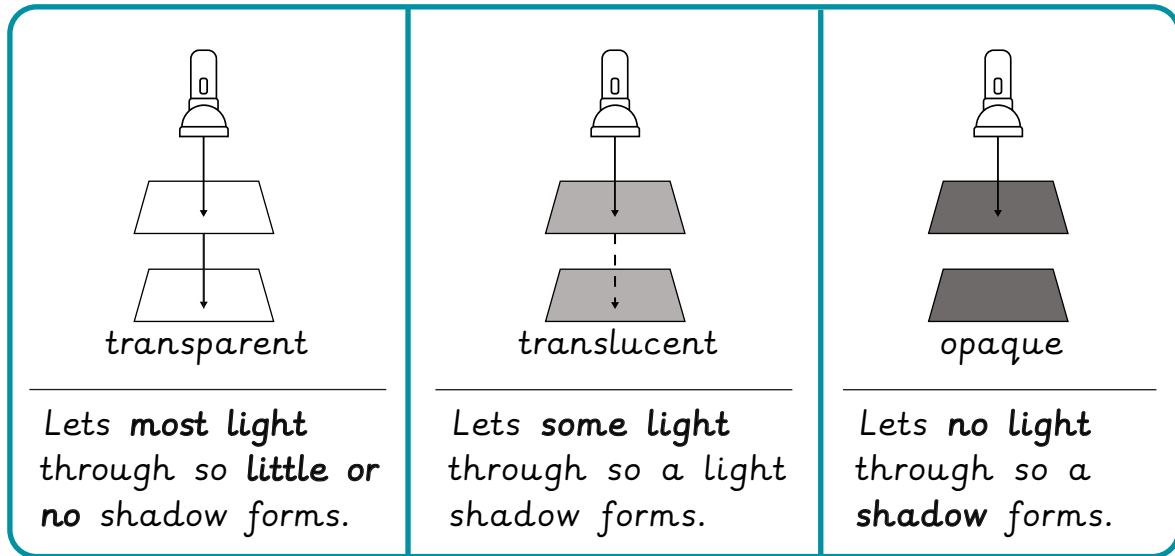


We need light to be able to see things.
Darkness is when there is no light.

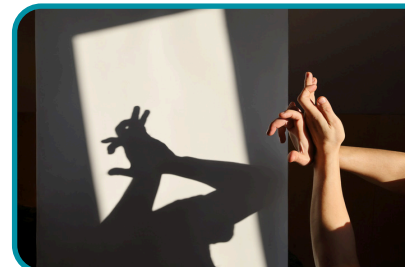
A **light source** is something that gives out light. This is also known as **luminous**.



- **Bright lights** can damage the eyes.
- Never look directly at bright lights like the Sun.
- Protect your eyes by wearing sunglasses and a sunhat.

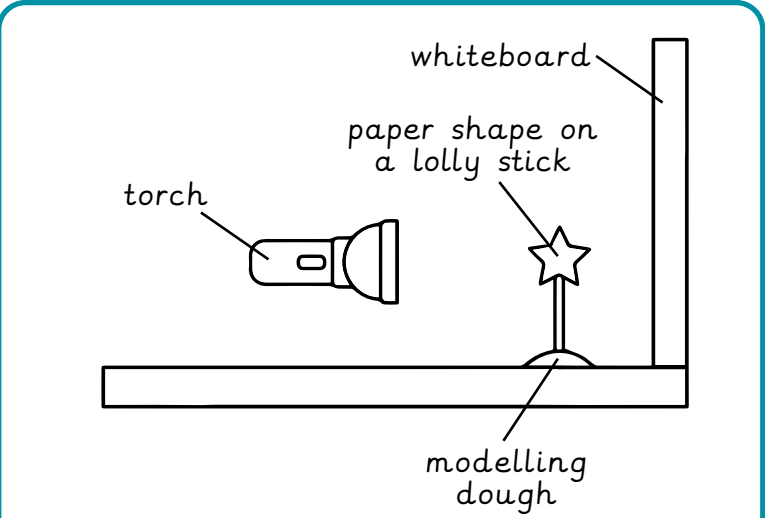


All surfaces **reflect** at least a little light where light bounces off them. Objects that are shiny and **reflective** let more light bounce off them.



