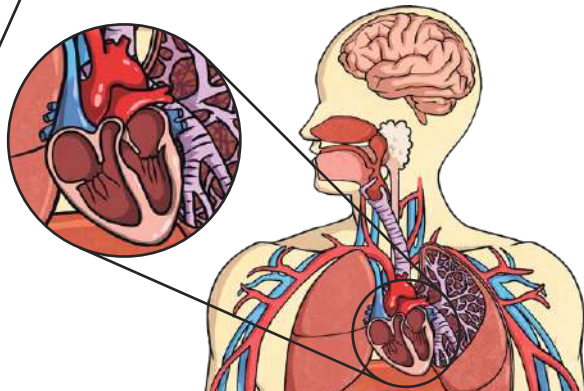


Key Vocabulary

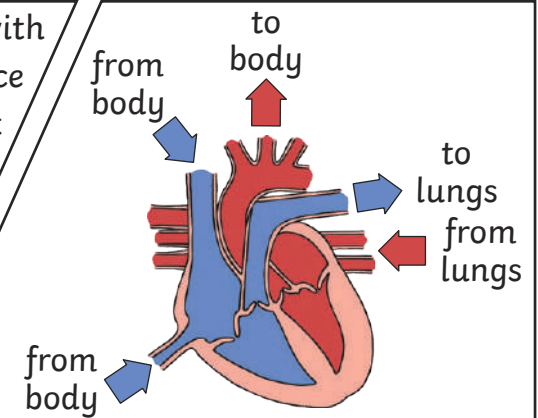
circulatory system	A system which includes the heart, veins, arteries and blood transporting substances around the body.
heart	An organ which constantly pumps blood around the circulatory system .
blood vessels	The tube-like structures that carry blood through the tissues and organs. Veins, arteries and capillaries are the three types of blood vessels.
oxygenated blood	Oxygenated blood has more oxygen. It is pumped from the heart to the rest of the body.
deoxygenated blood	Deoxygenated blood is blood where most of the oxygen has already been transferred to the rest of the body.

The **heart** pumps blood to the lungs to get oxygen.

It then pumps this **oxygenated blood** around the body.



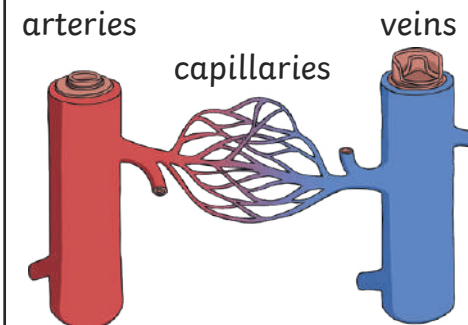
Mammals have **hearts** with four chambers. Notice how the blood that has come from the body is **deoxygenated**, and the blood that has come from the lungs is **oxygenated** again. The blood isn't actually red and blue: we just show it like that on a diagram.



deoxygenated blood → **oxygenated blood**

Capillaries are the smallest **blood vessels** in the body and it is here that the exchange of water, nutrients, oxygen and carbon dioxide takes place.

Arteries carry **oxygenated blood** away from the **heart**.



Veins carry **deoxygenated blood** toward the **heart**.

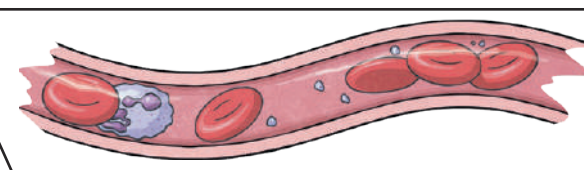
If you linked up all of the body's blood vessels, including arteries, capillaries, and veins, they would measure over 60,000 miles.

Key Vocabulary

drug	A substance containing natural or man-made chemicals that has an effect on your body when it enters your system.
alcohol	A drug produced from grains, fruits or vegetables when they are put through a process called fermentation.
nutrients	Substances that animals need to stay alive and healthy.



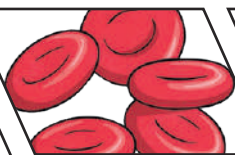
The liquid part of blood contains water and protein. This is called plasma.



Blood transports:

- gases (mostly oxygen and carbon dioxide);
- nutrients** (including water);
- waste products.

Plasma is liquid. The other parts of your blood are solid.



Platelets help you stop bleeding when you get hurt.



Red blood cells carry oxygen through your body.

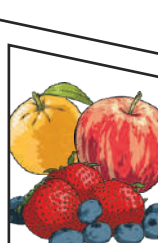


White blood cells fight infection when you're sick.

Drugs, **alcohol** and smoking have negative effects on the body.



A healthy diet involves eating the right types of **nutrients** in the right amounts.



Regular exercise:

- strengthens muscles including the heart muscle;
- improves circulation;
- increases the amount of oxygen around the body;
- releases brain chemicals which help you feel calm and relaxed;
- helps you sleep more easily;
- strengthens bones.

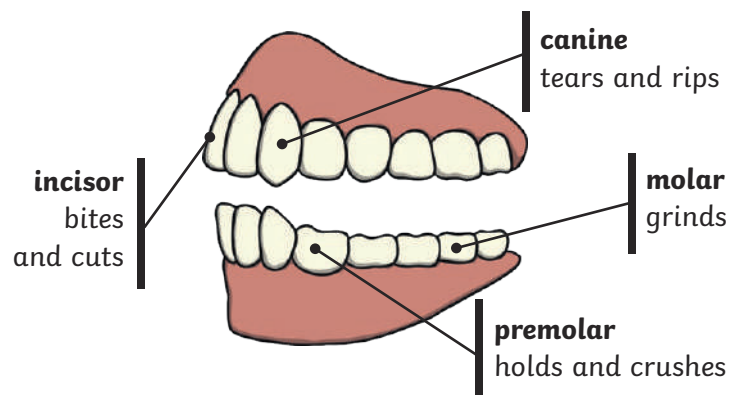
It can even help to stop us from getting ill.



Key Vocabulary

digest	Break down food so it can be used by the body.
oesophagus	A muscular tube which moves food from the mouth to the stomach.
stomach	An organ in the digestive system where food is broken down with stomach acid and by being churned around.
small intestine	Part of the intestine where nutrients are absorbed into the body.
large intestine	Part of the intestine where water is absorbed from remaining waste food. Faeces are formed in the large intestine.
rectum	Part of the digestive system where faeces are stored before leaving the body through the anus.

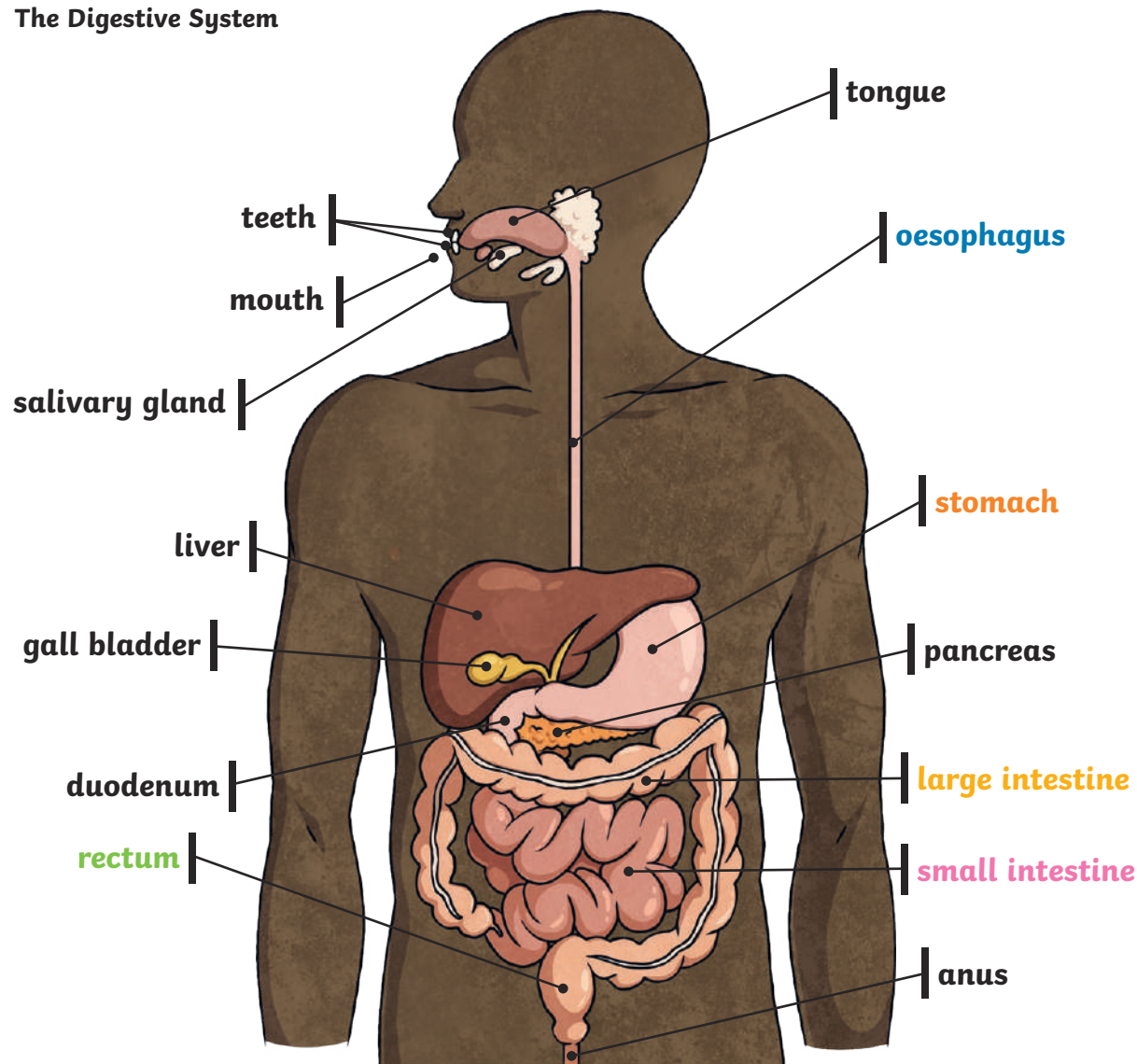
Human Teeth and Their Functions



Some people have wisdom teeth but they have no function now.

Key Knowledge

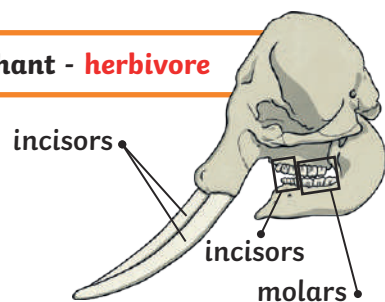
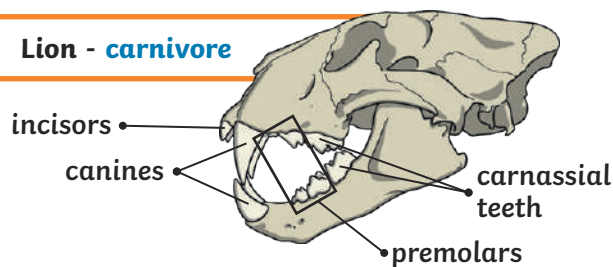
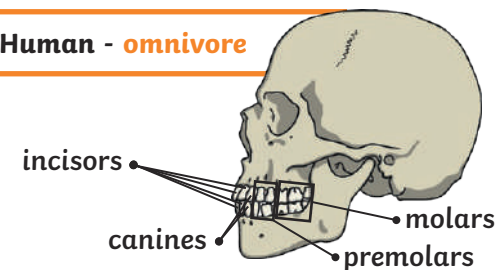
The Digestive System



To look at all the planning resources linked to the Animals Including Humans unit click [here](#).

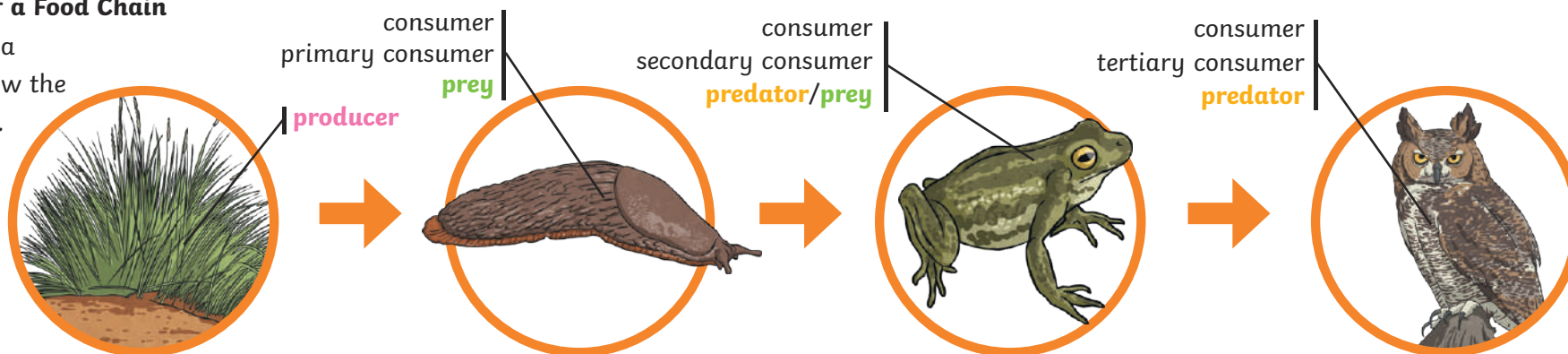
Key Knowledge

The teeth of an animal are designed to eat different foods depending on the diet of the animal. Examples of a **herbivore**, a **carnivore** and an **omnivore** skull:

Elephant - **herbivore**Lion - **carnivore**Human - **omnivore**

An Example of a Food Chain

The arrows in a food chain show the flow of energy.



Key Vocabulary

herbivore	An animal that eats plants.
carnivore	An animal that feeds on other animals.
omnivore	An animal that eats plants and animals.
producer	An organism, such as a plant, that produces its own food.
predator	An animal that hunts and eats other animals.
prey	An animal that gets hunted and eaten by another animal.

To help prevent tooth decay:

- limit sugary food and drink;
- brush teeth at least twice daily using a fluoride toothpaste;
- visit your dentist regularly.



Key Knowledge

fertilisation

The male and female sex cells fuse together.

**prenatal**

The cells develop and grow into a foetus inside the mother's uterus. After around nine months, the baby is born.

infancy

Rapid growth and development. Children learn to walk and talk.

childhood

Children learn new skills and become more independent.

adolescence

The body starts to change over a few years. The changes occur to enable reproduction during adulthood. Much more independent.

middle adulthood

Ability to reproduce decreases. There may be hair loss or hair may turn grey.

late adulthood

Leading a healthy lifestyle can help to slow down the decline in fitness and health which occurs during this stage.

early adulthood

The human body is at its peak of fitness and strength.

Key Vocabulary

fertilisation

The process of the male and female sex cells fusing together.

prenatal

The stage of development from the time of **fertilisation** to the time of birth.

gestation

The process or time when prenatal development takes place before birth.

reproduce

To produce young.

asexual reproduction

A process where one parent produces new life.

sexual reproduction

A process where two parents – one male and one female – are required to produce new life.

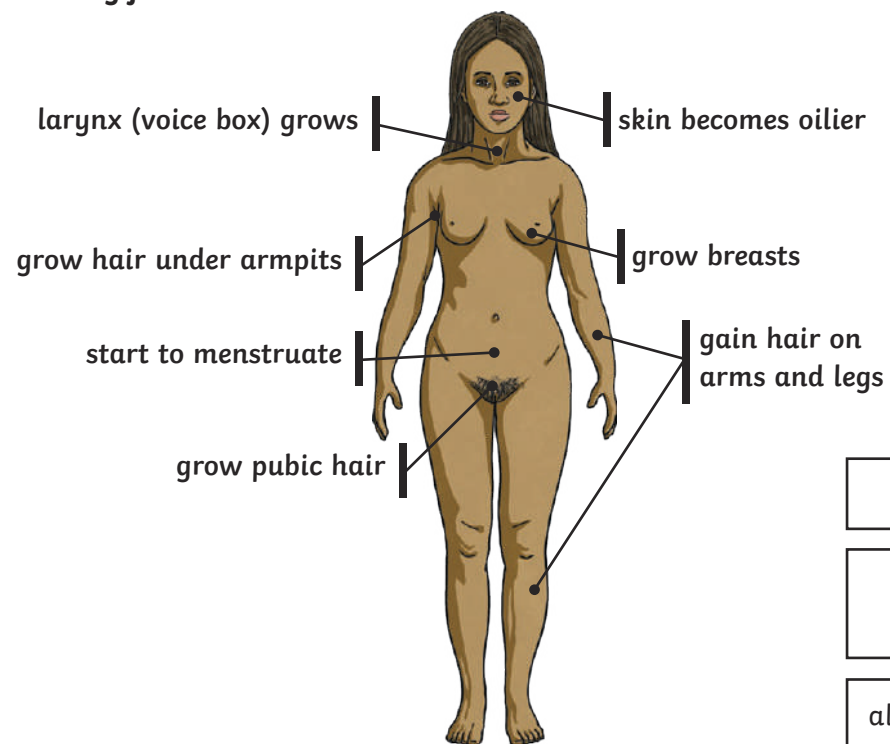
life cycle

The changes a living thing goes through, including reproduction.

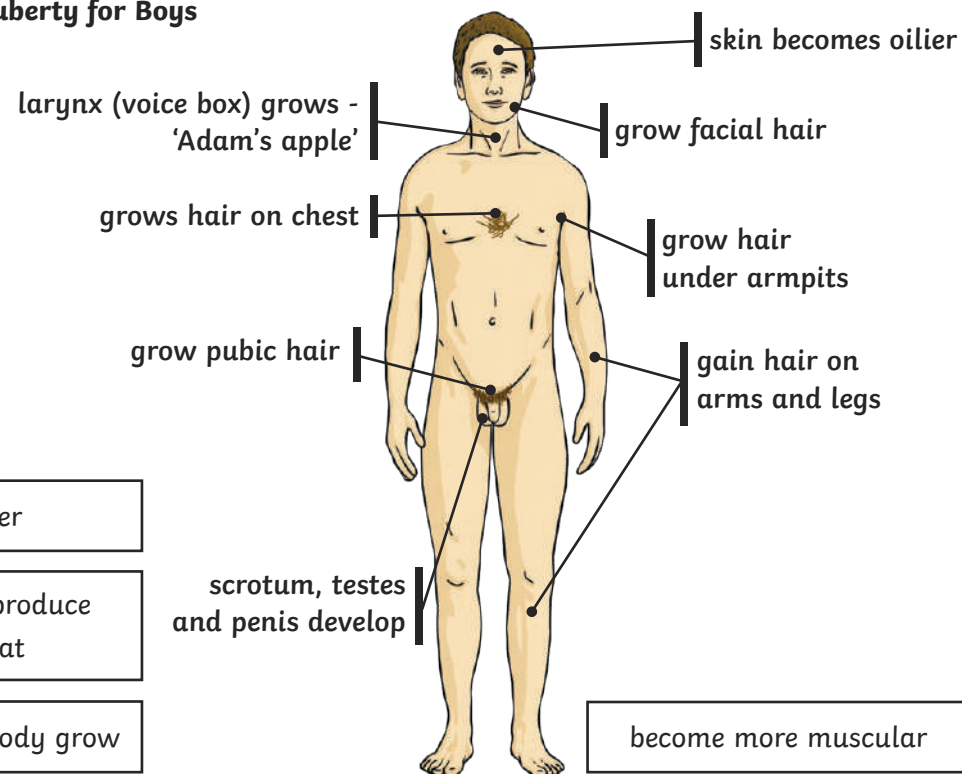
To look at all the planning resources linked to the Animals Including Humans unit click [here](#).

