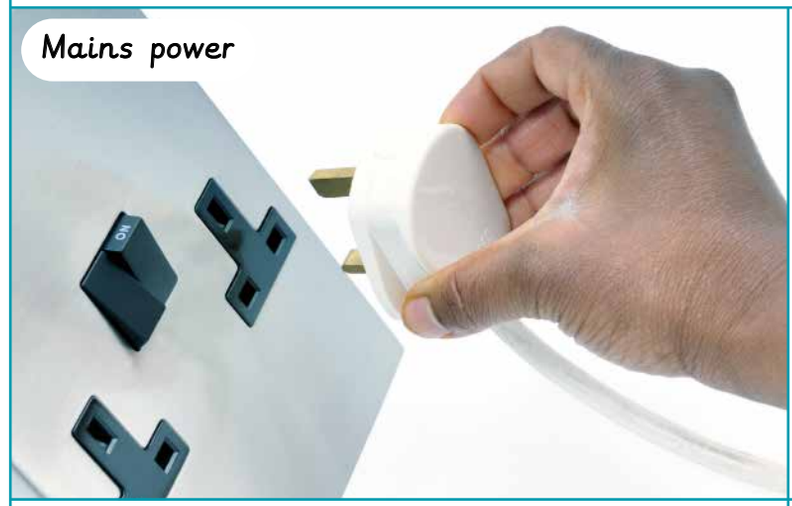

An electrical circuit is the pathway through which electrical charge flows in an appliance.

For a circuit to work, it must include:

- A power source.
- A complete pathway.
- A device or component, such as a bulb.

Power source: something that transfers electrical energy to make an appliance work.

Mains power



- Provides high power for larger appliances.
- Requires access to an electrical socket.
- Appliances are fixed in place.

Batteries

- Allows an appliance to be portable and used anywhere.
- Allows an appliance to be used where no electrical sockets are available.
- Batteries run out and need replacing.
- Batteries are harmful and must not go to landfill.

Science - Electricity and circuits

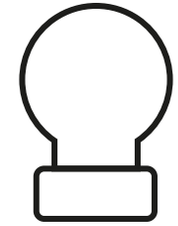
A **component** is a part of an electrical circuit.

Symbols are often used to represent the components so they are easy to draw and recognise.

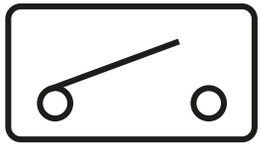
battery/cell

wire

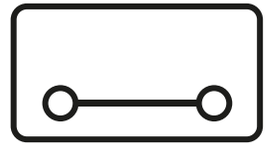
bulb



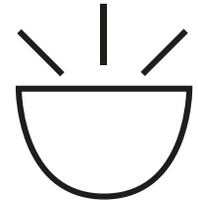
open switch



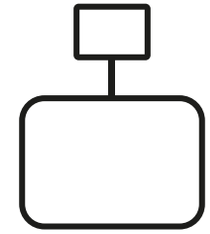
closed switch



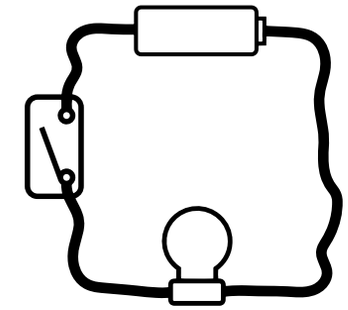
buzzer



motor



A **circuit diagram** is a simple line drawing that represents how the components in an appliance join together.



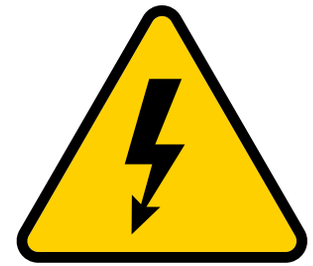
Electrical conductors are materials that allow electrical charge to flow through quickly.

Metals are good electrical conductors.