Shadows form when the light from a light source is blocked by an **opaque** object.

Changing the position of the light source affects the size, shape and position of the shadow.



As the Sun changes position in the sky throughout the day, shadows will also change. This can be done in the classroom by moving a torch like the Sun in the sky.

The distance between the light source and an object changes the size of the shadow.

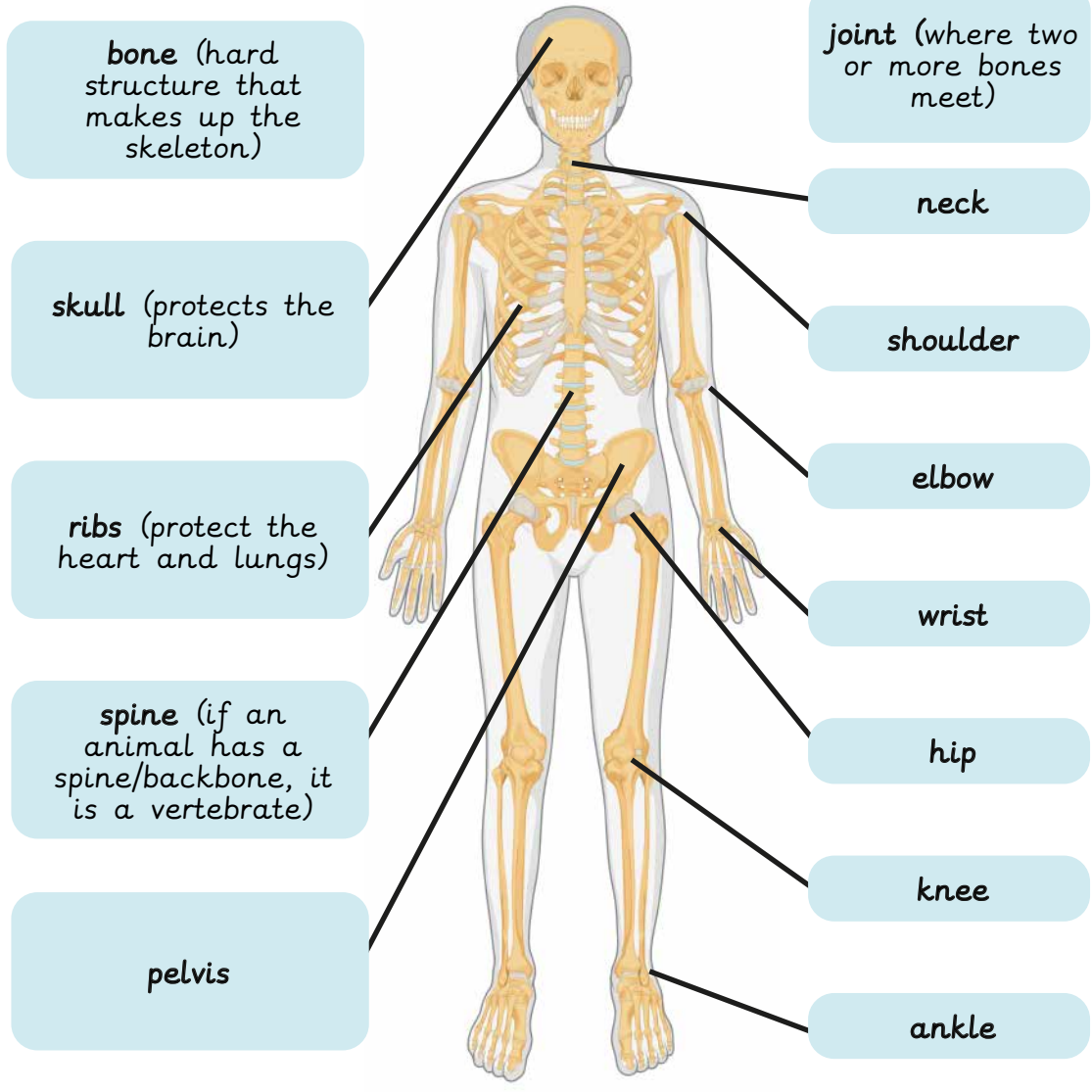
The closer the light source is to the object, the larger the shadow. This is because it blocks more light.