Key Knowledge

Puberty for Girls



Puberty for Boys



grow taller

sweat glands produce more sweat

all parts of the body grow

Key Vocabulary

adolescence	The social and emotional stage of development between childhood and adulthood .
puberty	The physical stage of development between childhood and adulthood .
menstruation	When the female body discharges the lining of the uterus. This happens approximately once a month.
adulthood	The stage of development when a human is fully grown and mature.
life expectancy	The length of time, on average, that a particular animal is expected to live.

Key Vocabulary

amphibians	Amphibians live in the water as babies and on land as they grow older. They have smooth, slimy skin.
birds	All birds have a beak, two legs, feathers and wings.
fish	Fish live and breathe under water. They have scaly skin, fins to help them swim and they breathe through gills.
mammals	Mammals are animals that breathe air, grow hair or fur and feed on their mother's milk as a baby.
reptiles	All reptiles breathe air. They have scales on their skin.
carnivore	Animals that mostly eat other animals (meat) are carnivores.
herbivore	Animals that only eat plants are herbivores.
omnivore	Animals that eat both plants and other animals are omnivores.

To look at all the planning resources linked to the Animals Including Humans unit, [click here](#).

Mammals



human



mouse



dog



cow

Birds



penguin



chicken



flamingo



robin

Fish



goldfish



tuna



shark



eel

Reptiles



snake



tortoise



lizard



alligator

Amphibians



frog



toad



newt



salamander

Key Vocabulary

sight	Your eyes let you see all the things around you.
hearing	Your ears let you listen to all the things around you. Your brain is able to tell what different sounds are.
touch	Your skin gives you the sense of touch. You can tell if something is warm, cold, smooth or rough without even looking at it!
taste	Your sense of taste comes from your tongue. You can tell if something tastes bitter or sweet. You might have some tastes you like and some you don't.
smell	You smell using your nose. Your nose can tell if things smell nice or not nice.

Senses



sight



hearing



touch

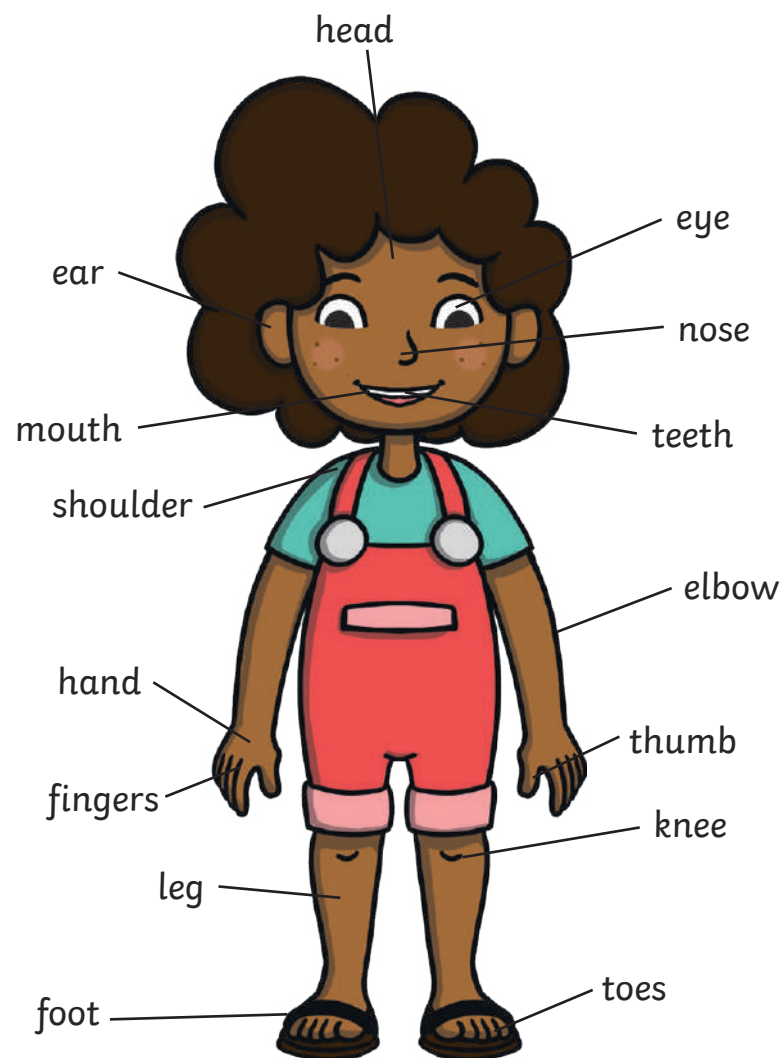


taste



smell

Parts of the Body



Key Vocabulary

healthy	in a good physical and mental condition
nutrients	substances that living things need to stay alive and healthy
energy	strength to be able to move and grow
saturated fats	types of fats, considered to be less healthy, that should only be eaten in small amounts
unsaturated fats	fats that give you energy, vitamins and minerals

- Living things need food to grow and to be strong and **healthy**.
- Plants can make their own food, but animals cannot.
- To stay **healthy**, humans need to exercise, eat a **healthy** diet and be hygienic.
- Animals, including humans, need food, water and air to stay alive.

Nutrient	Found in... (examples)	What it does/they do
carbohydrates		provide energy
protein		helps growth and repair
fibre		helps you to digest the food that you have eaten
fats		provide energy
vitamins		keep you healthy
minerals		keep you healthy
water		moves nutrients around your body and helps to get rid of waste

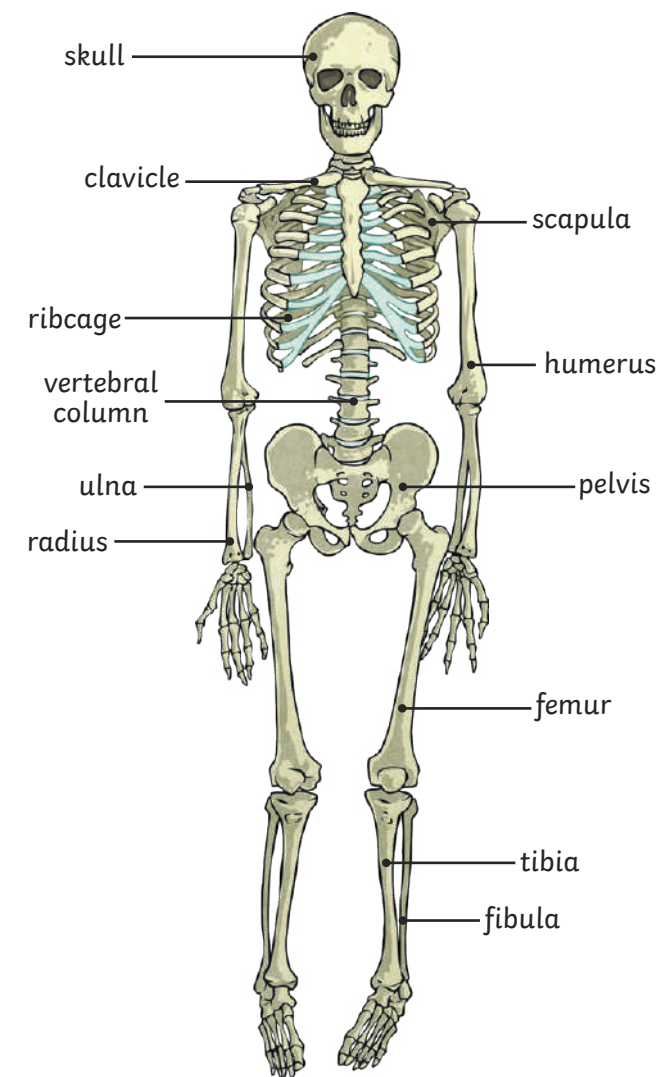
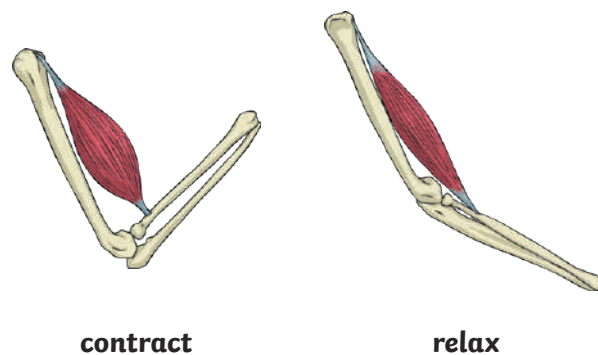
Key Vocabulary

vertebrate	animals with backbones
invertebrate	animals without backbones
muscles	soft tissues in the body that contract and relax to cause movement
tendons	cords that join muscles to bones
joints	areas where two or more bones are fitted together

Skeletons do three important jobs:

- protect organs inside the body;
- allow movement;
- support the body and stop it from falling on the floor.

Skeletal **muscles** work in pairs to move the bones they are attached to by taking turns to contract (get shorter) and relax (get longer).



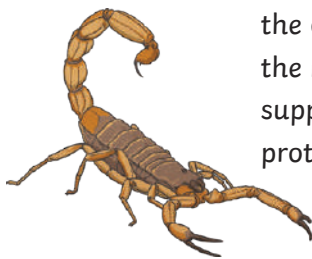
vertebrate

↓
endoskeleton – a skeleton on the inside of the body that supports and protects it



invertebrate

↓
exoskeleton – a skeleton on the outside of the body that supports and protects it



↓
hydrostatic skeleton – a skeleton made up of a fluid-filled compartment in the body called a coelom, mainly found in soft-bodied animals



Key Vocabulary

adult	A fully grown animal or plant.
develop	To grow bigger and become stronger.
life cycle	The changes living things go through to become an adult.
offspring	The child of an animal.
young	Offspring that has not reached adulthood.
live young	Offspring that has not hatched from an egg.

All **young** animals change as they go through the different stages of their **life cycle** and grow into **adults**.

Some animals give birth to **live young**.

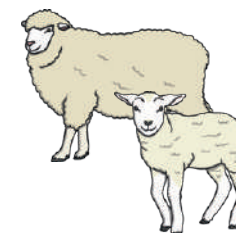


Some animals lay eggs which the **young** hatch from.

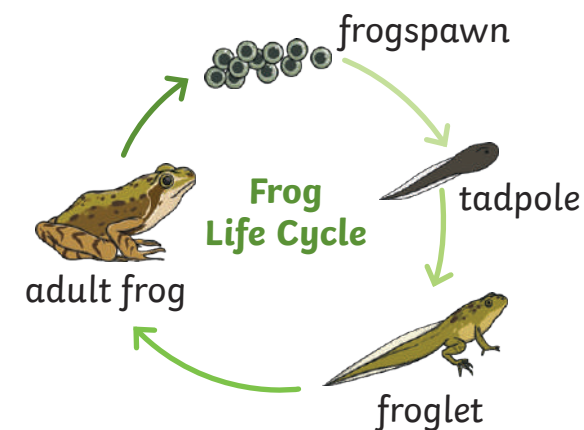
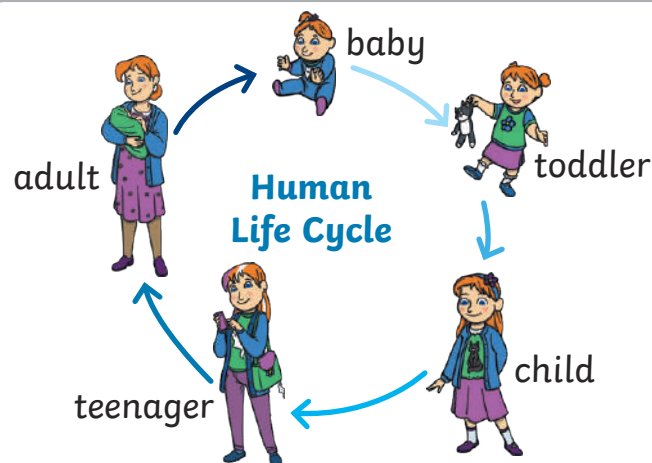
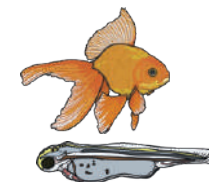


Both of these types of **young** then **develop** into **adults**.

Some **offspring** look like their **adult** when they are born.



Some **offspring** do not look like their **adult** when they are born.



Key Vocabulary

diet	The food and water that an animal needs.
disease	Illness or sickness.
exercise	A physical activity to keep your body fit.
germs	Tiny living things that can cause disease.
hygiene	How we keep ourselves and the world around us clean so we can stay healthy and stop germs spreading.
nutrition	Food needed to live.
pulse	The beating of the heart that can be felt in your neck and wrist.

To look at all the planning resources linked to the Animals Including Humans unit, [click here](#).

To stay alive, all animals have three basic needs for survival:

air



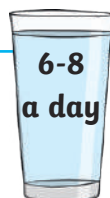
water



food

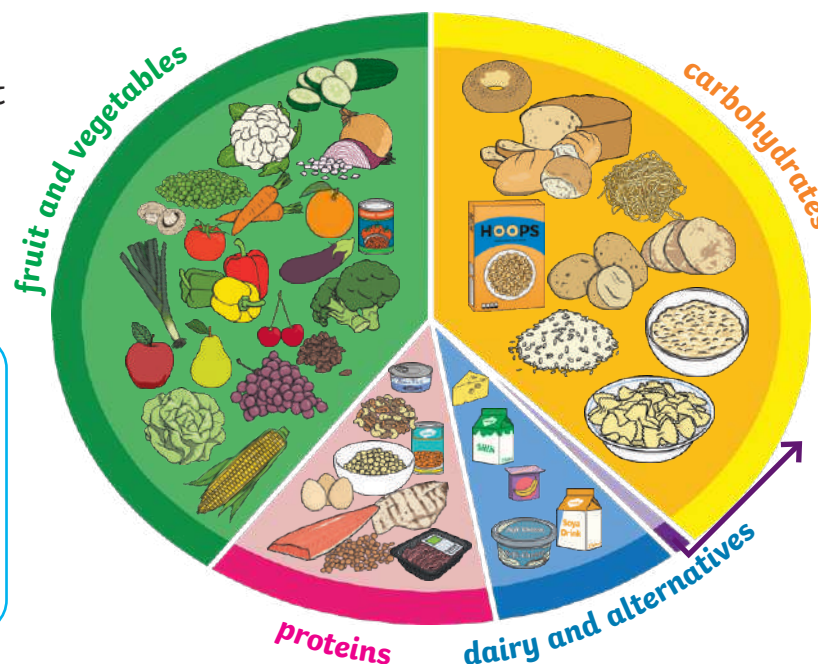


To grow into a healthy adult, we must eat the right types of food in the right amount and **exercise**.



Water, lower fat milk and sugar-free drinks.

Eatwell Guide



Eat less often and in small amounts.



oil and spreads
Choose unsaturated oils and use in small amounts.



Being active and **exercising** keeps our bodies and minds healthy.



To stop germs from spreading, it is important to be **hygienic**.



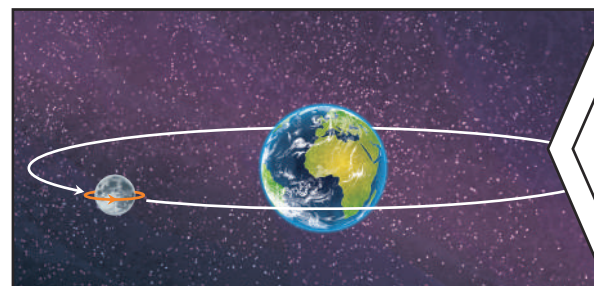
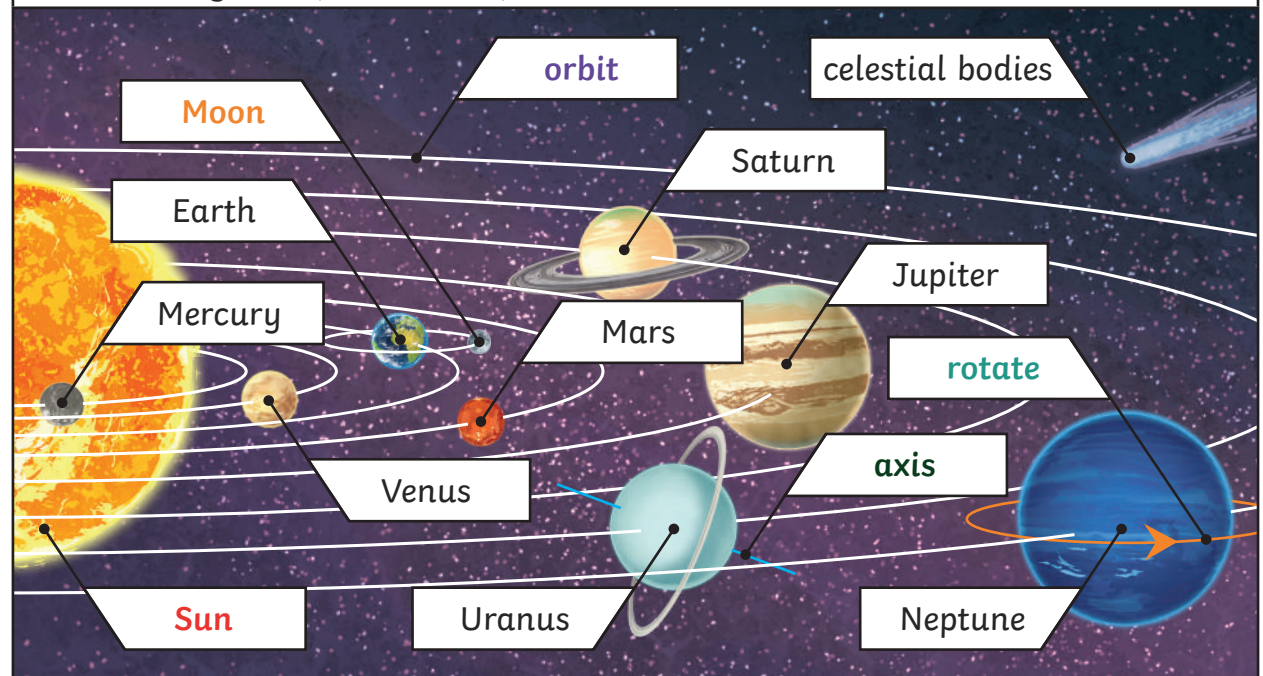
Key Vocabulary

Sun	A huge star that Earth and the other planets in our solar system orbit around.
star	A giant ball of gas held together by its own gravity.
moon	A natural satellite which orbits Earth or other planets .
planet	A large object, round or nearly round, that orbits a star .
sphere	A round 3D shape in the shape of a ball.
spherical bodies	Astronomical objects shapes like spheres .
satellite	Any object or body in space that orbits something else, for example: the Moon is a satellite of Earth.