Electrical insulators are materials that do not allow electrical charge to flow easily.

Plastics are good electrical insulators.

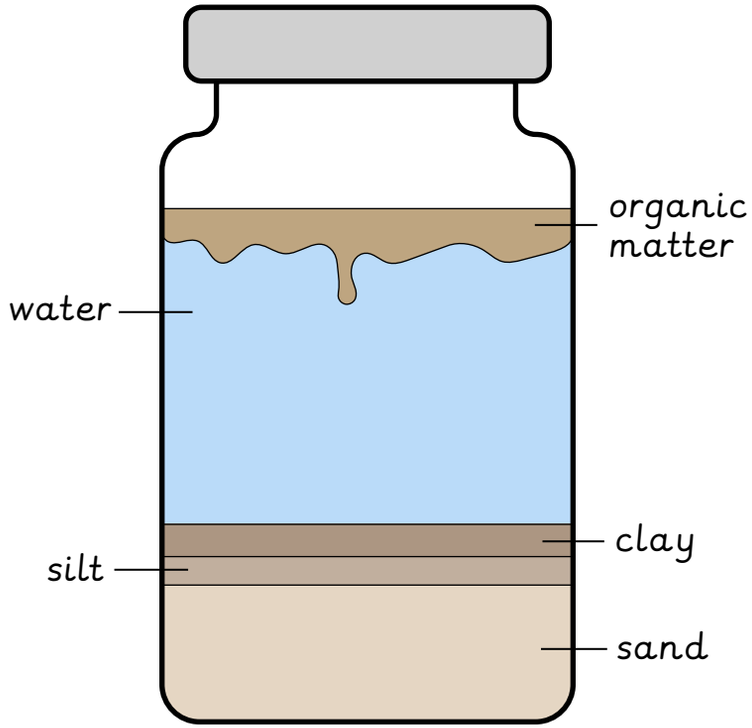
Electrical safety



- Do not use electrical appliances or switches with wet hands.
- Do not put anything other than a plug in an electrical socket.
- Let an adult know if electrical appliances or wires appear damaged.
- Do not leave electrical wires laying across the floor or on hot surfaces.

Rocks are formed in different ways and from different mixtures of minerals, other rocks and **organic materials**. This means their appearance and physical properties can vary.

Drainage rate is how quickly water passes through a soil.



Soil can be separated using sedimentation (mixing with water).

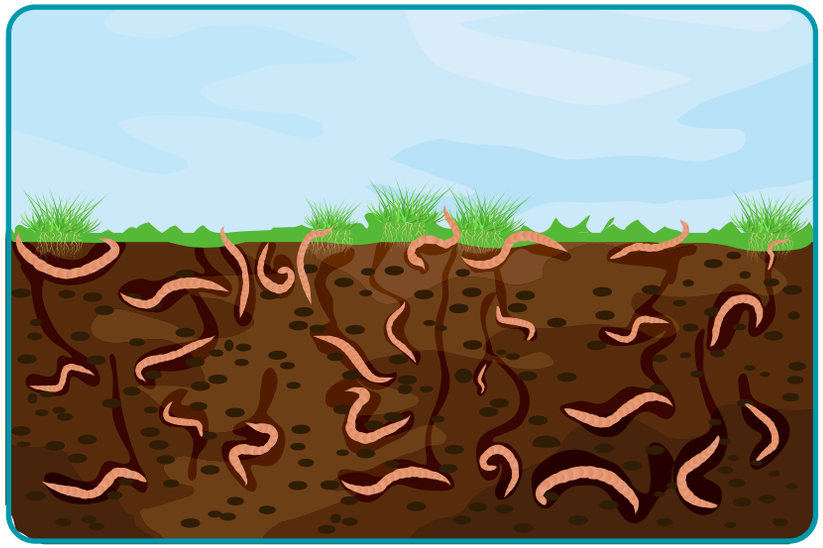
Peaty soil
- Consists of mainly organic matter.
- Medium drainage.