The further away the light source from the object, the smaller the shadow.



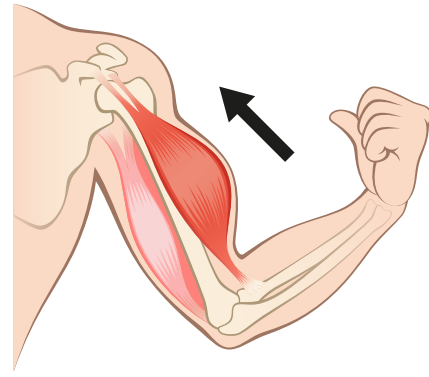
The shadow's position will change as the Sun rises in the East and sets in the West. The shadows get shorter as the Sun moves higher in the sky until midday and then get longer again as the Sun sets.

The human skeleton

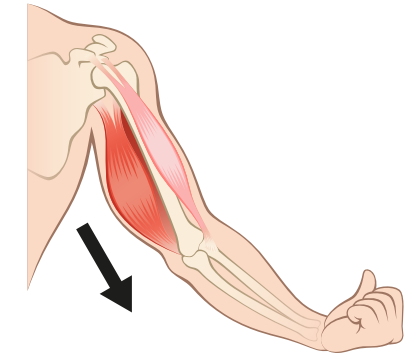


Muscles attach to bones to cause a movement.

A muscle can shorten to **pull** on the **bone**.



Another muscle will need to pull in the opposite direction to change the position.



A **vertebrate** is an animal with a backbone.

Endoskeleton is a skeleton on the inside of the body.



An **invertebrate** is an animal without a backbone.

An invertebrate may have an **exoskeleton** (a skeleton on the outside of the body)...



...or no skeleton at all.



There are seven **nutrient** groups essential for survival. Eating all of these in the right amounts provides a **balanced** diet.

carbohydrates
fruit
vegetables
protein
fats

Carbohydrates

Carbohydrates give energy.

Protein

Protein is needed for growth and repair.

Fats and oils

unsaturated

saturated

These are needed as an energy store to keep bodies warm and protect organs.

Fibre

Fibre keeps food moving through the digestive system.

Vitamins and minerals

Vitamins and minerals are important for health and help the body to work. For example, vitamin A (vitamins) is needed for healthy eyes and calcium (minerals) is needed for healthy teeth and bones.

Water

Water helps the body to work, transport nutrients and remove waste.

Electrical appliances

Electrical appliances are found all around us.



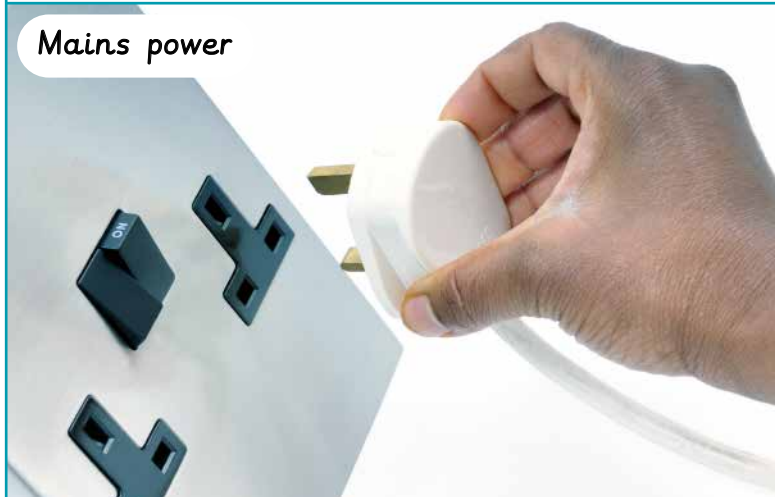
An electrical circuit is the pathway through which electrical charge flows in an appliance.