Key Knowledge

Mercury, Venus, Earth and Mars are rocky **planets**. They are mostly made up of metal and rock. Jupiter, Saturn, Uranus and Neptune are mostly made up of gases (helium and hydrogen) although they do have cores made up of rock and metal.

Our Solar System (not to scale)



The **Moon** **orbits** Earth in an oval-shaped path while spinning on its **axis**. At various times in a month, the **Moon** appears to be different shapes. This is because as the **Moon** **rotates** round Earth, the **Sun** lights up different parts of it.

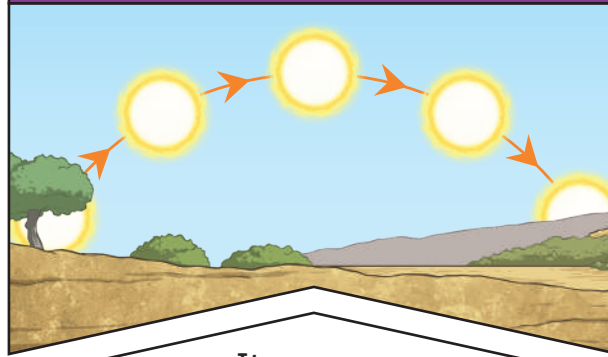
Pluto used to be considered a **planet** but was reclassified as a dwarf **planet** in 2006.



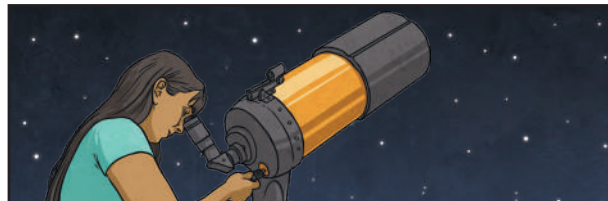
Key Vocabulary

orbit	To move in a regular, repeating curved path around another object.
rotate	To spin. E.g. Earth rotates on its own axis .
axis	An imaginary line that a body rotates around. E.g. Earth's axis (imaginary line) runs from the North Pole to the South Pole.
geocentric model	A belief people used to have that other planets and the Sun orbited around Earth.
heliocentric model	The structure of the Solar System where the planets orbit around the Sun .
astronomer	Someone who studies or is an expert in astronomy (space science).

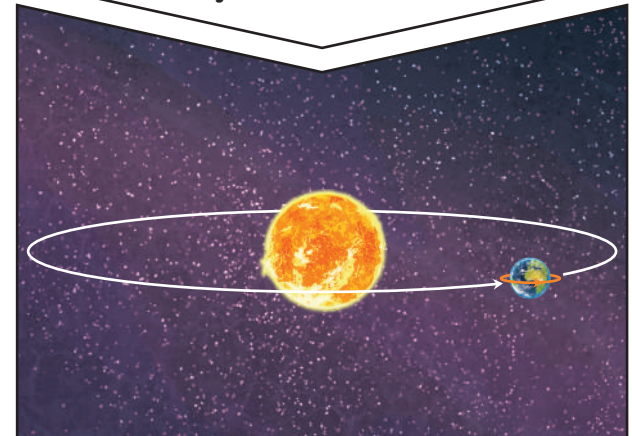
Key Knowledge



It appears to us that the **Sun** moves across the sky during the day but the **Sun** does not move at all. It seems to us that the **Sun** moves because of the movements of Earth.

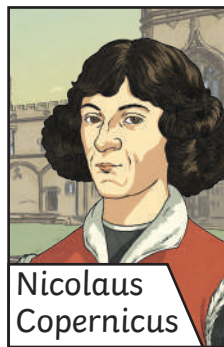
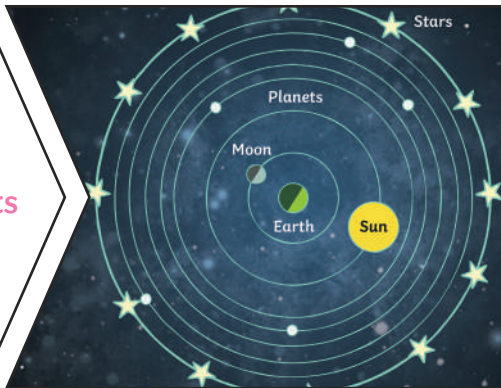


Earth **rotates** (spins) on its **axis**. It does a full **rotation** once in every 24 hours. At the same time that Earth is **rotating**, it is also **orbiting** (revolving) around the **Sun**. It takes a little more than 365 days to **orbit** the **Sun**. Daytime occurs when the side of Earth is facing towards the **Sun**. Night occurs when the side of Earth is facing away from the **Sun**.



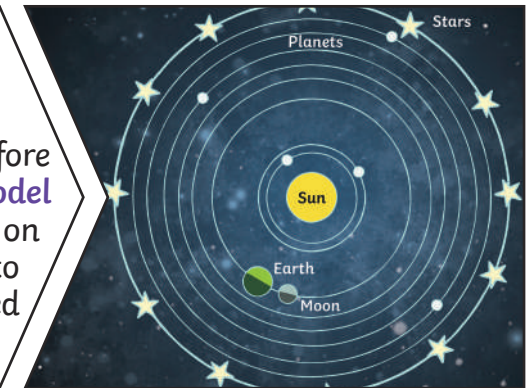
Geocentric model

Years ago people believed that **planets** moved around the Earth.



Nicolaus Copernicus

The work and ideas of many **astronomers** (such as Copernicus and Kepler) combined over many years before the idea of the **heliocentric model** was developed. Galileo's work on gravity allowed **astronomers** to understand how **planets** stayed in **orbit**.



Key Vocabulary

electricity	The flow of an electric current through a material, e.g. from a power source through wires to an appliance .
generate	To make or produce.
renewable	A source of electricity that will not run out. These include solar, geothermal, hydro and wind.
non-renewable	This source of energy will eventually run out and so will no longer be able to be used to make electricity . These include fossil fuels – coal, oil and natural gas.
appliances	A piece of equipment or a device designed to perform a particular job, such as a washing machine or mobile phone.
battery	A device that stores electrical energy as a chemical.

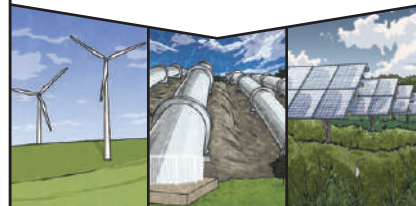
Key Knowledge

Lightning and static **electricity** are examples of **electricity** occurring naturally but for us to use **electricity** to power **appliances**, we need to make it.

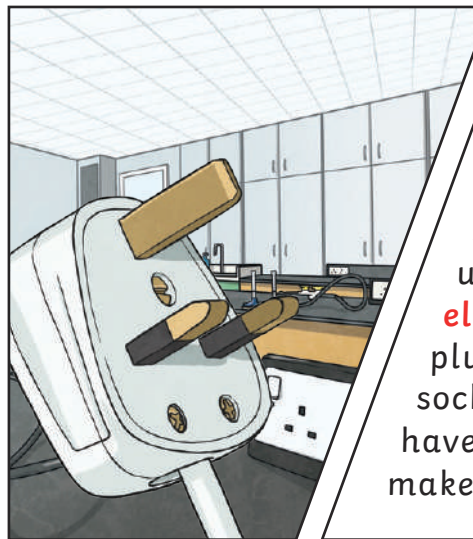


Coal, oil and natural gases are fossil fuels which, when burnt, produce heat which can be used to **generate electricity**.

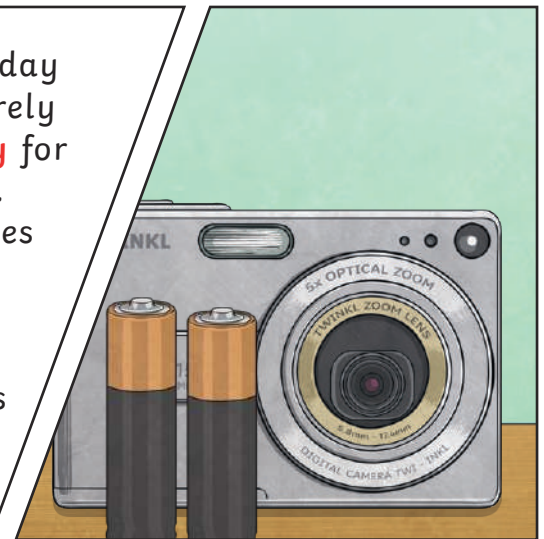
Electricity can be **generated** from wind power used to turn windmills and hydroelectric power from water used in dams. The Sun's rays can be converted into **electricity** by solar panels.



Nuclear energy is created when atoms are split. This creates heat which can be used to **generate electricity**. Geothermal energy is heat from the Earth that is converted into **electricity**.



Many everyday **appliances** rely on **electricity** for them to work. Some appliances use mains **electricity** (are plugged into a socket) and others have a **battery** to make them work.



To look at all the planning resources linked to the Electricity unit, [click here](#).

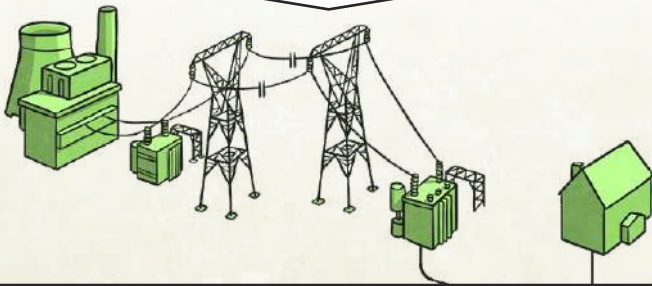
Key Vocabulary

circuit

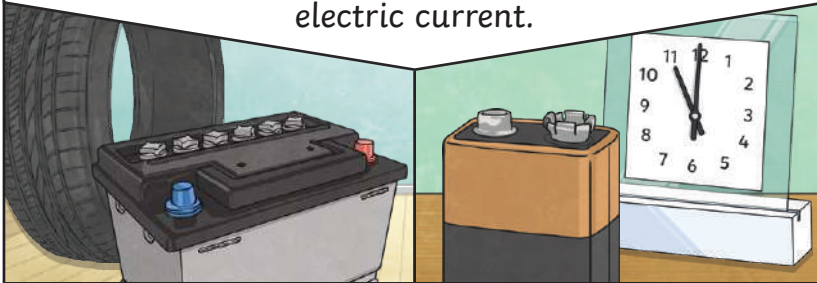
A pathway that **electricity** can flow around. It includes wires and a power supply and may include bulbs, switches or buzzers.

There are two types of electric current.

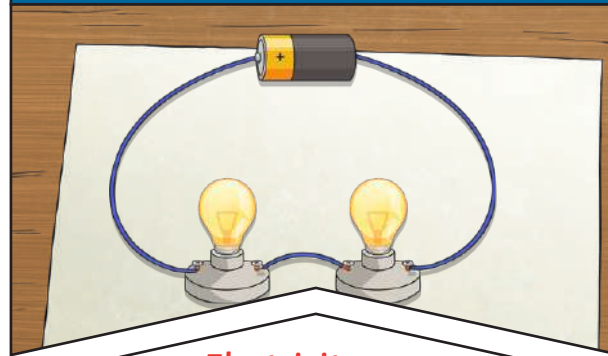
Mains **electricity**: power stations send an electric charge through wires to transformers and pylons. Then, underground wires carry the electricity into our homes via wires in the walls and out through plug sockets.



Battery **electricity**: **batteries** store chemicals which produce an electric current. Eventually, even rechargeable **batteries** will stop producing an electric current.



Key Knowledge

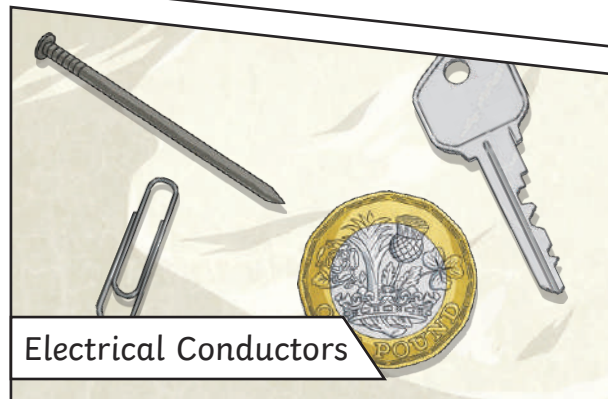


Electricity can only flow around a complete **circuit** that has no gaps. There must be wires connected to both the positive and negative end of the power supply/**battery**.

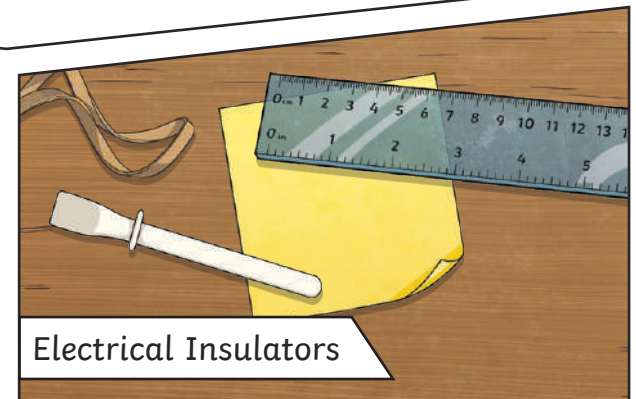
Switches can be used to open or close a **circuit**. When off, a switch 'breaks' the **circuit** to stop the flow of **electricity**. When on, a switch 'completes' the circuit and allows the **electricity** to flow.



A conductor of **electricity** is a material that will allow **electricity** to flow through it. Metals are good conductors. Materials that are electrical insulators do not allow **electricity** to flow through them. Wood, plastic and glass are good insulators



Electrical Conductors

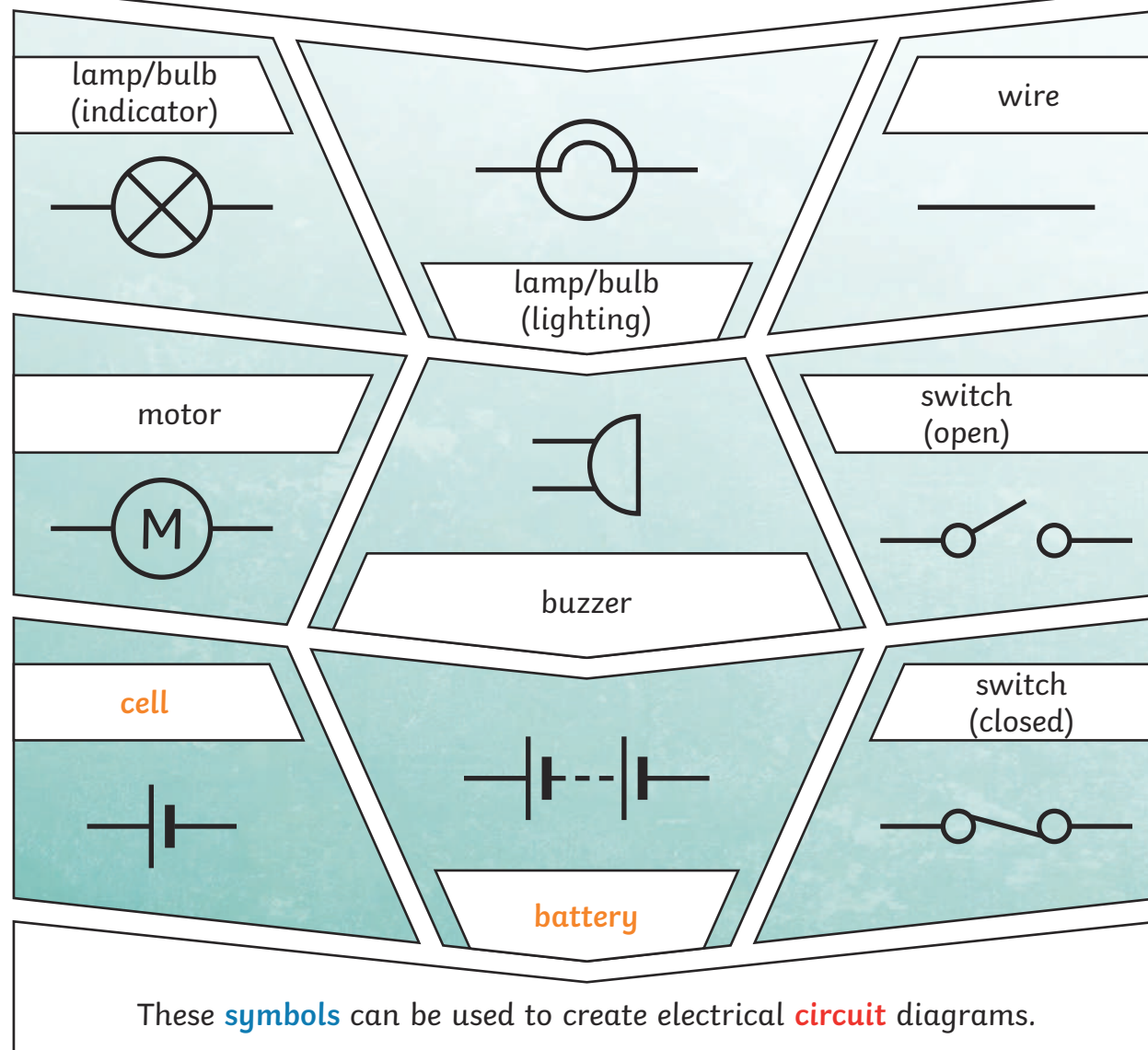


Electrical Insulators

Key Vocabulary

circuit	A path that an electrical current can flow around.
symbol	A visual picture that stands for something else.
cell/battery	A device that stores chemical energy until it is needed. A cell is a single unit. A battery is a collection of cells .
current	The flow of electrons , measured in amps .
amps	How electric current is measured.
voltage	The force that makes the electric current move through the wires. The greater the voltage , the more current will flow.
resistance	The difficulty that the electric current has when flowing around a circuit .
electrons	Very small particles that travel around an electrical circuit .