Clay soil
- Consists of mainly clay grains.
- Drains slowly.

Loam soil
- Consists of even amounts of sand, clay, silt and organic matter.
- Medium drainage.

Sandy soil
- Consists of mainly sand grains.
- Drains quickly.

Science - Rocks and soil

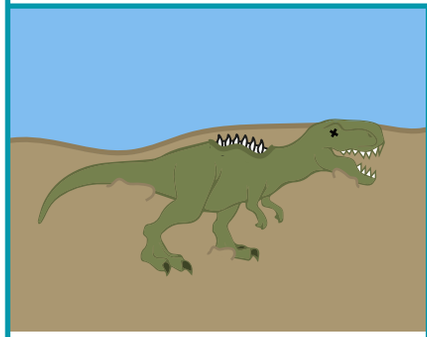


Rock can be broken down into small pieces called **sediment** by forces of nature like wind, rain, rivers, animals and plants.

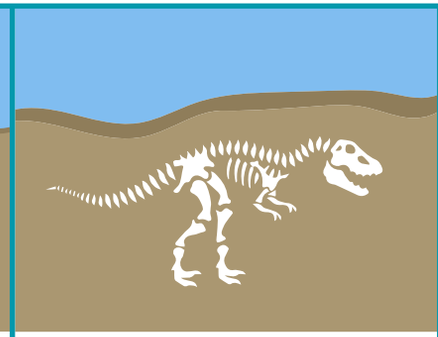
Soil is made from **grains** of sediment, organic matter, water and air. Soil contains different sized grains of sediment:

- Clay (smallest).
- Silt (medium).
- Sand (largest).

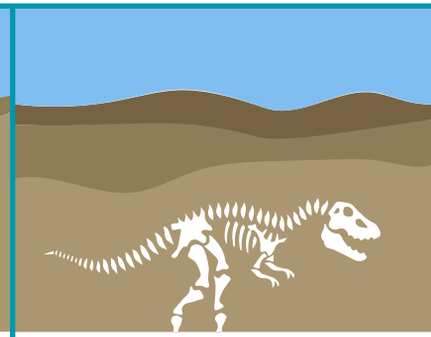
A paleontologist is a scientist who studies fossils. Fossils can tell us about the living things from Earth's past.



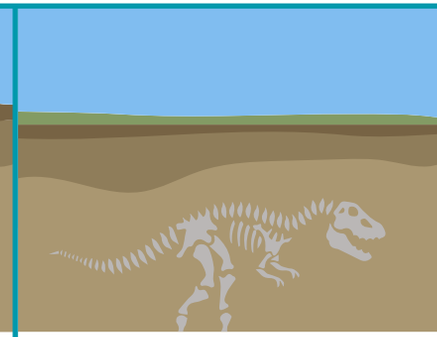
A living thing dies.



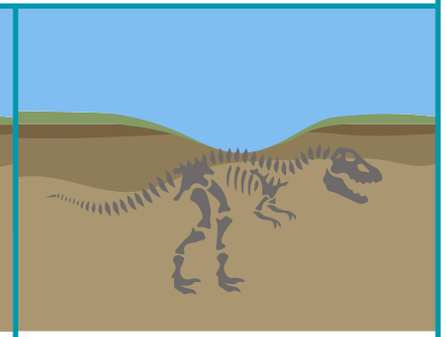
It is buried under a layer of sediment.



Layers of sediment build up on top and squash it.



Water seeps in and minerals replace the parts of the living thing.



It has been turned to rock and is now a fossil.