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



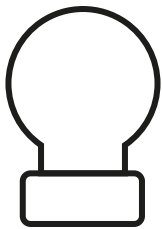
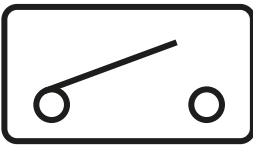
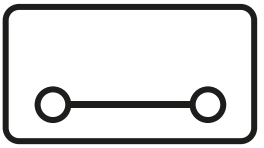
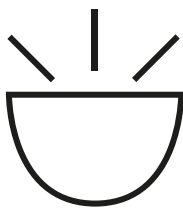
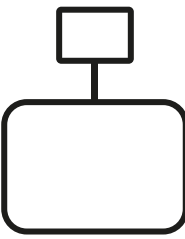


- Provides high power for larger appliances.
- Requires access to an electrical socket.
- Appliances are fixed in place.

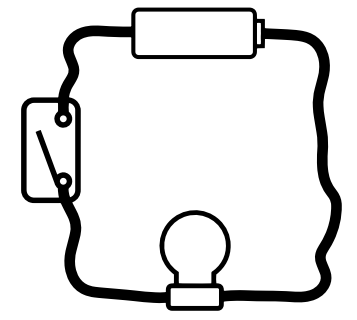
Batteries



- 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.

<p>A component is a part of an electrical circuit.</p> <p>Symbols are often used to represent the components so they are easy to draw and recognise.</p>	<p>battery/cell</p> 	<p>wire</p> 	<p>bulb</p> 
<p>open switch</p> 	<p>closed switch</p> 	<p>buzzer</p> 	<p>motor</p> 

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.



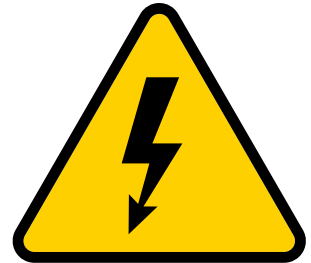
Metals are good electrical conductors.

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.

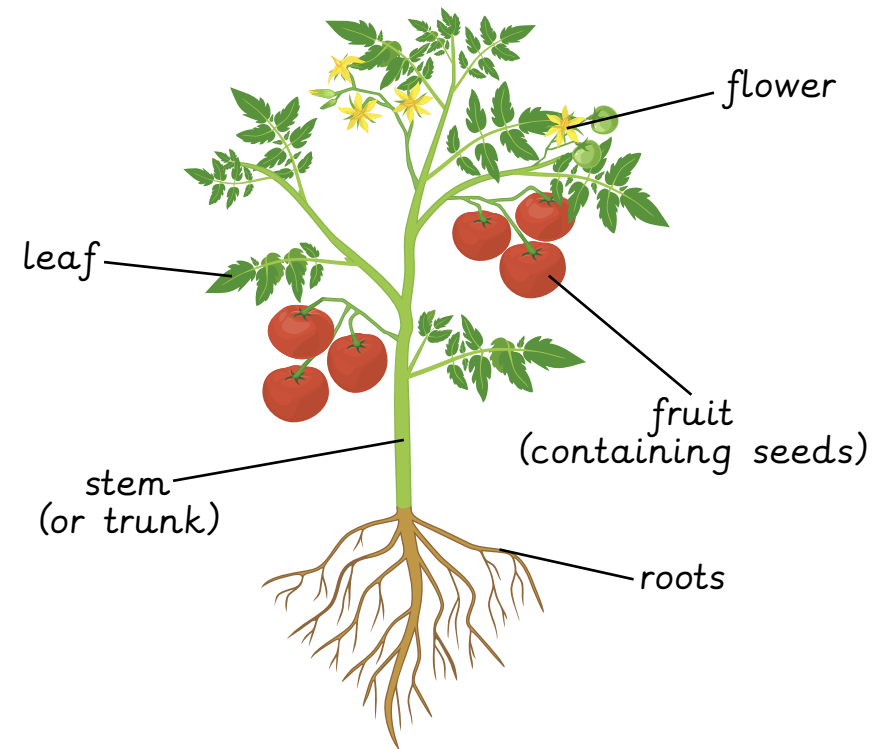
Healthy plant growth

Plants need:

- Air.
- Water.
- Light.
- Nutrients.
- Room to grow.