Key Knowledge

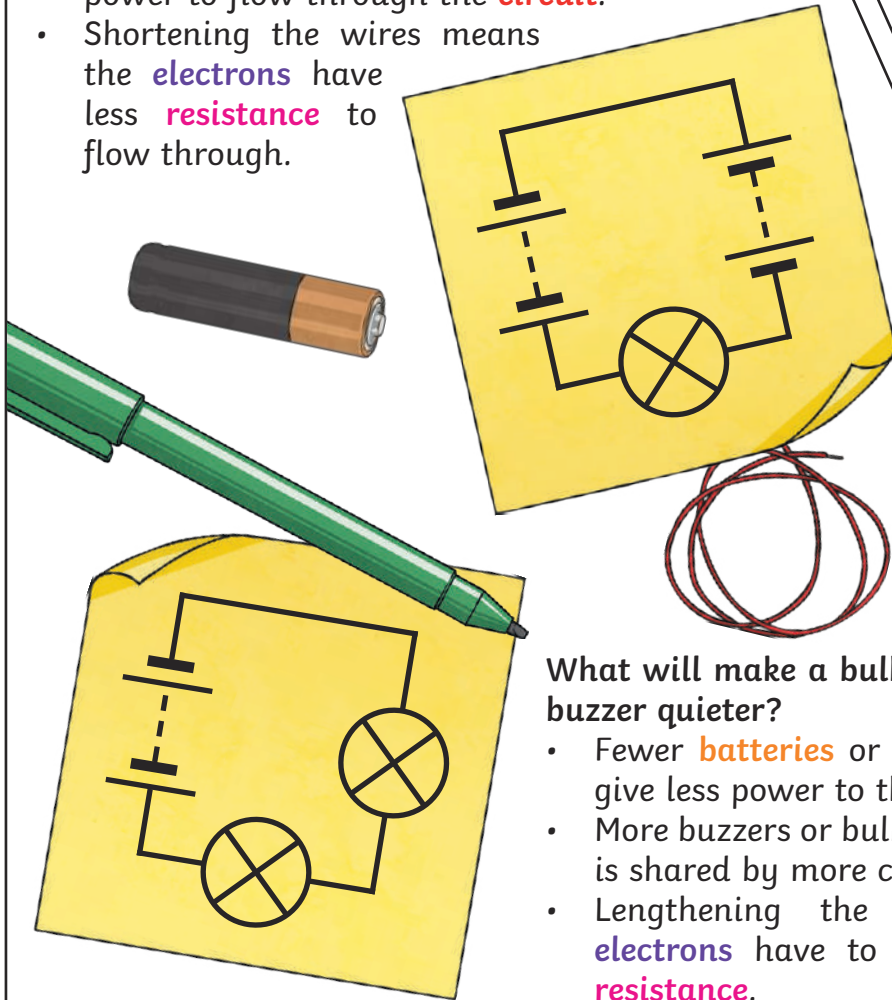
Components of a **Circuit** and Their **Symbols**

To look at all the planning resources linked to the Electricity unit, [click here](#).

Key Knowledge

What will make a bulb brighter or a buzzer louder?

- More **batteries** or a higher **voltage** create more power to flow through the **circuit**.
- Shortening the wires means the **electrons** have less **resistance** to flow through.

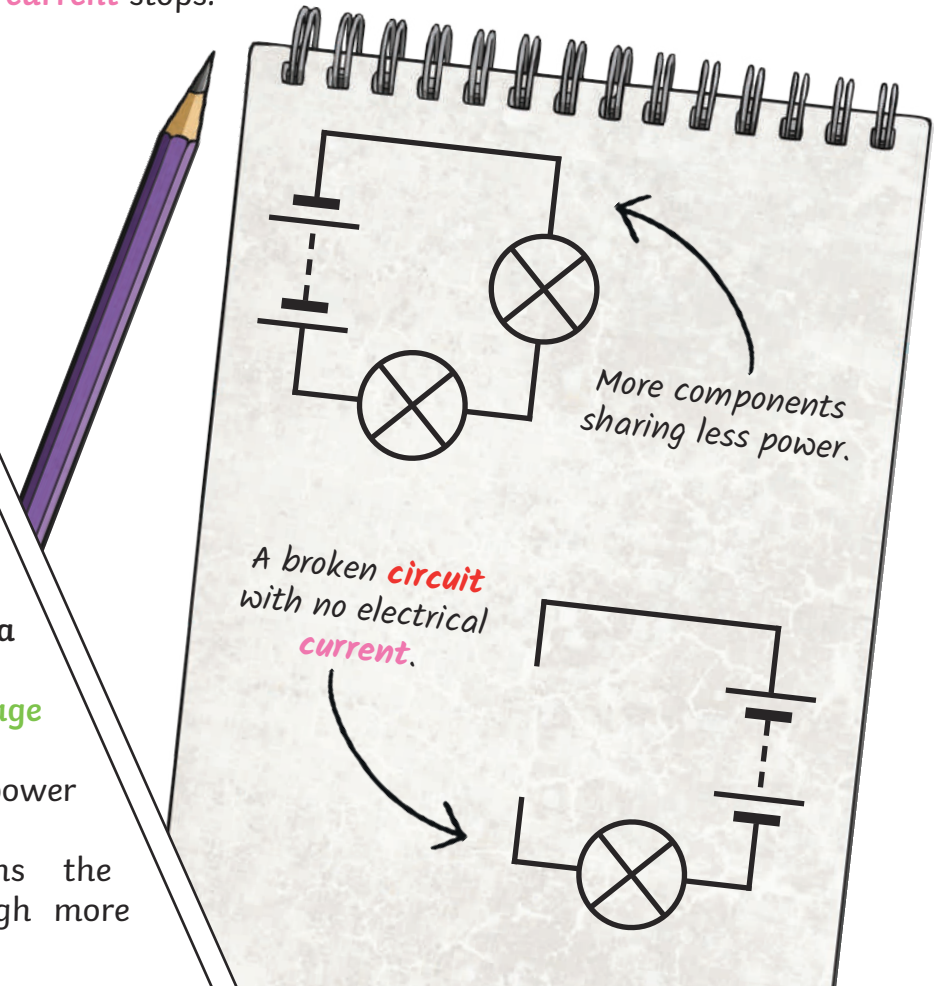


What will make a bulb dimmer or a buzzer quieter?

- Fewer **batteries** or a lower **voltage** give less power to the **circuit**.
- More buzzers or bulbs mean the power is shared by more components.
- Lengthening the wires means the **electrons** have to travel through more **resistance**.

Series Circuit

A **circuit** that has only one route for the **current** to take. If more bulbs or buzzers are added, the power has to be shared and so they will be dimmer or quieter. If just one part of this series **circuit** breaks, the **circuit** is broken and the flow of **current** stops.



Key Vocabulary

object	A thing that can be used. For example a door, chair, car, table are all objects .
material	Materials are what an object is made from.
hard	Not easily broken or bent.
soft	If something is soft , it is easy to cut, fold or change the shape of.
stretchy	Can be pulled to make it longer or wider without breaking.
shiny	Reflects light easily.
dull	Doesn't reflect light. Doesn't look bright or shiny .
rough	If something is rough , it feels and looks uneven or bumpy.

Key Knowledge

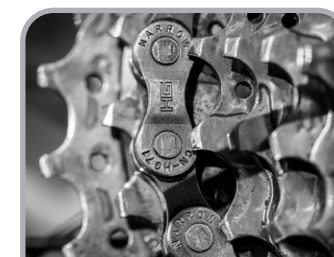
Materials:



plastic



wood



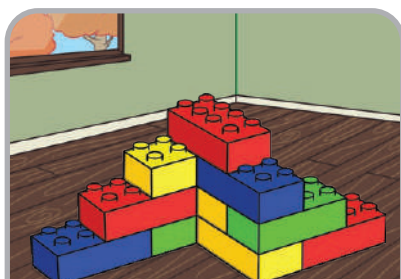
metal



water



glass



plastic toys



wooden furniture



metal tools



drinking water



glass window

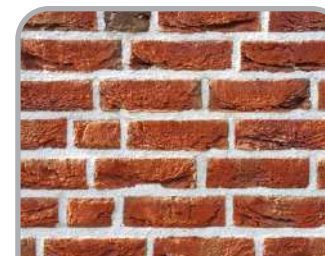
To look at all the planning resources linked to the Everyday Materials unit, [click here](#).

Key Vocabulary

smooth	Smooth objects have no lumps or bumps.
bendy	Bendy things can be bent easily into a curved or folded shape.
not bendy	If something is not bendy , it can't be bent easily into a curved or folded shape.
waterproof	If something is waterproof , it keeps water out. It keeps things dry.
not waterproof	Not waterproof materials let water in.
absorbent	If something is absorbent , it soaks liquid up.
not absorbent	If something is not absorbent , it does not soak up liquid.
transparent	Transparent objects can be seen through.
opaque	Opaque objects can't be seen through.

Key Knowledge

Materials:



brick



fabric



paper



stone



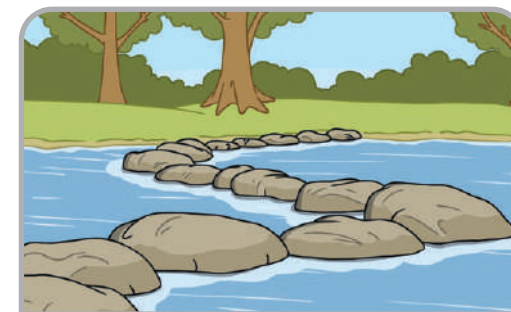
paper books



brick houses



fabric clothing



stepping stones

Key Vocabulary

offspring	The young animal or plant that is produced by the reproduction of that species.
inheritance	This is when characteristics are passed on to offspring from their parents.
variations	The differences between individuals within a species.
characteristics	The distinguishing features or qualities that are specific to a species.
adaptation	An adaptation is a trait (or characteristic) changing to increase a living thing's chances of surviving and reproducing.
habitat	Refers to a specific area or place in which particular animals and plants can live.
environment	An environment contains many habitats and includes areas where there are both living and non-living things.



Offspring

Animals and plants produce **offspring** that are similar but not identical to them. **Offspring** often look like their parents because features are passed on.

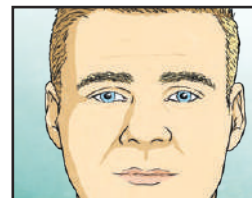
Variation

In the same way that there is **variation** between parents and their **offspring**, you can see **variation** within any species, even plants.



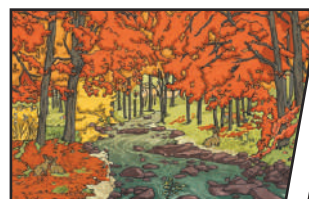
Adaptive Traits

Characteristics that are influenced by the **environment** the living things live in. These **adaptations** can develop as a result of many things, such as food and climate.



Inherited Traits

Eye colour is an example of an **inherited trait**, but so are things like hair colour, the shape of your earlobes and whether or not you can smell certain flowers.

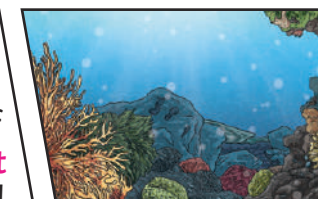


Habitats

A good **habitat** should provide shelter, water, enough space and plenty of food.

Environments

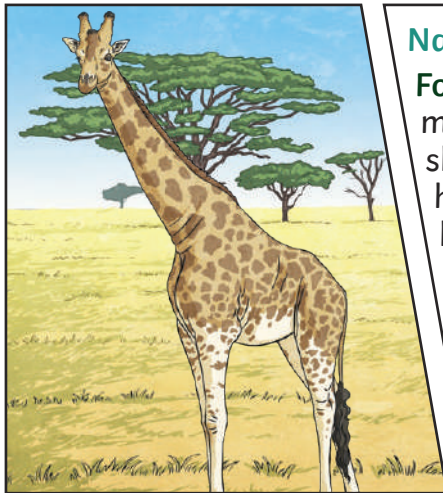
There are many types of **environment** around the world. Polar regions, deserts, rainforests, oceans, rivers, and grasslands are all **environments**.



To look at all the planning resources linked to the Evolution and Inheritance unit, [click here](#).

Key Vocabulary

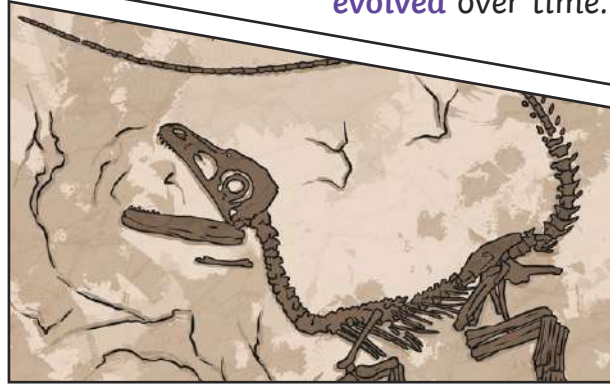
evolution	Adaptation over a very long time.
natural selection	The process where organisms that are better adapted to their environment tend to survive and produce more offspring .
fossil	The remains or imprint of a prehistoric plant or animal, embedded in rock and preserved.
adaptive traits	Genetic features that help a living thing to survive.
inherited traits	These are traits you get from your parents. Within a family, you will often see similar traits, e.g. curly hair.



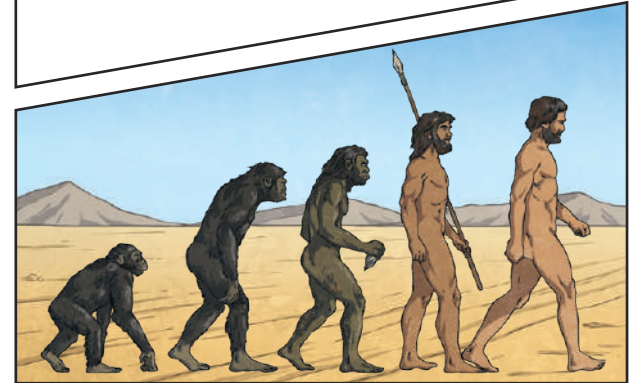
Natural Selection

Fossils of giraffes from millions of years ago show that they used to have shorter necks. They have gradually **evolved** through **natural selection** to have longer necks so that they can reach the top leaves on taller trees.

Fossils are the preserved remains, or partial remains, of ancient animals and plants. **Fossils** let scientists know how plants and animals used to look millions of years ago. This is proof that living things have **evolved** over time.



Evolution is the gradual process by which different kinds of living organism have developed from earlier forms over millions of years. Scientists have proof that living things are continuously **evolving** - even today!



Living Things		Habitat		Adaptive Traits
polar bear		arctic		Its white fur enables it to camouflage in the snow.
camel		desert		It has wide feet to make it easier to walk in the sand.
cactus		desert		It stores water in its stem.
toucan		rainforest		Its narrow tongue allows it to eat small fruit and insects.

Key Vocabulary

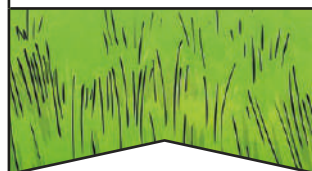
forces	Pushes or pulls.
friction	A force that acts between two surfaces or objects that are moving, or trying to move, across each other.
surface	The top layer of something.

Key Knowledge

Different **surfaces** create different amounts of **friction**. The amount of **friction** created by an object moving over a **surface** depends on the roughness of the **surface** and the object, and the **force** between them.

The driving **force** pushes the bicycle, making it move.

Friction pushes on the bicycle, slowing it down.



Grass



Gravel



Sand

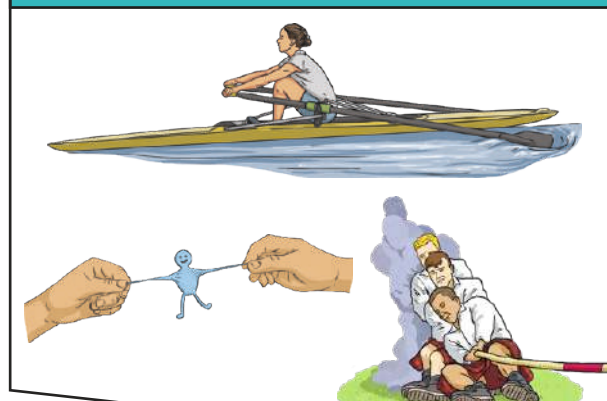


Road

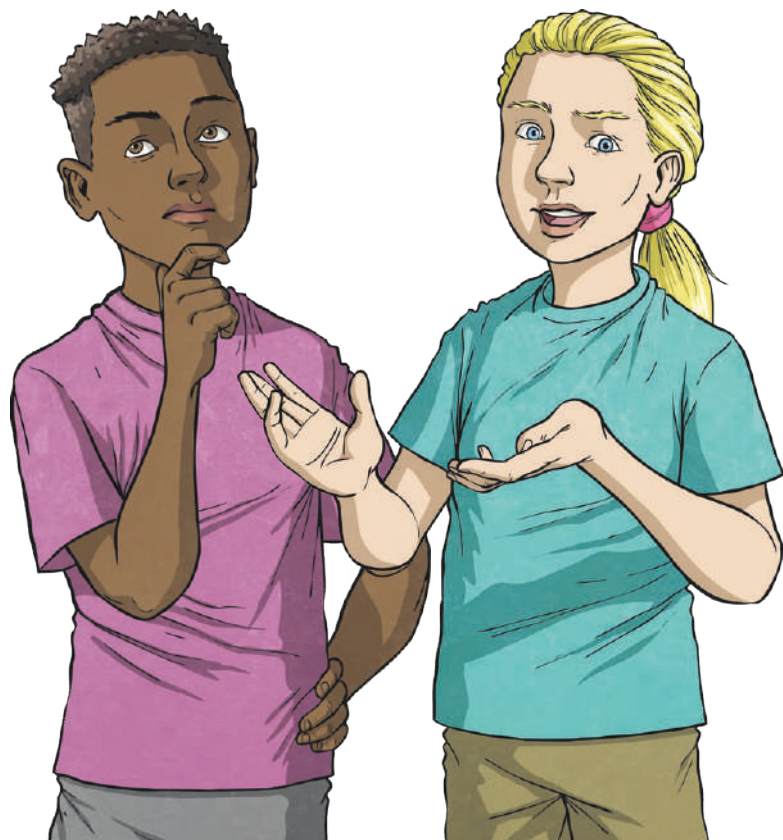
Pushes



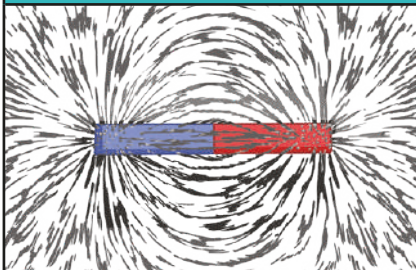
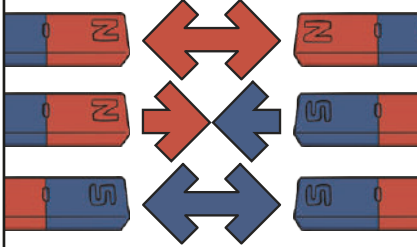
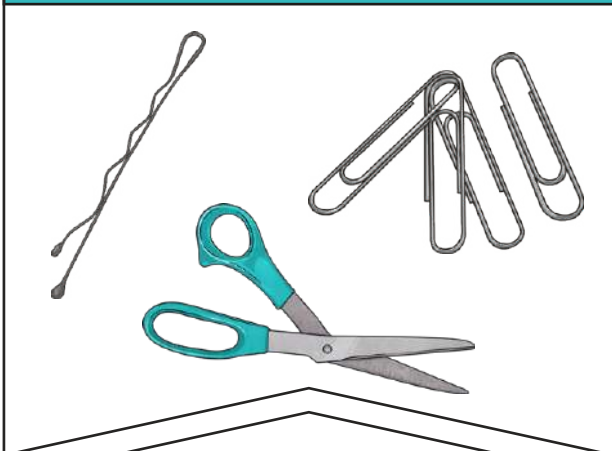
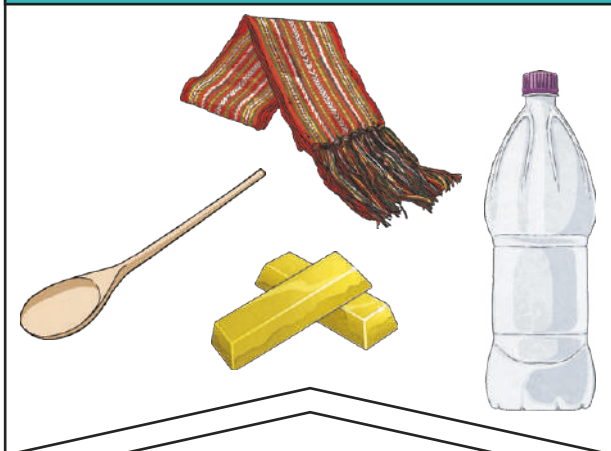
Pulls



Forces will change the motion of an object. They will either make it start to move, speed up, slow it down or even make it stop.