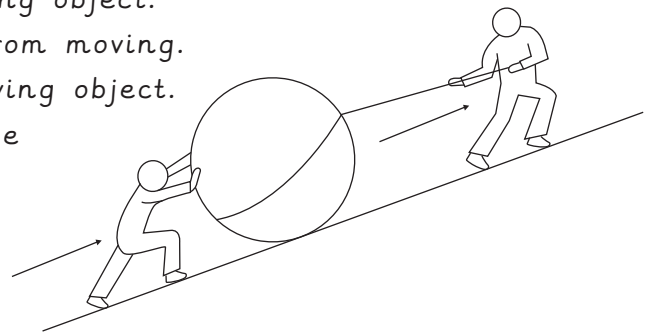
Rock type	Appearance	Physical properties
granite	 crystals	• impermeable • no reaction to acid • hard
marble	 crystals	• impermeable • reacts to acid • medium
chalk	 no crystals	• permeable • reacts to acid • soft
slate	 no crystals	• impermeable • some react to acid • medium
sandstone	 no crystals	• permeable • some react to acid • soft

Science - Forces and magnets

A force is a push, a pull or a twist.

Forces can have the following effects:

- Starts an object moving.
- Changes the direction of a moving object.
- Speeds up a moving object.
- Stops an object from moving.
- Slows down a moving object.
- Changes the shape of an object.

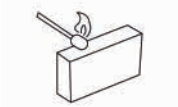


Friction is useful when it:

- Helps a car brake.
- Lights a match.
- Rubs out mistakes.
- Opens a jar.
- Brushes teeth clean.
- Sands down wood.

car braking


brushing teeth


lighting a match


rubbing out


sanding

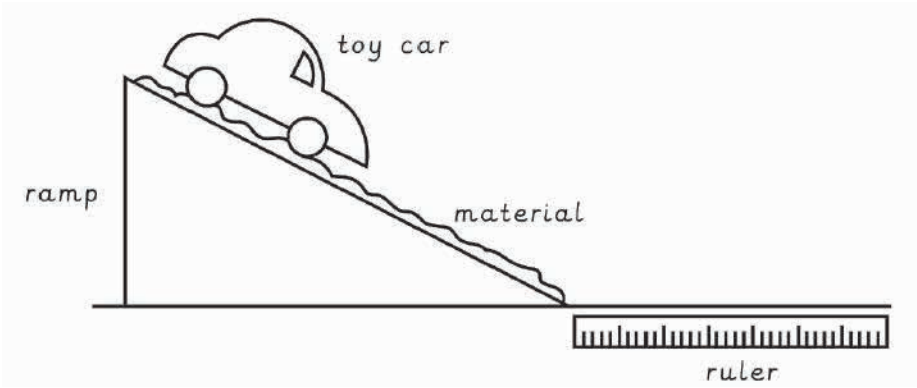

opening a jar

Contact forces are caused by contact between two surfaces.

Friction is a contact force that acts between surfaces that are sliding over one another.

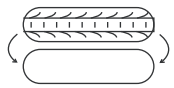
It acts in the opposite direction to motion.

The rougher a surface is, the more bumps it has and the more points of contact there are between the two surfaces. More points of contact create more friction. More friction leads to a greater slowing effect on the object.



Friction is not useful when it:

- Slows down racing cars.
- Wears down car or bike tyres.


worn tyre

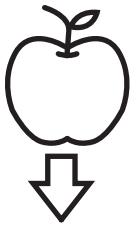

breaking speed records

Science - Forces and magnets

Non-contact forces can act at a distance.

Examples of non-contact forces are:

- Magnetism.
- Gravity.



gravity

magnetism

There are different types of magnets. They can have different strengths.