Structure and function



Water transport



Water is **absorbed** by the **roots** and travels up the **stem**. It is used in **photosynthesis** and is lost through the **leaves**.

Each part of the plant has an important job.

The **leaves** use sunlight and water to make food. The **stem** supports the plant and transports water. The **flower** attracts insects to **pollinate** the plant. **Fruit** is eaten by animals that carry away the **seeds**. The **roots** anchor the plant and **absorb** water and **nutrients**.

Pollination

Pollen is transferred from the **male** part of the **flower** to the **female** part. A **seed** will form from the female part.

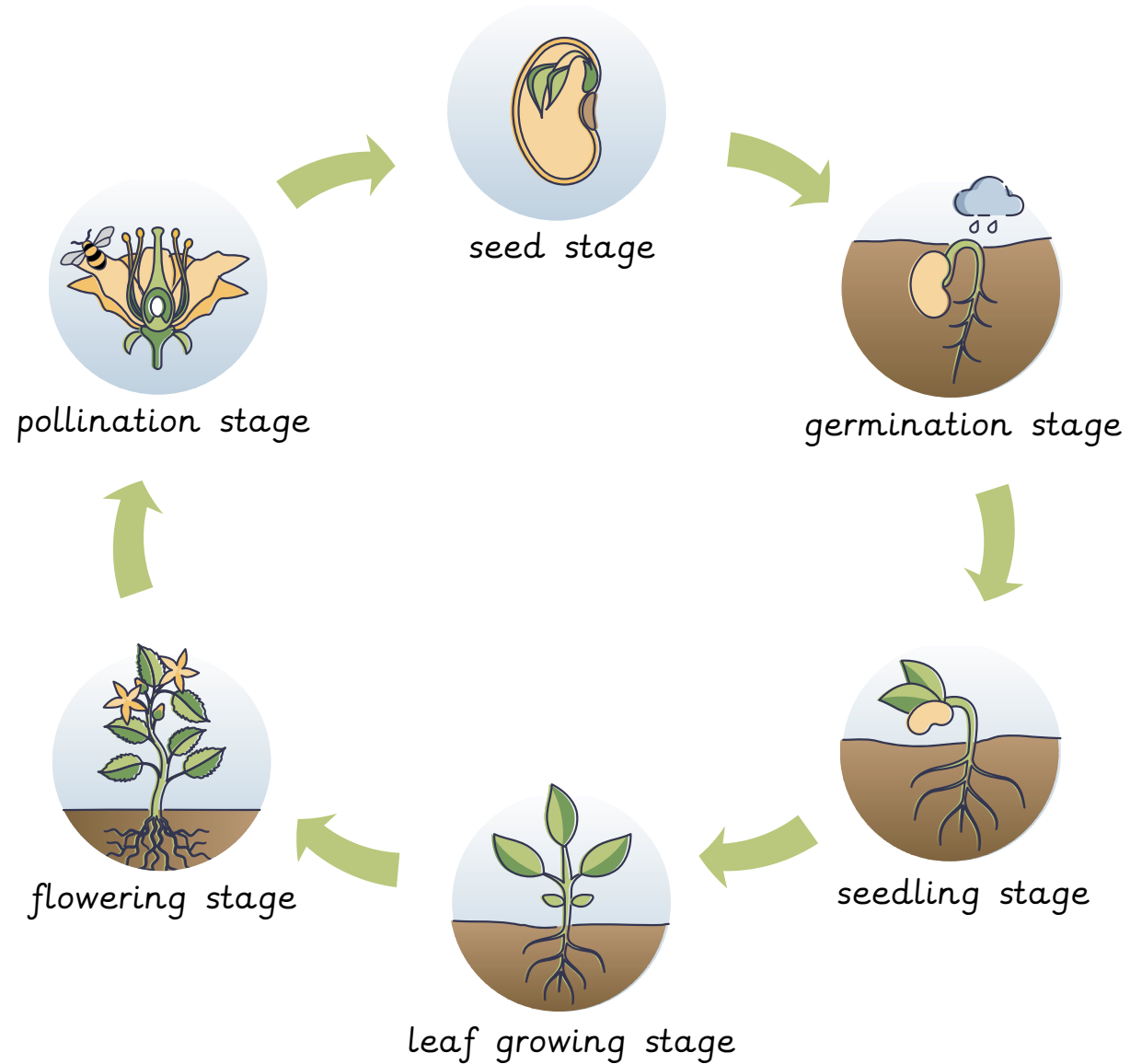


Seed dispersal

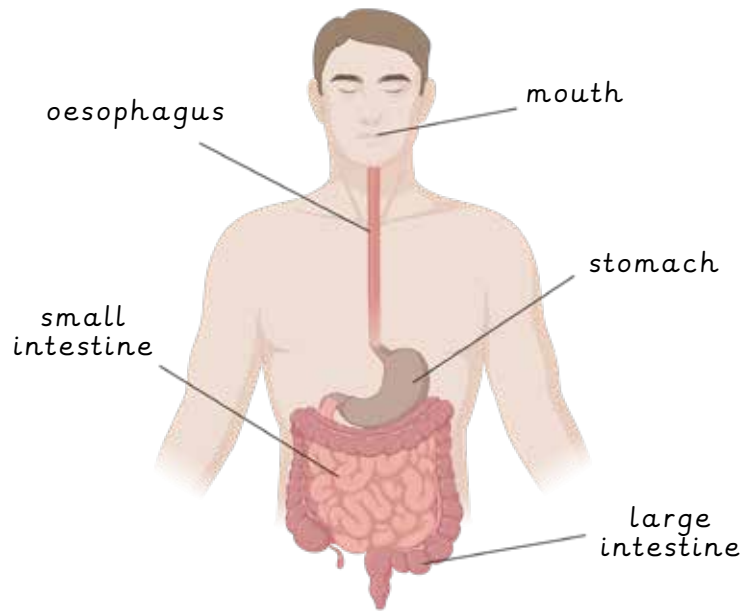


Seeds are carried away from the parent plant by the wind, animals or water.

The life cycle of a flowering plant



The human digestive system



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

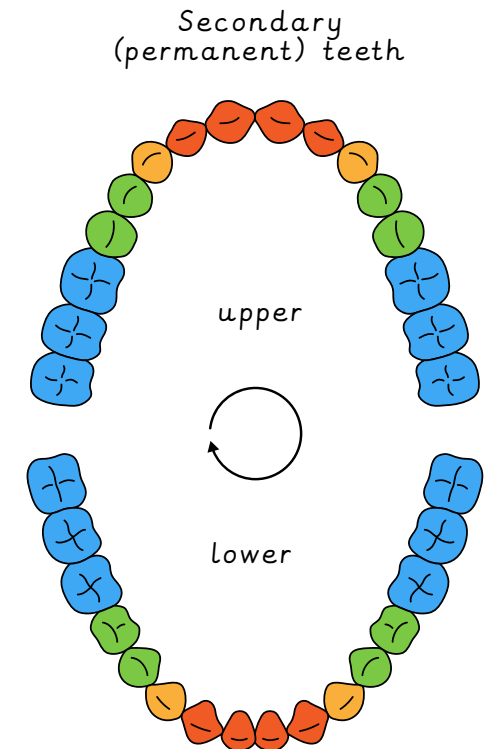
Oesophagus: carries food from the mouth to the stomach.


Stomach: breaks up food using acid.


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


Large intestine: absorbs water into the blood.


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.

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.



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.