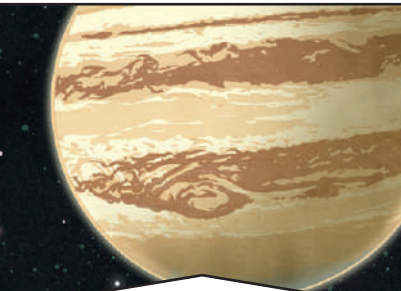
To look at all the planning resources linked to the Forces and Magnets unit, [click here](#).

Key Vocabulary		Key Knowledge				
magnet	An object which produces a magnetic force that pulls certain objects towards it.		Like poles repel . Opposite poles attract .			
magnetic	Objects which are attracted to a magnet are magnetic . Objects containing iron, nickel or cobalt metals are magnetic .	A magnetic field is invisible. You can see the magnetic field here though. This is what happens when iron filings are placed on top of a piece of paper with a magnet underneath.		The needle in a compass is a magnet . A compass always points north-south on Earth.		
magnetic field	The area around a magnet where there is a magnetic force which will pull magnetic objects towards the magnet .					
poles	North and south poles are found at different ends of a magnet .					
repel	Repulsion is a force that pushes objects away. For example, when a north pole is placed near the north pole of another magnet , the two poles repel (push away from each other).					
attract	Attraction is a force that pulls objects together. For example, when a north pole is placed near the south pole of another magnet , the two poles attract (pull together).					
		Magnetic ✓		Non-magnetic ✕		
						
		These objects contain iron, nickel or cobalt. Not all metals are magnetic .		These objects do not contain iron, nickel or cobalt.		

Key Vocabulary

forces	Pushes or pulls.
gravity	A pulling force exerted by the Earth (or anything else which has mass).
Earth's gravitational pull	The pull that Earth exerts on an object, pulling it towards Earth's centre. It is the Earth's gravitational pull which keeps us on the ground.
weight	The measure of the force of gravity on an object.
mass	A measure of how much matter (or 'stuff') is inside an object.

The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.



Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.

Key Knowledge

Forces		Isaac Newton
start to move.	stop moving.	 Isaac Newton is famously thought to have developed his theory of gravity when he saw an apple fall to the ground from an apple tree. 
change direction.	move faster.	
change its shape.	move more slowly.	
Forces can make an object...		

Mass is how much matter is inside an object. It is measured in kilograms (kg).



Weight is how strongly **gravity** is pulling an object down. It is measured in newtons (N).



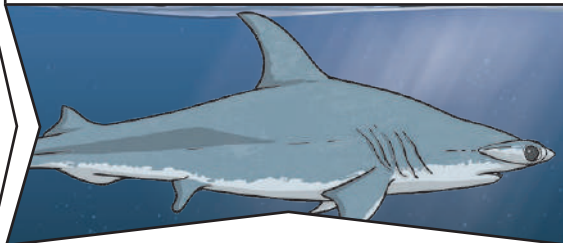
To look at all the planning resources linked to the Forces unit, [click here](#).

Key Vocabulary

friction	A force that acts between two surfaces or objects that are moving, or trying to move, across each other.
air resistance	A type of friction caused by air pushing against any moving object.
water resistance	A type of friction caused by water pushing against any moving object.
buoyancy	An object is buoyant if it floats. This is because the weight of the object is equal to the upthrust .
streamlined	When an object is shaped to minimise the effects of air or water resistance .
mechanism	Parts which work together in a machine. Examples of mechanisms are pulleys, gears and levers.
upthrust	A force that pushes objects up, usually in water.

It has a pointed nose to cut through the water, and a smooth, low, curved back to allow the water to flow over and around it.

This shark is **streamlined**.



It does not create much **water resistance** so it can move through the water quickly.

Key Knowledge

Examples of **forces** in action:



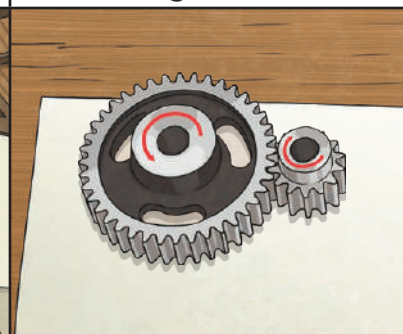
Water resistance and **air resistance** are forms of **friction**. **Friction** is sometimes helpful and sometimes unhelpful. For example, **air resistance** is helpful as it stops the skydiver hitting the ground at high speed. **Friction** on a bike chain can make the bike harder to pedal so it is unhelpful.

Pulleys



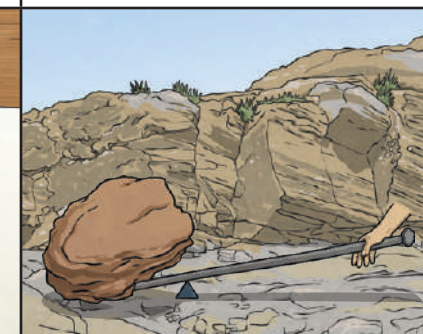
Pulleys can be used to make a small **force** lift a heavier load. The more wheels in a pulley, the less **force** is needed to lift a **weight**.

Gears/Cogs



Gears or cogs can be used to change the speed, **force** or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.

Levers



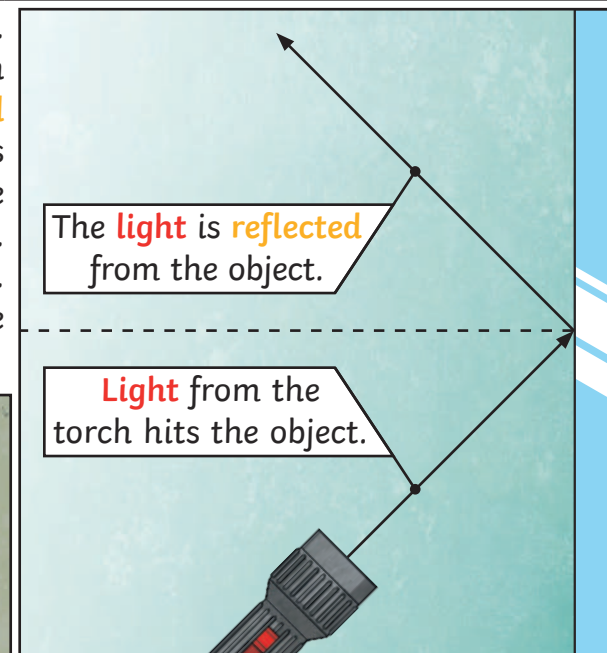
Levers can be used to make a small **force** lift a heavier load. A lever always rests on a pivot.

Key Vocabulary

light	A form of energy that travels in a wave from a source.
light source	An object that makes its own light .
dark	Dark is the absence of light .
reflection	The process where light hits the surface of an object and bounces back into our eyes.
reflect	To bounce off.
reflective	A word to describe something which reflects light well.
ray	Waves of light are called light rays . They can also be called beams.

Key Knowledge

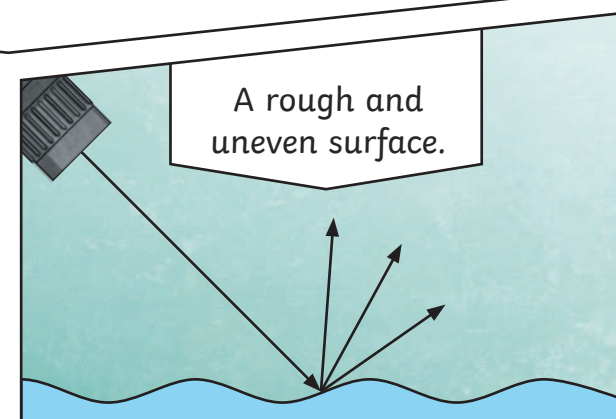
We need **light** to be able to see things. **Light** travels in a straight line. When **light** hits an object, it is **reflected** (bounces off). If the **reflected light** hits our eyes, we can see the object. Some surfaces and materials **reflect light** well. Other materials do not **reflect light** well. **Reflective** surfaces and materials can be very useful...



Mirrors **reflect light** very well, so they create a clear image. An image in a mirror appears to be reversed. For example, if you look in a mirror and raise your right hand, the mirror image appears to raise its left hand.



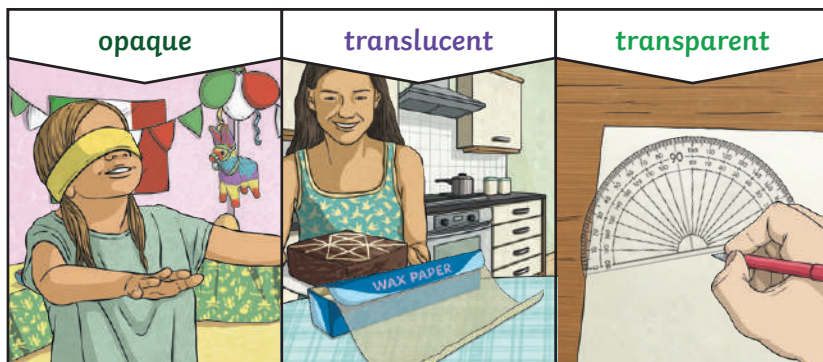
The surfaces that reflect **light** best are smooth, shiny and flat.



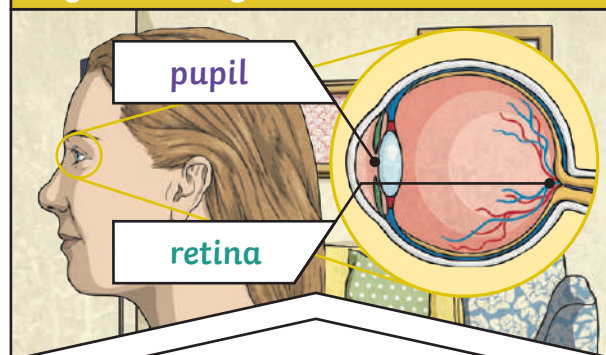
To look at all the planning resources linked to the Light unit, [click here](#).

Key Vocabulary

pupil	The black part of the eye which lets light in.
retina	A layer at the very back of the eye. The retina takes the light the eye receives. It then changes it into nerve signals to send to the brain.
shadow	An area of darkness where light has been blocked.
opaque	Describes objects that do not let any light pass through them.
translucent	Describes objects that let some light through, but scatter the light so we can't see through them properly.
transparent	Describes objects that let light travel through them easily, meaning that you can see through the object.



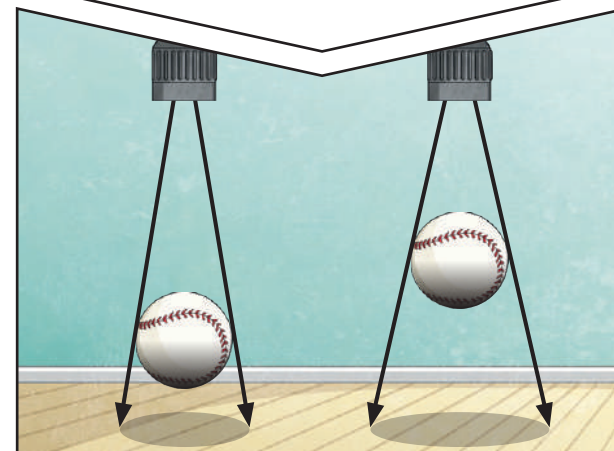
Key Knowledge



The pupils

control the amount of **light** entering the eyes. If too much **light** enters, then it can damage the **retina**. To help protect the eyes, you can wear a hat with a wide brim and sunglasses with a UV rating.

A **shadow** is caused when **light** is blocked by an **opaque** object. A **shadow** is larger when an object is closer to the **light** source. This is because it blocks more of the **light**.



When the **light** source is directly above the object, the **shadow** will be directly underneath.



When a **light** source is to one side of an object, the **shadow** will appear on the opposite side. The **shadow** will also be longer.



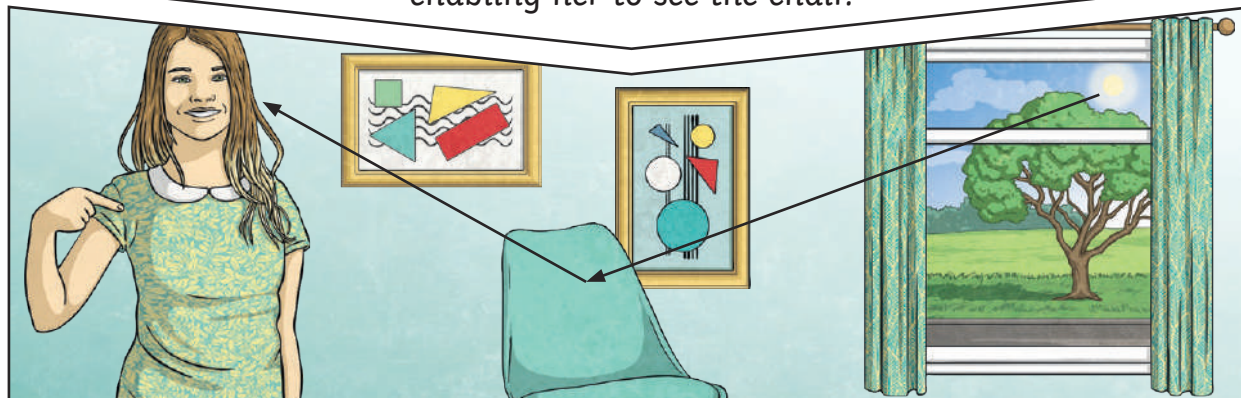
Key Vocabulary

light	A form of energy that travels in a wave from a source.
light source	An object that makes its own light .
reflection	Reflection is when light bounces off a surface, changing the direction of a ray of light .
incident ray	A ray of light that hits a surface.
reflected ray	A ray of light that has bounced back after hitting a surface.
the law of reflection	The law states that the angle of the incident ray is equal to the angle of the reflected ray .

Key Knowledge

We need **light** to be able to see things. **Light** waves travel out from sources of **light** in straight lines. These lines are often called rays or beams of **light**.

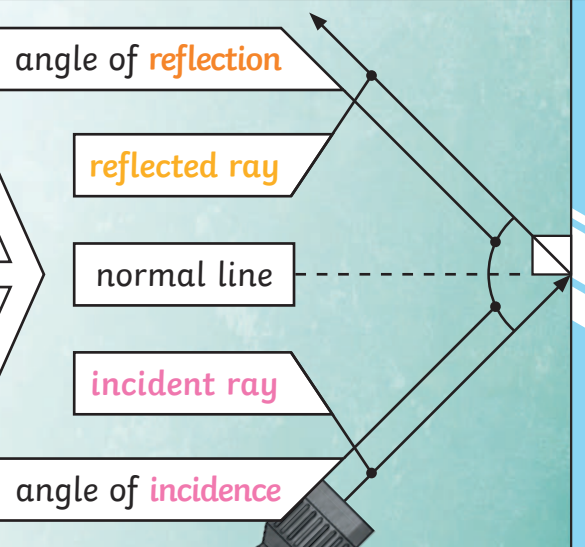
Light from the sun travels in a straight line and hits the chair. The **light** ray is then **reflected** off the chair and travels in a straight line to the girl's eye, enabling her to see the chair.



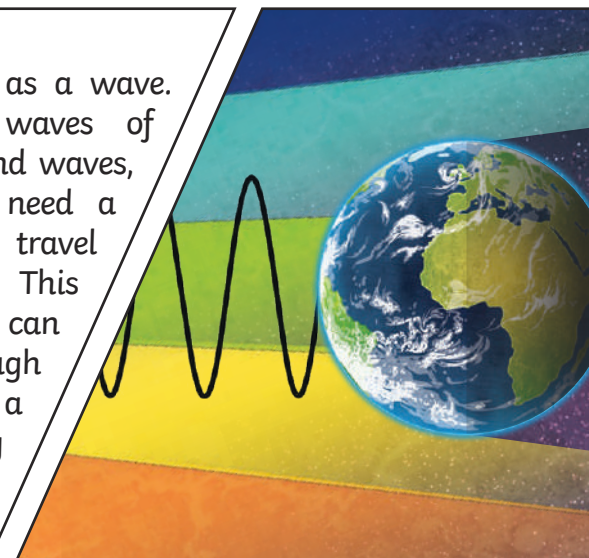
The **law of reflection** states that the angle of **incidence** is equal to the angle of **reflection**. Whenever **light** is **reflected** from a surface, it obeys this law.

The angle of **reflection** is the angle between the normal line and the **reflected ray** **light**.

The angle of **incidence** is the angle between the normal line and the **incident ray** of **light**.



Light travels as a wave. But unlike waves of water or sound waves, it does not need a medium to travel through. This means **light** can travel through a vacuum - a completely airless space.



Key Vocabulary

refraction	This is when light bends as it passes from one medium to another. E.g. Light bends when it moves from air into water.
visible spectrum	Light that is visible to the human eye. It is made up of a colour spectrum .
prism	A prism is a solid 3D shape with flat sides. The two ends are an equal shape and size. A transparent prism separates out visible light into all the colours of the spectrum .
shadow	An area of darkness where light has been blocked.
transparent	Describes objects that let light travel through them easily, meaning you can see through the object.
translucent	Describes objects that things let some light through, but scatters the light so we can't see through them properly.
opaque	Describes objects that do not let any light pass through them.

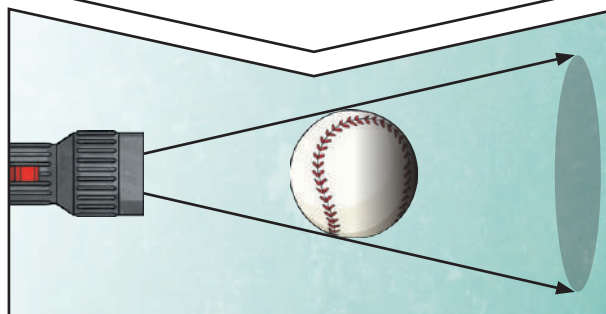
To look at all the planning resources linked to the Light unit, [click here](#).

Key Knowledge

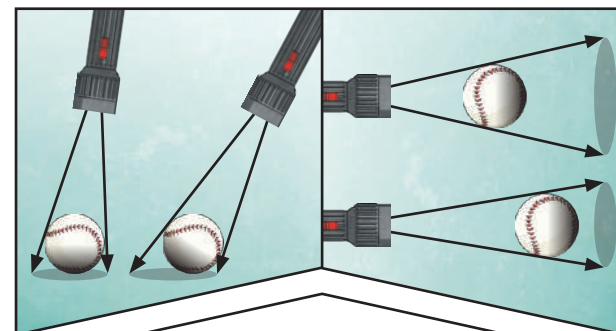


The spoon in this water looks as if it is bent. This is because **light** bends when it moves from air to water. When **light** bends in this way, it is called **refraction**.

A **shadow** is always the same shape as the object that casts it. This is because when an **opaque** object is in the path of **light** travelling from a **light source**, it will block the **light** rays that hit it, while the rest of the **light** can continue travelling.