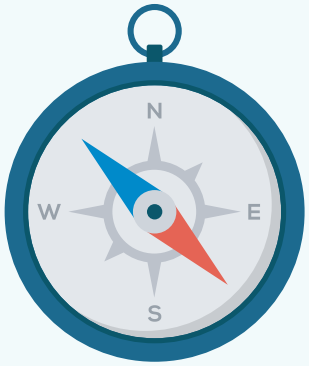
bar magnet

horseshoe magnet

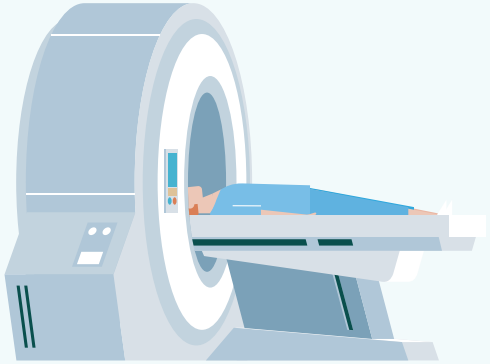
ring magnet

button magnet

Magnets are used in compasses, fridge magnets, toys, jewellery, handbags, furniture, paints and polishes.

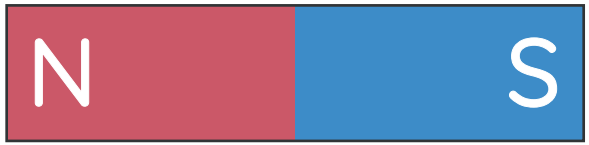


Electromagnets are magnets that can be turned on and off using electricity.



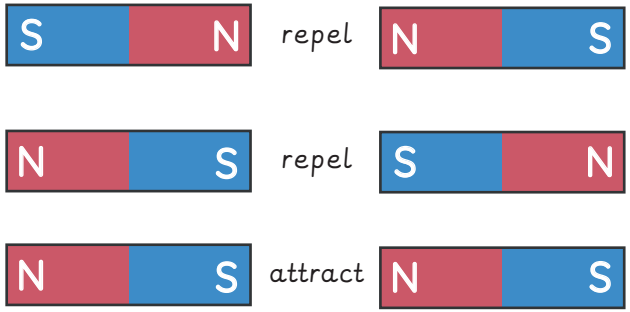
They are used in doorbells, speakers, motors, Maglev trains, MRIs and on cranes.

Magnetism is the non-contact force that comes from a magnet.