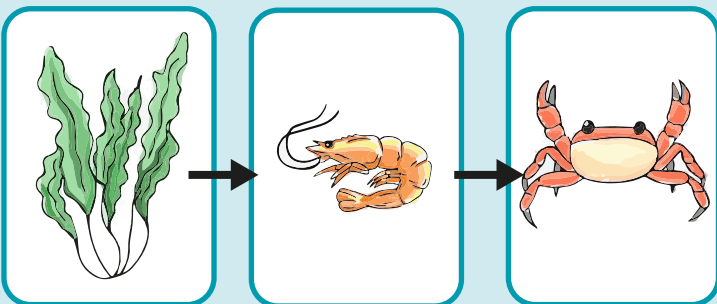


Faeces are the solid waste from the **digestive system**. The contents of the faeces can show what an animal has eaten and if it is living nearby.

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.

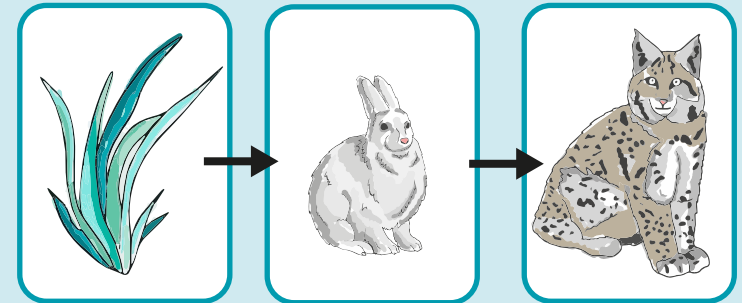
Food chains show the energy being passed between living things in a habitat



seaweed → shrimp → crab

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**).



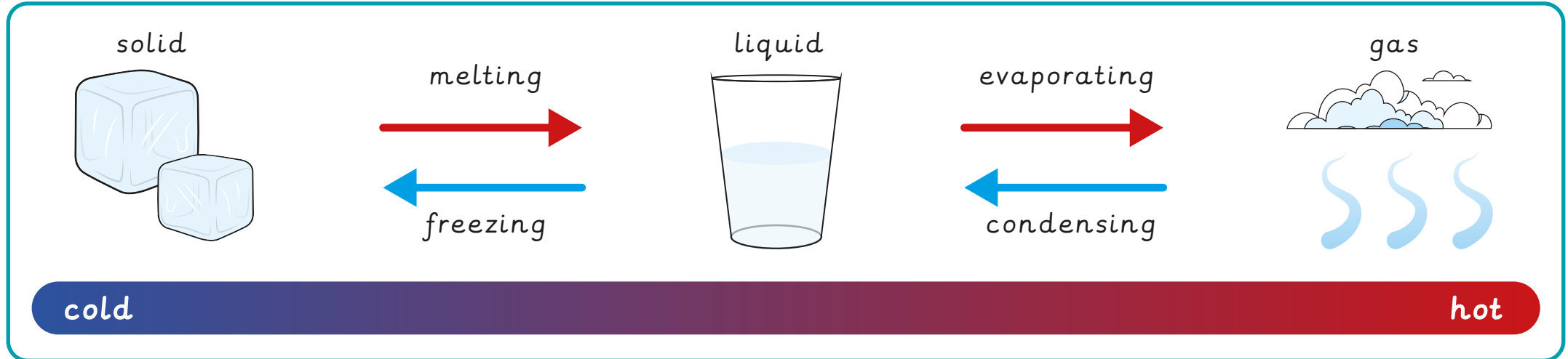
grass → snowshoe hare → lynx

Matter takes up space and can be weighed. There are three states of matter: solid, liquid and gas.

Solids have a fixed shape and volume. The shape can be changed by applying a force.

Liquids have a fixed volume but not a fixed shape. They will flow when poured and take the shape of the container they are in.

Gases do not have a fixed shape or volume. They will spread out to fill a container.



Cooling a liquid below its **freezing point** will cause it to freeze. **Freezing** is a change of state from a liquid to a solid.