Isaac Newton shone a **light** through a **transparent prism**, separating out **light** into the colours of the rainbow (red, orange, yellow, green, blue, indigo and violet) - the colours of the **spectrum**. All the colours together merge and make visible **light**.



Shadows can also be elongated or shortened depending on the angle of the **light source**. A **shadow** is also larger when the object is closer to the **light source**. This is because it blocks more of the **light**.

Key Vocabulary

asexual reproduction	One parent is needed to create an offspring, which is an exact copy of the parent.
fertilise	The action of fusing the male and female sex cells in order to develop an egg.
gestation	The length of a pregnancy.
life cycle	The journey of changes that take place throughout the life of a living thing including birth, growing up and reproduction .
metamorphosis	An abrupt and obvious change in the structure of an animal's body and their behaviour.
pollination	The transfer of pollen to a stigma to allow fertilisation .
reproduction	The process of new living things being made.
sexual reproduction	Two parents are needed to make offspring which are similar but not identical to either parent.

Humans develop inside their mothers and are dependent on their parents for many years until they are old enough to look after themselves.



Amphibians such as frogs are laid in eggs then, once hatched, go through many changes until they become an adult.



Some animals, such as butterflies, go through **metamorphosis** to become an adult.



Birds are hatched from eggs and are looked after by their parents until they are able to live independently.

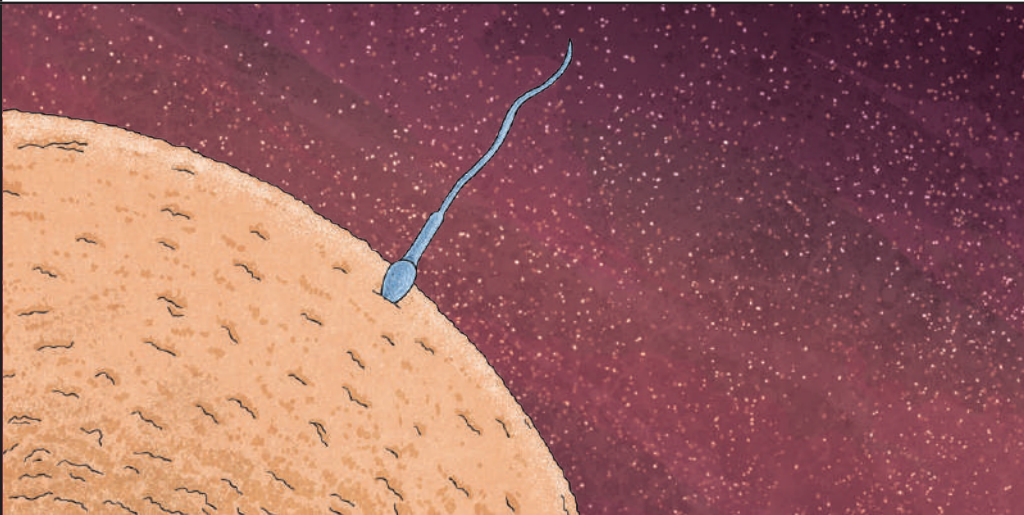


Some living things, such as plants, contain both the male and female sex cells. In others, such as humans, they contain either the male or female sex cell.

Reproduction in mammals

Mammals use **sexual reproduction** to produce their offspring.

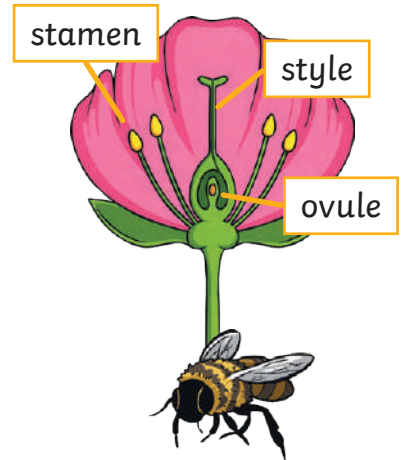
- The male sex cell, called the sperm, **fertilises** the female sex cells.
- The **fertilised** cell divides into different cells and will form a baby with a beating heart.
- The baby will grow inside the female until the end of the **gestation** period when the baby is born.



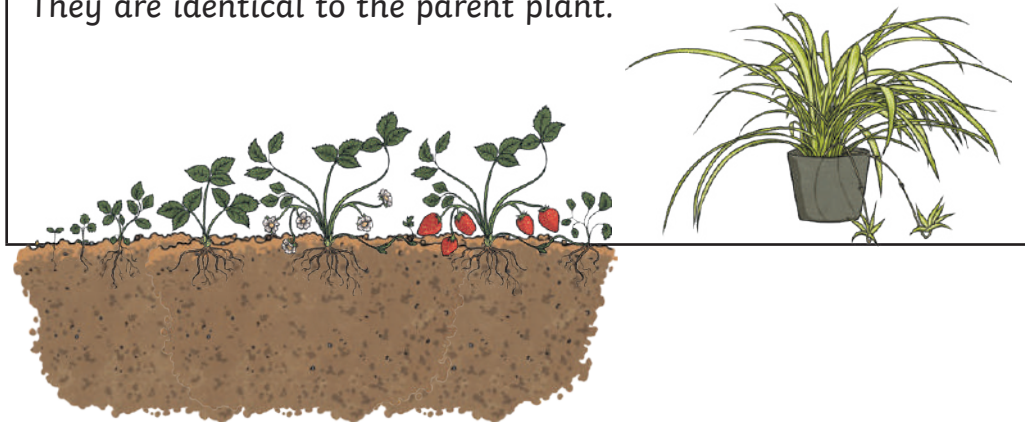
Echidnas and platypus are mammals but they lay eggs rather than giving birth to live young.

Plants

Most plants contain both the male sex cell (pollen) and female sex cell (ovules), but most plants can't **fertilise** themselves. Wind and insects help to transfer pollen to a different plant. The pollen from the stamen of one plant is transferred to the stigma of another. The pollen then travels down a tube through the style and fuses with an ovule.



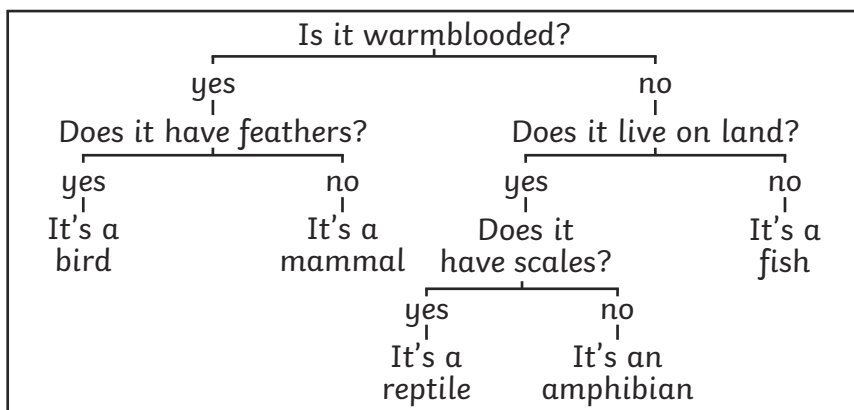
Some plants, such as strawberry plants, potatoes, spider plants and daffodils use **asexual reproduction** to create a new plant. They are identical to the parent plant.



Key Vocabulary

characteristics	Special qualities or appearances that make an individual or group of things different to others.
classify	To sort things into different groups.
taxonomist	A scientist who classifies different living things into categories.
key	A key is a series of questions about the characteristics of living things. A key is used to identify a living thing or decide which group it belongs to by answering 'yes' or 'no' questions.

Scientists, called Taxonomists, sort and group living things according to their similarities and differences.



Classification

In 1735, Swedish Scientist Carl Linnaeus first published a system for **classifying** all living things. An adapted version of this system is still used today: The Linnaeus System.

Living things can be **classified** by these eight levels. The number of living things in each level gets smaller until the one animal is left in its species level. This is how a dog would be classified.

Domain: Eukarya

jackal, clownfish, cat, dog, ladybird, daisy, rabbit, fox

Kingdom: Animalia

jackal, clownfish, cat, dog, ladybird, rabbit, fox

Phylum: Chordata

jackal, clownfish, cat, dog, rabbit, fox

Class: Mammalia

jackal, cat, dog, rabbit, fox

Order: Carnivora

jackal, cat, dog, fox

Family: Canidae

jackal, dog, fox

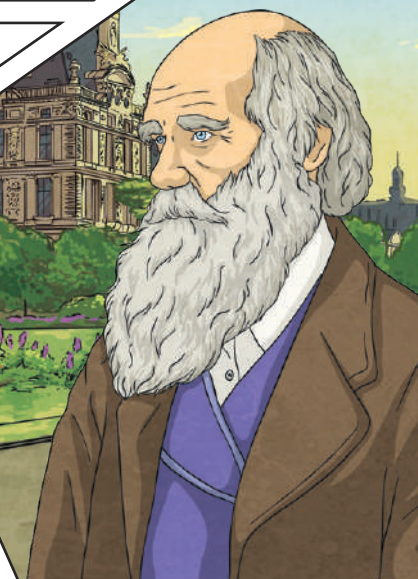
Genus: Canis

jackal, dog

Species: Lupus

dog

Each group allows scientists to observe and understand the **characteristics** of living things more clearly. They group similar things together then split the groups again and again based on their differences.



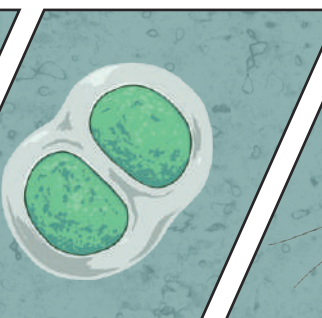
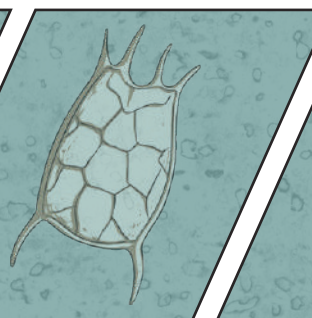
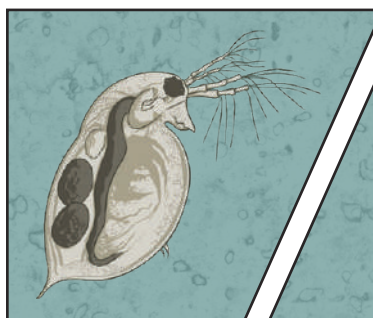
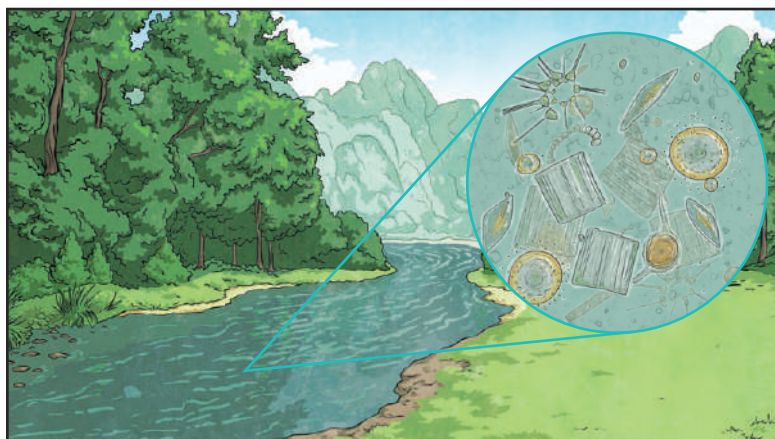
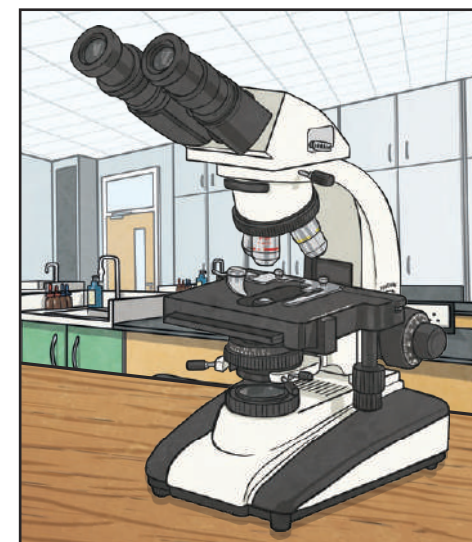
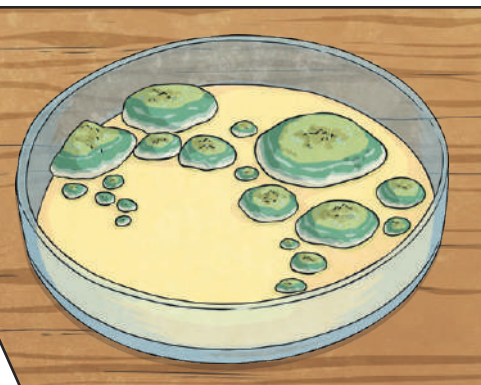
Key Vocabulary

bacteria	A single-celled microorganism .
microorganism	An organism that can only be seen using a microscope , e.g. bacteria , mould and yeast.
microscope	A piece of equipment that is used to view very tiny (microscopic) things by magnifying their appearance.
species	A group of animals that can reproduce to produce fertile offspring.

Microorganisms

Microorganisms are viruses, **bacteria**, moulds and yeast. Some animals (dust mites) and plants (phytoplankton) are also **microorganisms**.

Microorganisms are very tiny living things that can only be seen using a **microscope**. They can be found in and on our bodies, in the air, in water and on objects around us.



Helpful Microbes	Harmful Microbes
Bacteria – cheese	Bacteria – salmonella is a bacterium that can lead to food poisoning
Yeast – wine	Virus – chicken pox and flu are examples of viral diseases
Bacteria – yoghurt	Fungi – athlete's foot
Yeast – bread dough	Bacteria – plaque
Penicillium fungi - antibiotics	Fungi - mould

Key Vocabulary

life processes	These are the things that all living things do. They move, breathe, sense, grow, make babies, get rid of waste and get their energy from food.
living	Things that are living have all the life processes .
dead	Things that are dead were once living . They did have all the life processes but don't now.
never living	Things made out of metal, plastic or rock were never living . They never had the life processes .
food chain	A food chain shows how each animal gets its food. Food chains are one of the ways that living things depend on each other to stay alive.
food sources	This is the place a living thing's food comes from.

Key Knowledge



living

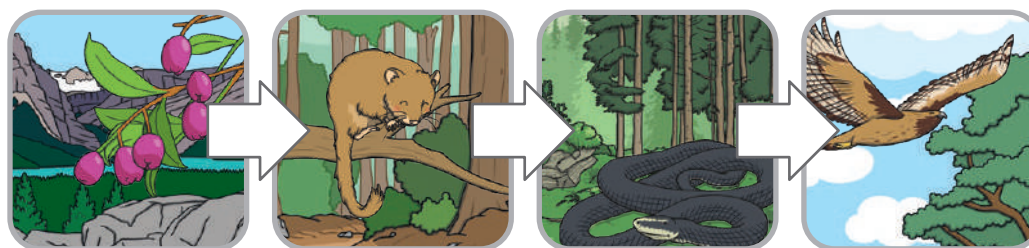


dead



never living

Food chains. The arrows mean 'is eaten by'.



To look at all the planning resources linked to the Living Things and Their Habitats unit, [click here](#).

Key Vocabulary

habitat	A habitat is the natural place something lives. A habitat provides living things with everything they need to survive such as food, shelter and water.
microhabitat	A microhabitat is a very small habitat in places like under a rock, under leaves or on a branch. Minibeasts live in microhabitats . The microhabitats have everything they need to survive .
depend	Many living things in a habitat depend on each other. This means they need each other for different things.
survive	This means to stay alive.

Examples of **microhabitats**:



short grass



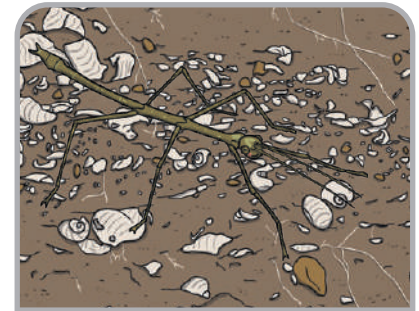
flowers



inside rotting wood



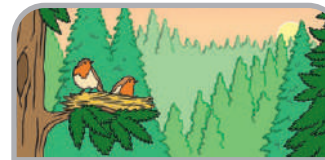
under leaves



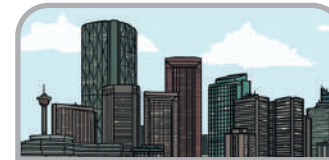
in and on soil

Key Knowledge

Examples of **habitats**:



woodland



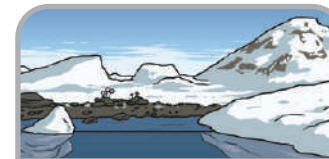
urban



coastal



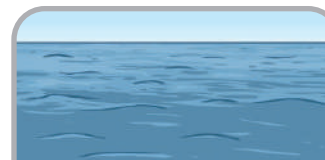
rainforest



arctic



desert



ocean



river



mountain

Key Vocabulary

organisms	This is another word that can be used to mean 'living things'.
life processes	The things living things do to stay alive.
respiration	A process where plants and animals use oxygen gas from the air to help turn their food into energy.
sensitivity	The way living things react to changes in their environment .
reproduction	The process through which young are produced.
excretion	The process by which living things get rid of waste products.
nutrition	The process of obtaining food to provide living things with energy to live and stay healthy.
habitat	The specific area or place in which particular animals or plants may live.
environment	An environment contains many habitats and these include areas where there are both living and non-living things.
endangered species	A plant or animal where there are not many of their species left and scientists are concerned that the species may become extinct .
extinct	When a species has no more members alive on the planet, it is extinct .

Changes to an **environment** can be natural or caused by humans. Changes to an **environment** can have positive as well as negative effects. Here are some examples of things that can change an **environment**.

Natural

- earthquakes
- storms
- floods
- droughts
- wildfires
- the seasons

Human-Made

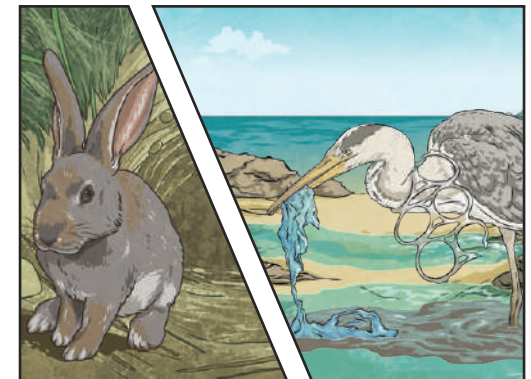
- deforestation
- pollution
- urbanisation
- the introduction of new animal or plant species to an **environment**
- creating new nature reserves

Plants and animals rely on the **environment** to give them everything they need. Therefore, when **habitats** change, it can be very dangerous to the plants and animals that live there.