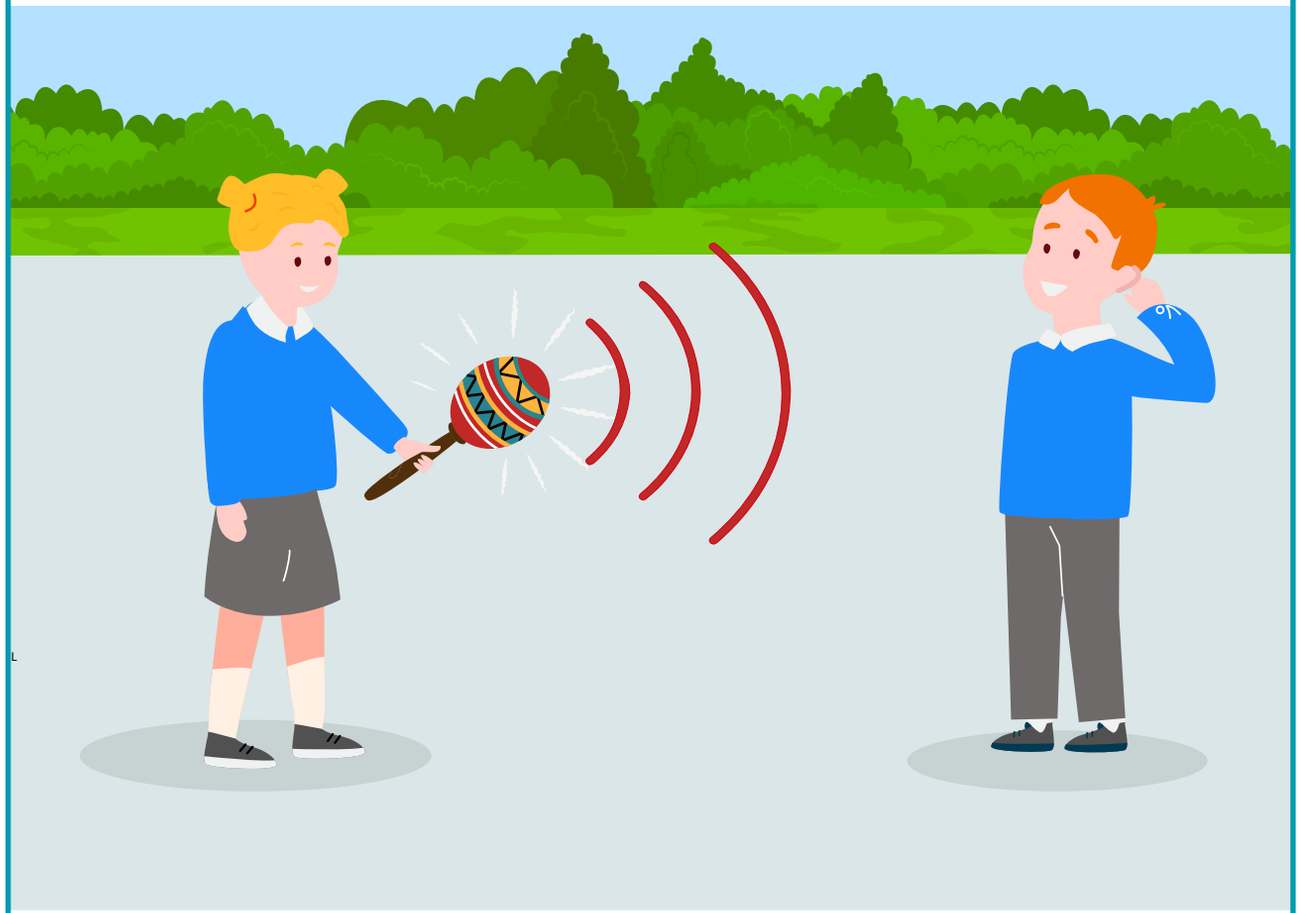
north pole south pole

Magnets have a **north pole** and a **south pole**. The opposite poles of magnets attract and like poles repel.



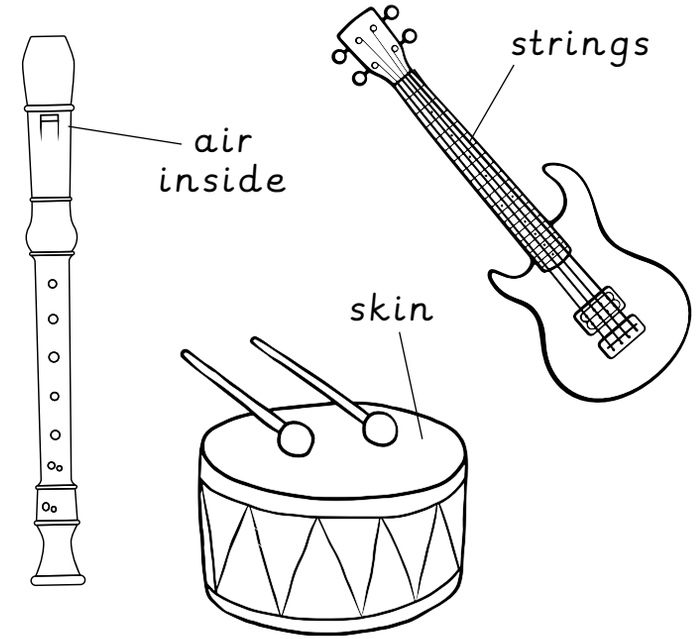
Magnetic materials are attracted to a magnet. Iron and nickel are magnetic metals. Objects that contain them will be attracted to a magnet.

Sound is made by **vibrations**. When something vibrates, it moves the air around it, creating a **sound wave**. Sound waves can travel through different mediums (solids, liquids and gases) to our **ears**, allowing us to hear sounds.



Sound waves travel fastest and farthest through solids, then liquids and slowest through gases.