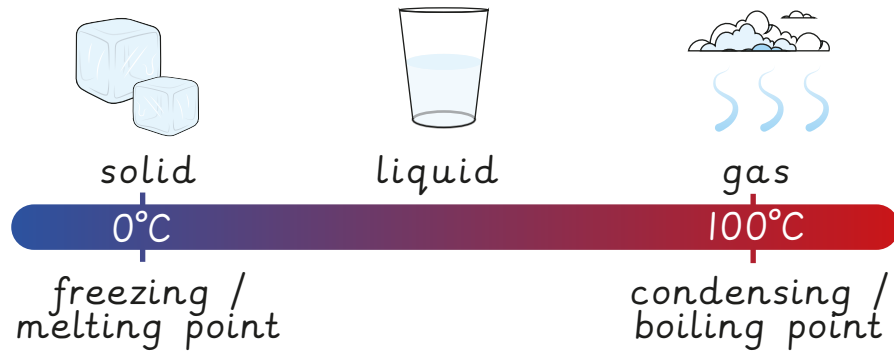
Heating a solid above its **melting point** will cause it to melt. **Melting** is a change of state from a solid to a liquid.

Cooling a gas below its **condensing point** will cause it to condense. **Condensing** is a change of state from a gas to a liquid.

Heating a liquid above its **boiling point** will cause it to evaporate. **Evaporating** is a change of state from a liquid to a gas.

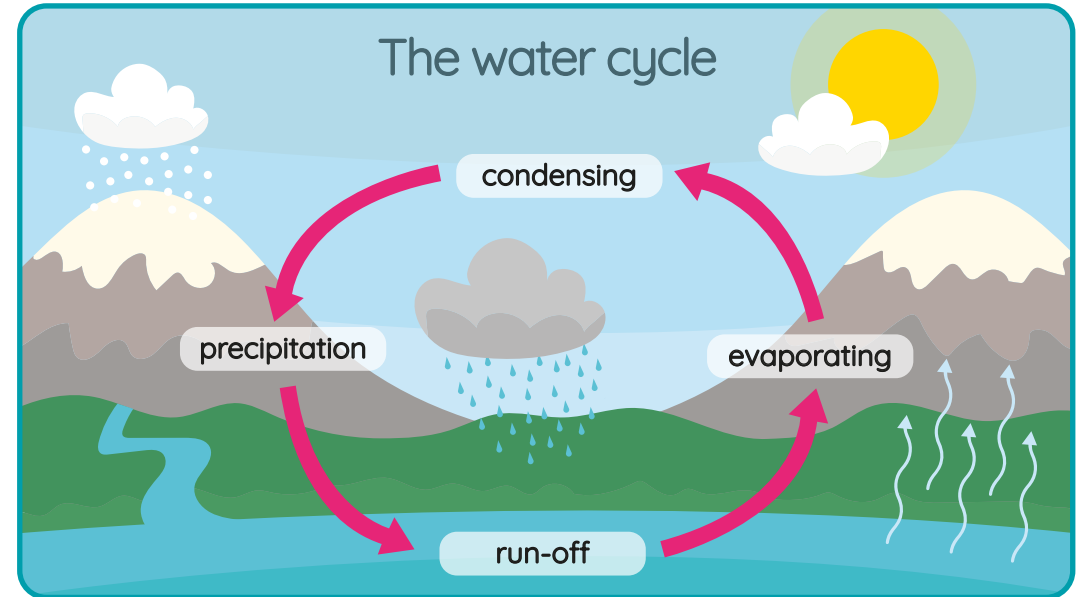
Temperature affects the **rate** (how quickly) at which **changes of state** happen. The windier and hotter the weather, the faster the **evaporation rate**.

Water is a material that can exist in all three states depending on the temperature.



The water cycle is being affected by **climate change**. Increasing temperatures are causing:

- Melting of ice and snow; leading to rising sea levels.
- Faster evaporation rates:
 - causing more rainfall in some areas, leading to **flooding**;
 - causing less rainfall in some areas, leading to **droughts**.



The water cycle is the constant movement of water from one place and state to another:

- **Evaporating:** water in water stores, such as seas and lakes, is heated by the Sun and evaporates into water vapour.
- **Condensing:** water vapour cools as it rises and condenses to form clouds; tiny liquid droplets of water.
- **Precipitation:** water falls from the clouds in a liquid state (e.g. rain) or a solid state (e.g. snow).
- **Run-off:** precipitation runs off the land into rivers and streams and back to water stores like the sea.