Life Processes

To stay alive and healthy, all living things need certain conditions that let them carry out the seven **life processes**:

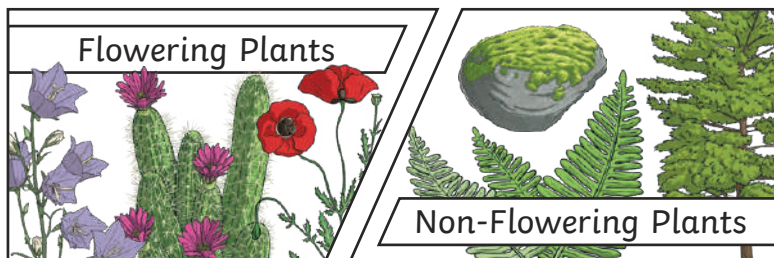
Growth
Reproduction
Excretion
Nutrition
Movement
Respiration
Sensitivity



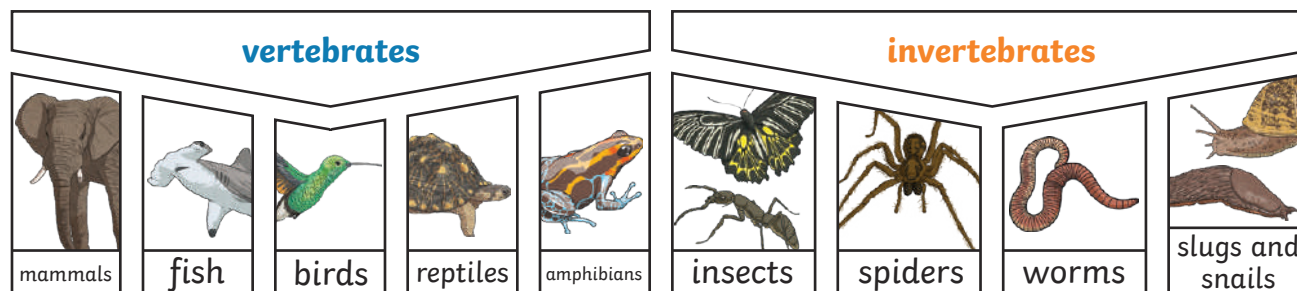
Key Vocabulary

classification	This is where plants or animals are placed into groups according to their similarities.
vertebrates	Animals with a backbone.
invertebrates	Animals without a backbone.
specimen	A particular plant or animal that scientists study to find out about its species.
characteristics	The distinguishing features or qualities that are specific to a species.

Plants can be sorted into many different groups. For example:



Animals can be grouped in lots of different ways based upon their **characteristics**.

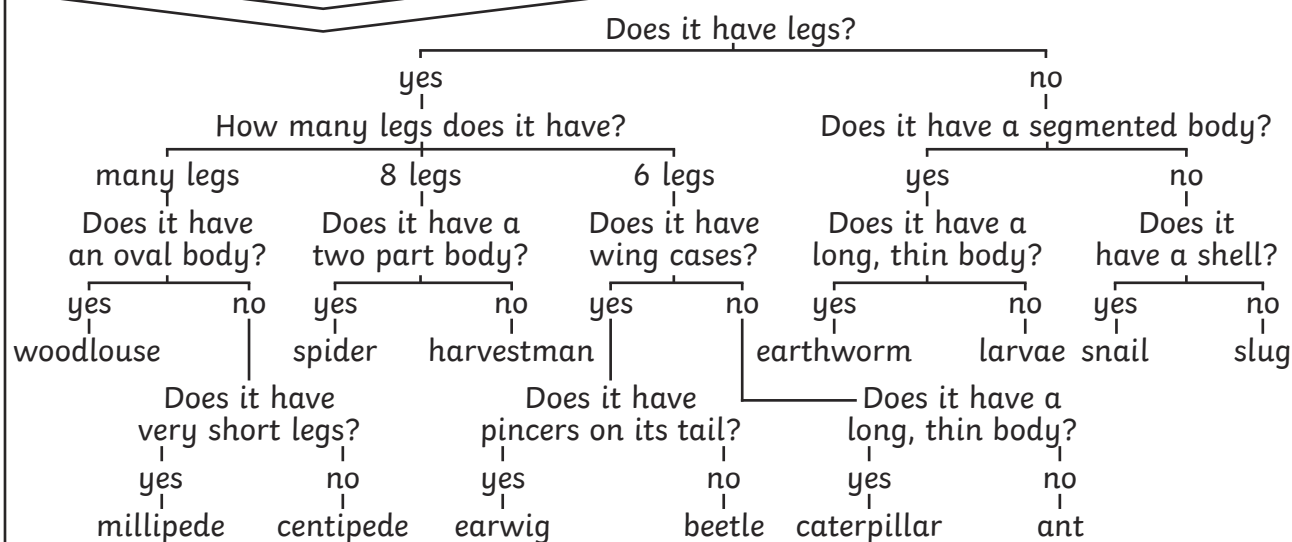


Vertebrates can be separated into five broad groups.

You can use **classification** keys to help group, identify and name a variety of living things. Here is an example of a **classification** key:

You could sort **invertebrates** you might see around school in different ways, such as in this example. The vast majority of living things on the planet are **invertebrates**.

Invertebrate Classification Key



Key Vocabulary

wild plants	A wild plant seed grows where it falls. It doesn't need to be planted or cared for as it grows.
garden plants	Garden plants are plants that people choose to grow in their gardens.
weed	Weeds are wild plants that grow in places where people don't want them.
deciduous	A deciduous tree loses its leaves each year.
evergreen	An evergreen tree keeps its green leaves all year round, even in the winter.

Trees



Key Knowledge

Wild Plants



Garden Plants



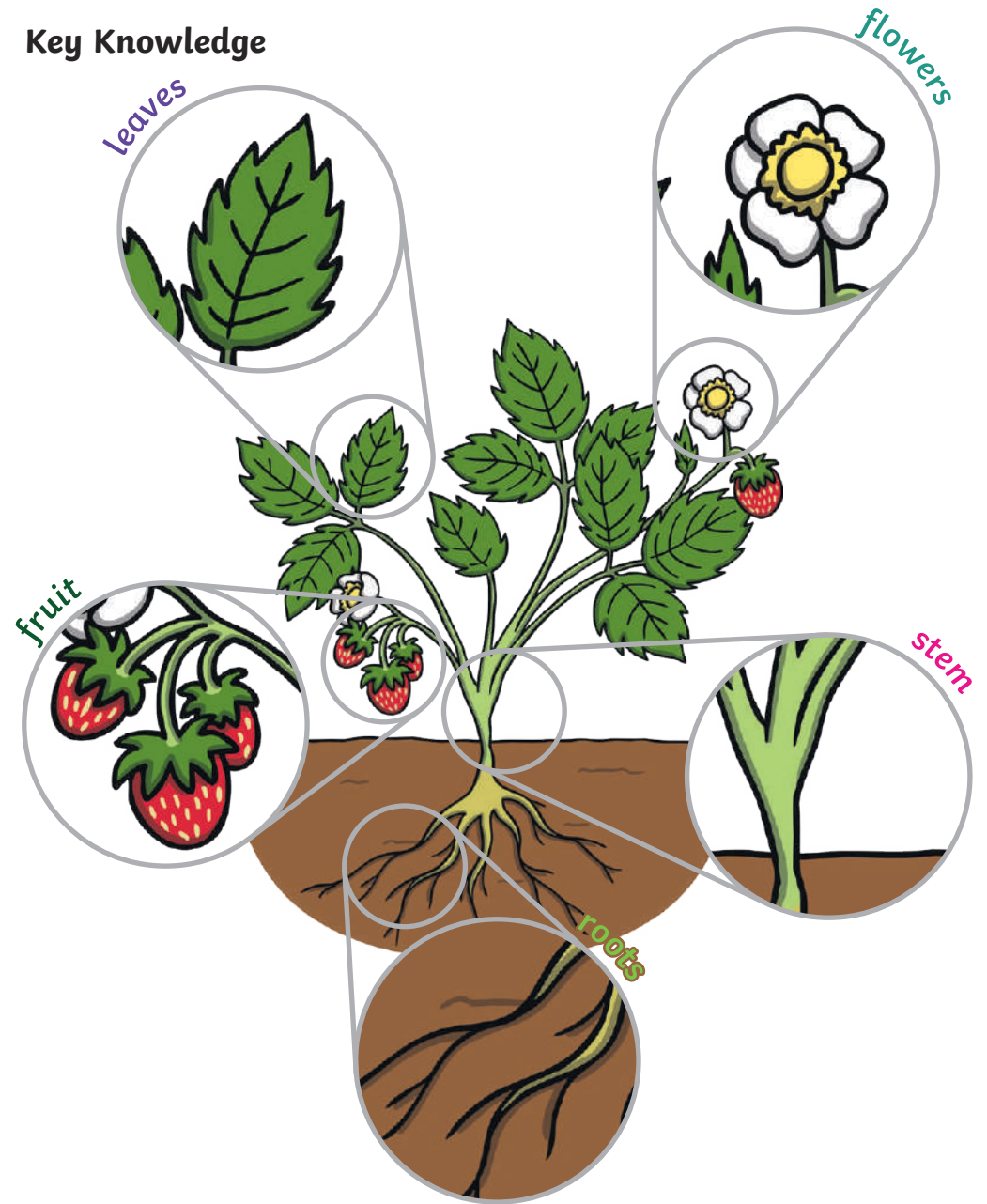
To look at all the planning resources linked to the Plants unit, [click here](#).

Key Vocabulary

roots	Roots take in water and nutrients from the soil and keep the plant in the ground.
stem	The stem holds the plant up and carries the water and nutrients from the roots to the leaves and flowers .
leaves	Leaves catch sunlight to help the plant to make its own food.
flowers	Flowers attract insects and birds.
petals	Petals are the colourful part of the flower .
fruit	Fruit contains the plant's seeds . Sometimes humans try to grow fruit without seeds because it's easier to eat.
seed	Seeds grow into new plants.
bulb	Bulbs grow into new plants.

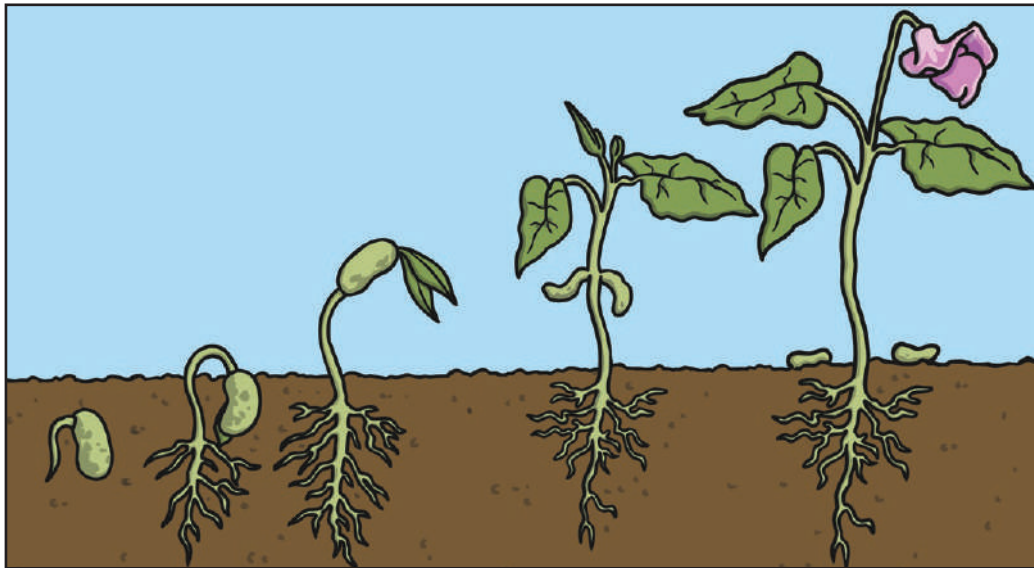


Key Knowledge

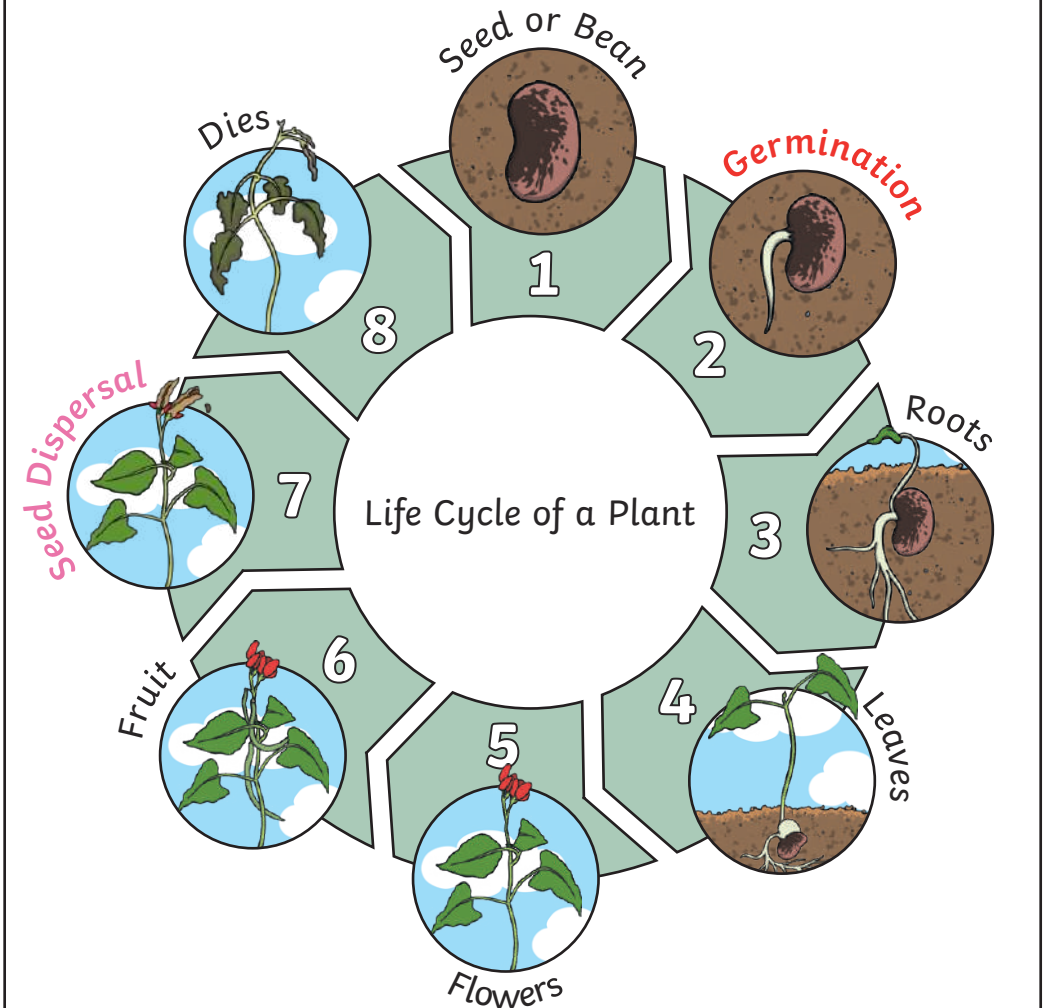


Key Vocabulary

germination	When the conditions are right, the seed soaks up water and swells, and the tiny new plant bursts out of its shell. This is called germination .
sprout	When a plant sprouts , it grows new shoots .
shoot	A shoot grows upwards from the seed or plant to find sunlight .
seed dispersal	Seed dispersal is when the seeds move away from the parent plant. They can be moved by the wind or animals.



Key Knowledge



To look at all the planning resources linked to the Plants unit, [click here](#).

Key Vocabulary

What do plants need to grow well?

sunlight

All plants need light from the sun to grow well. Some plants need lots of **sunlight**. Some plants only need a little **sunlight**.

water

All plants need **water** to grow. Without **water**, seeds and bulbs will not **germinate**.

temperature

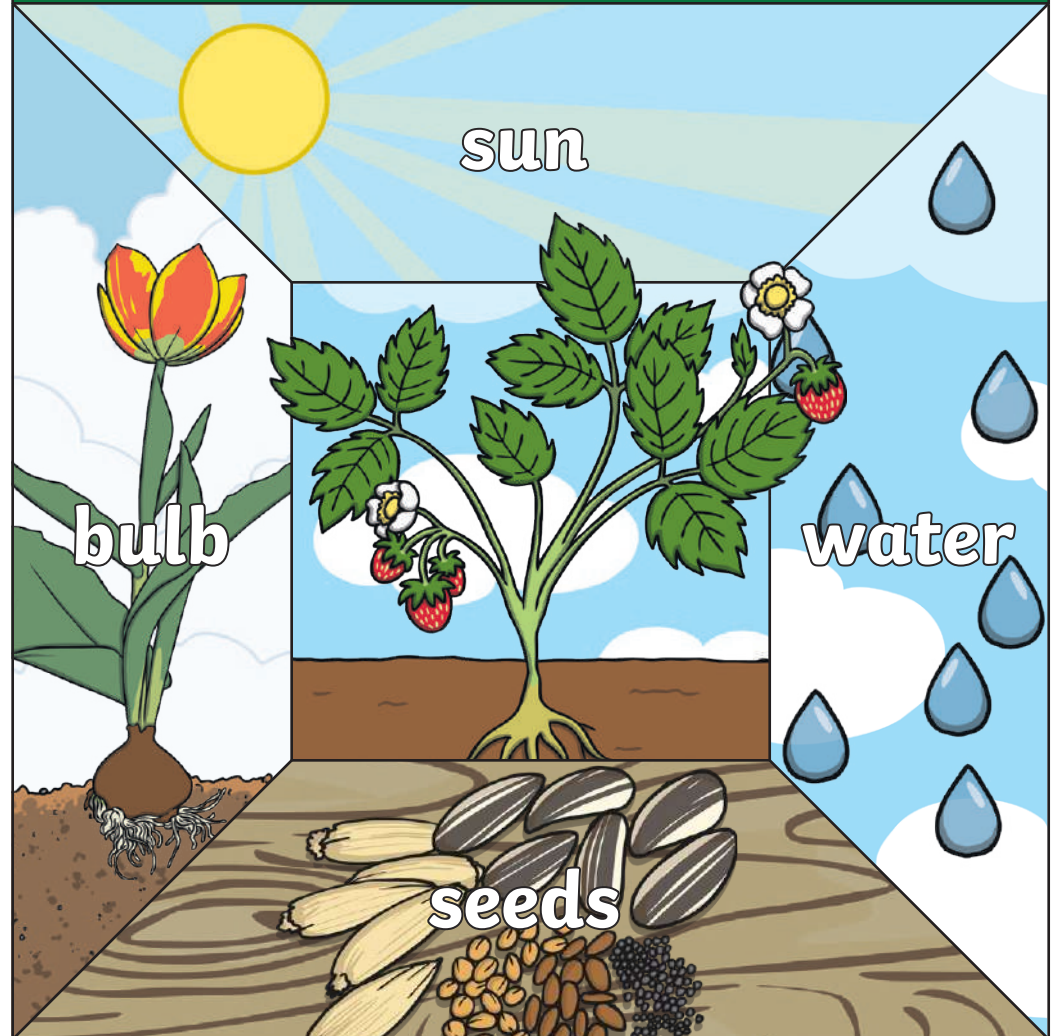
Temperature is how warm or cold something or somewhere is. Some plants like cooler **temperatures** and some like warmer **temperatures**.

nutrition

Food or nourishment. Plants make their own food in their leaves using **sunlight**.