Different **musical instruments** make vibrations in different ways:

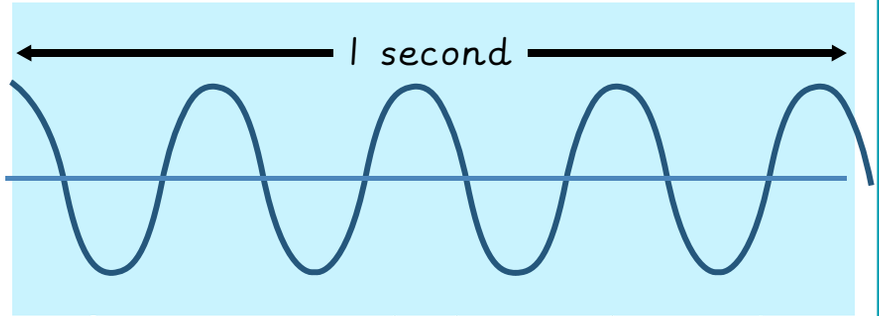


The volume of an instrument can be changed, for example by plucking, blowing or hitting harder.

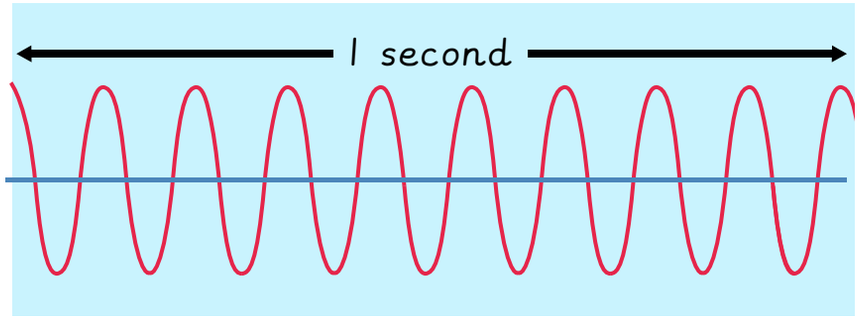
The pitch of some instruments can be changed, for example by pressing a different key or plucking a different string.

Science - Sound and vibrations

slower waves = lower pitch sound



faster waves = higher pitch sound



The **pitch** of a sound depends on the speed of the vibrations.

Pitch can be measured in **hertz (Hz)**. High-pitched sounds can be dangerous to the ear and cause hearing loss.

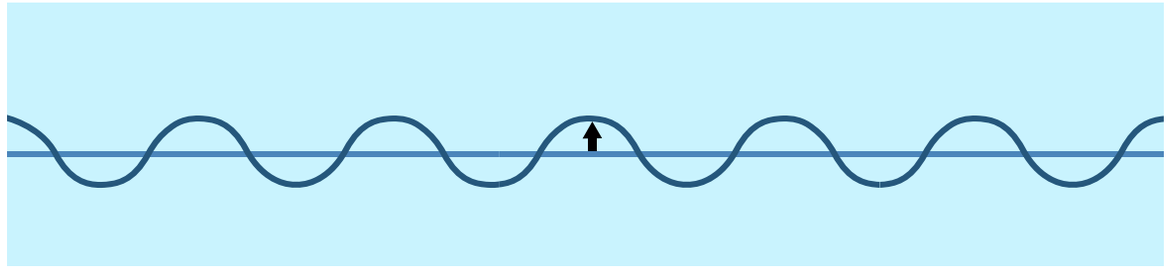
Materials that do not let sounds pass through quickly are called **insulators** and can be used to muffle loud sounds.

The **volume** of a sound depends on the strength of the vibrations.

The volume of a sound decreases as the **distance** from the source increases.

Volume can be measured in **decibels (dB)** using a decibel meter. Sounds above 80 dB can be dangerous to the ear and cause hearing loss. **Ear protectors** can be worn to muffle loud sounds.

weaker vibrations = smaller waves = quieter sounds



stronger vibrations = bigger waves = louder sounds