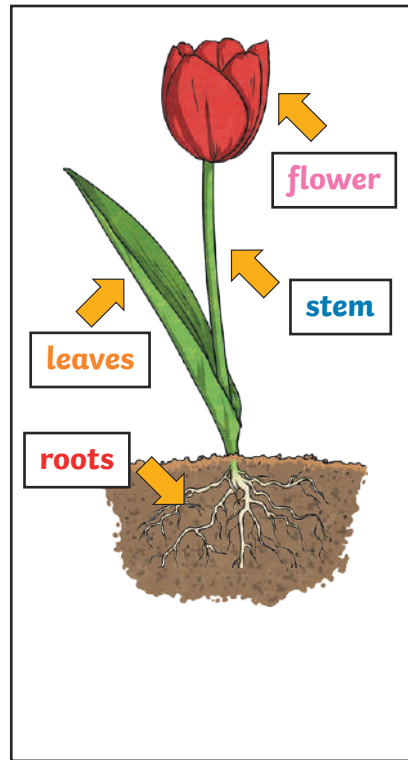


Key Knowledge



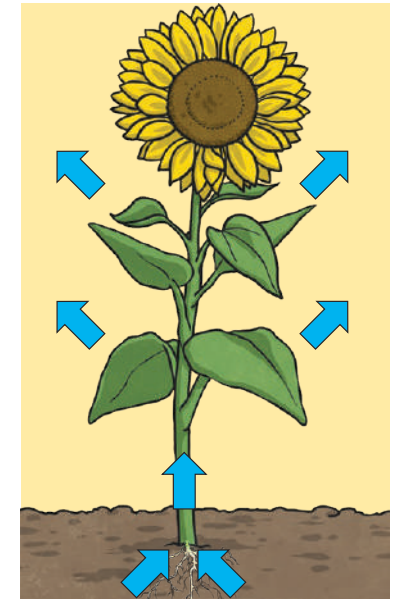
Key Vocabulary

roots	These anchor the plant into the ground and absorb water and nutrients from the soil.
stem	This holds the plant up and carries water and nutrients from the soil to the leaves . A trunk is the stem of a tree.
leaves	These make food for the plant using sunlight and carbon dioxide from the air.
flowers	These make seeds to grow into new plants. Their petals attract pollinators to the plant.
nutrients	These substances are needed by living things to grow and survive. Plants get nutrients from the soil and also make their own food in their leaves .
evaporation	When a liquid turns into a gas.



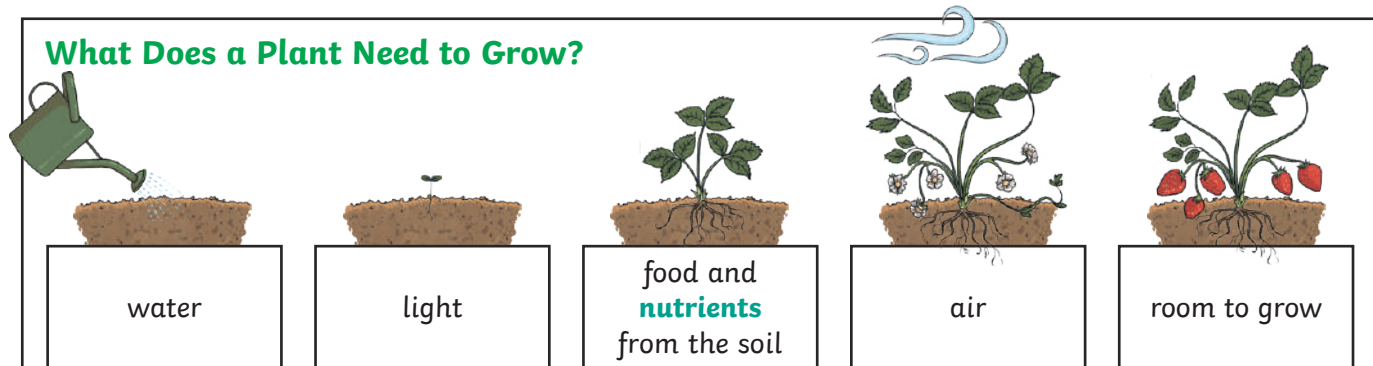
How Water Moves through a Plant

1. The **roots** absorb water from the soil.
2. The **stem** transports water to the **leaves**.
3. Water **evaporates** from the **leaves**.
4. This **evaporation** causes more water to be sucked up the **stem**.



The water is sucked up the **stem** like water being sucked up through a straw.

What Does a Plant Need to Grow?

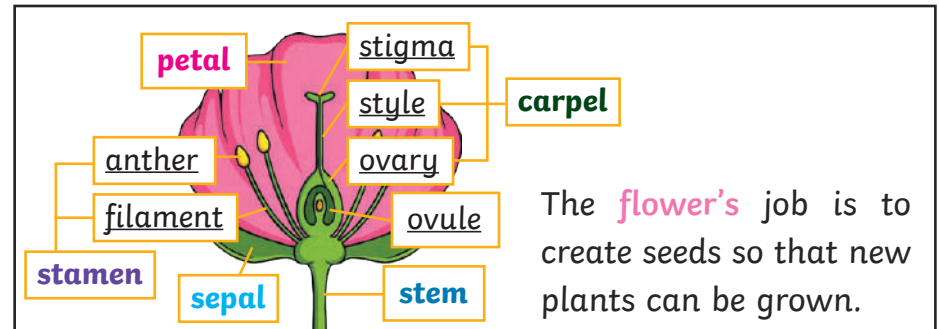


Different plants vary in how much of these things they need. For example, cacti can survive in areas with little water, whereas water lilies need to live in water.

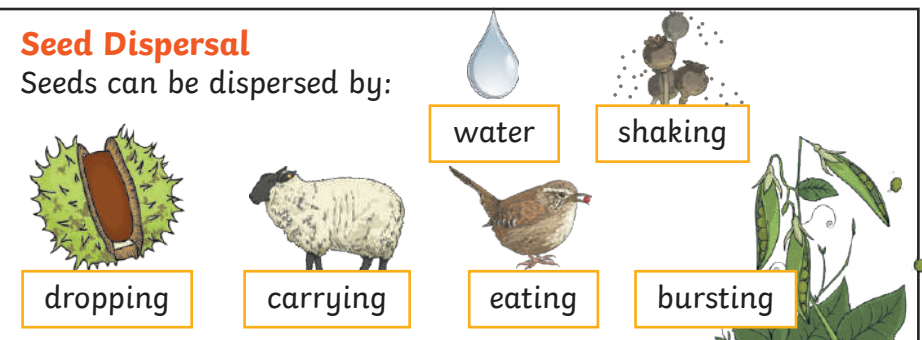
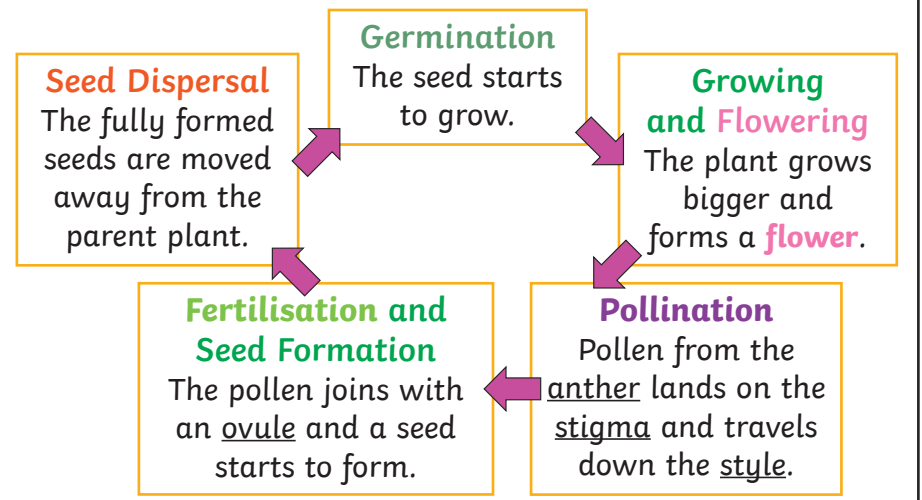
To look at all the planning resources linked to the Plants unit, [click here](#).

Key Vocabulary

fertilisation	When the male and female parts of the flower have mixed in order to make seeds for new plants.
petal	The brightly coloured part of the flower that attracts insects to pollinate the plant.
stamen	The male parts of the flower . The stamen is made up of the anther and the filament. The filament's job is to hold up the anther. The job of the anther is to make the pollen.
carpel (pistil)	The female parts of the flower . Made up of the stigma, style and ovary. The job of the style is to hold up the stigma. The stigma collects the pollen when a pollinator brushes by it. The ovary contains the ovules, which are the part of the flower that gets fertilised and eventually becomes the new seed.
sepal	Leaf-like structures that protect the flower and petals before they open out.
pollination	When pollen (a fine powdery substance produced by a flowering plant) is moved from the male anther of a flower to the female stigma.
pollinator	Animals or insects which carry pollen between plants. Examples include birds, bees and bats.
germination	When a seed starts to grow.
seed dispersal	A method of moving the seeds away from the parent plant so that the seeds have the best chance of survival.



Life Cycle of a Flowering Plant

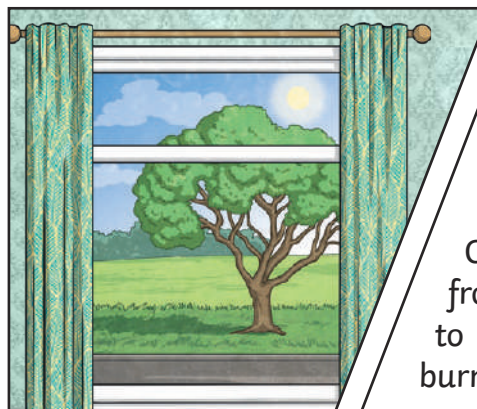


Key Vocabulary

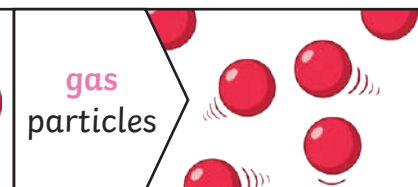
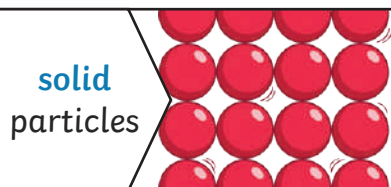
materials	The substance that something is made out of, e.g. wood, plastic, metal.
solids	One of the three states of matter. Solid particles are very close together, meaning solids , such as wood and glass, hold their shape.
liquids	This state of matter can flow and take the shape of the container because the particles are more loosely packed than solids and can move around each other. Examples of liquids include water and milk.
gases	One of the three states of matter. Gas particles are further apart than solid or liquid particles and they are free to move around. A gas fills its container, taking both the shape and the volume of the container. Examples of gases are oxygen and helium.
melting	The process of heating a solid until it changes into a liquid .
freezing	When a liquid cools and turns into a solid .
evaporating	When a liquid turns into a gas or vapour.
condensing	When a gas , such as water vapour, cools and turns into a liquid .

Key Knowledge

Different **materials** are used for particular jobs based on their properties: electrical **conductivity**, flexibility, hardness, **insulators**, magnetism, solubility, thermal **conductivity**, **transparency**.



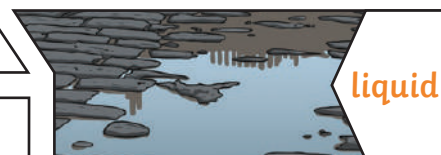
For example, glass is used for windows because it is hard and **transparent**. Oven gloves are made from a thermal **insulator** to keep the heat from burning your hand.



Changes of State



The **solid** melts.



The **liquid** freezes.



The **gas** condenses.



The **liquid** evaporates.

Key Vocabulary

conductor

A **conductor** is a material that heat or electricity can easily travel through. Most metals are both thermal **conductors** (they **conduct** heat) and electrical **conductors** (they **conduct** electricity).

insulator

An **insulator** is a material that does not let heat or electricity travel through them. Wood and plastic are both thermal and electrical **insulators**.

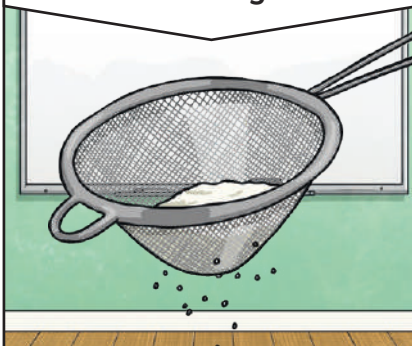
transparency

A **transparent** object lets light through so the object can be looked through, for example glass or some plastics.

Key Knowledge

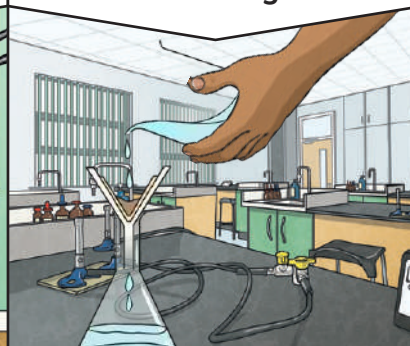
Reversible changes, such as mixing and dissolving **solids** and **liquids** together, can be reversed by:

Sieving



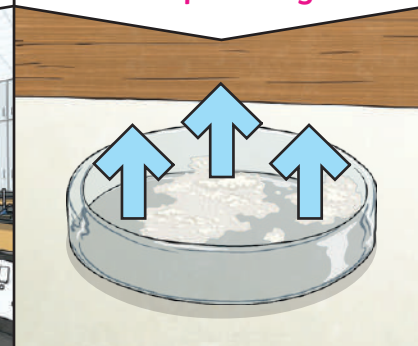
Smaller **materials** are able to fall through the holes in the sieve, separating them from larger particles.

Filtering



The **solid** particles will get caught in the filter paper but the **liquid** will be able to get through.

Evaporating

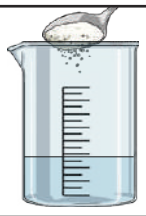


The **liquid** changes into a **gas**, leaving the **solid** particles behind.

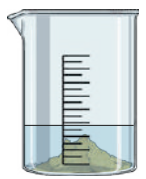
Dissolving

A solution is made when **solid** particles are mixed with **liquid** particles. **Materials** that will dissolve are known as soluble. **Materials** that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve.

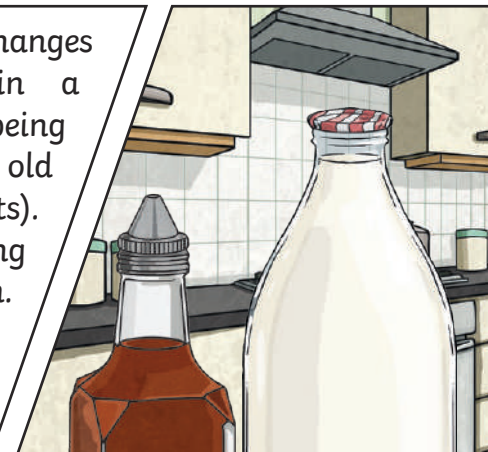
Sugar is a soluble **material**.



Sand is an insoluble **material**.



Irreversible changes often result in a new product being made from the old **materials** (reactants). For example, burning wood produces ash. Mixing vinegar and milk produces casein plastic.



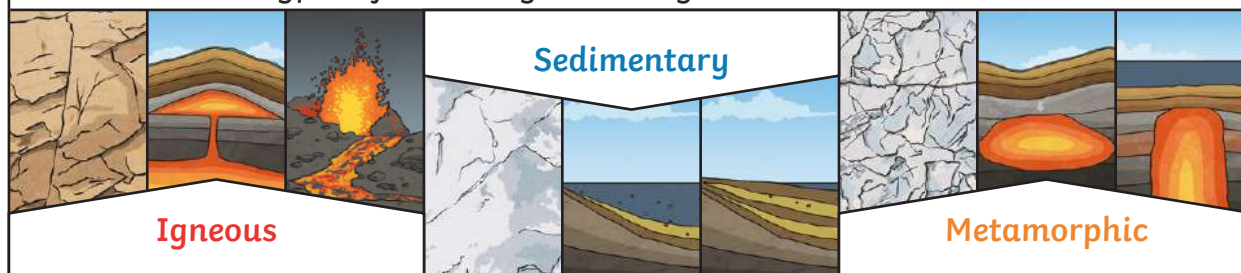
To look at all the planning resources linked to the Properties and Changes of Materials unit, [click here](#).

Key Vocabulary

igneous rock	Rock that has been formed from magma or lava .
sedimentary rock	Rock that has been formed by layers of sediment being pressed down hard and sticking together. You can see the layers of sediment in the rock.
metamorphic rock	Rock that started out as igneous or sedimentary rock but changed due to being exposed to extreme heat or pressure.
magma	Molten rock that remains underground.
lava	Molten rock that comes out of the ground is called lava .
sediment	Natural solid material that is moved and dropped off in a new place by water or wind, e.g. sand.
permeable	Allows liquids to pass through it.
impermeable	Does not allow liquids to pass through it.

Key Knowledge

There are three types of naturally occurring rock.



Natural Rocks			Human-Made Rocks
Igneous	Sedimentary	Metamorphic	
Obsidian	Chalk	Marble	Brick
			
Granite	Sandstone	Quartzite	Concrete
			
Basalt	Limestone	Slate	Coade Stone
			

Some words you might use to discuss the properties of a rock:

hard, soft, **permeable**, **impermeable**, durable (meaning resistant to weathering), high density, low density. Density measures how 'bulky' the rock is (how tightly packed the molecules are).

To look at all the planning resources linked to the Rocks unit, [click here](#).

Key Vocabulary

fossilisation	The process by which fossils are made.
palaeontology	The study of fossils.
erosion	When water, wind or ice wears away land.

Caves are formed when water **permeates** through the base rock and **erodes** some of the rock away. Over thousands of years these caves can become very large.

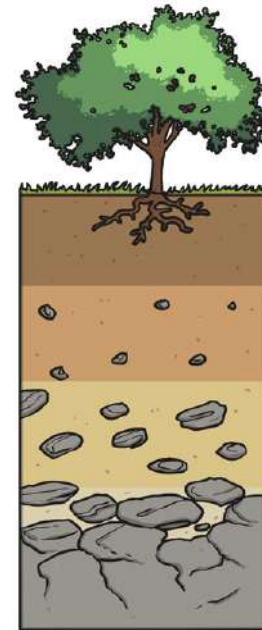


Key Knowledge

Soil is the uppermost layer of the Earth. It is a mixture of different things:

- minerals (the minerals in soil come from finely broken-down rock);
- air;
- water;
- organic matter (including living and dead plants and animals).

Soil



topsoil



subsoil



baserock



Fossilisation

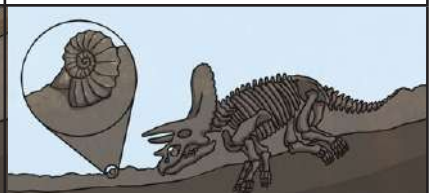
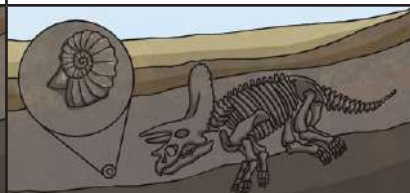
An animal dies. It gets covered with **sediments** which eventually become rock.

More layers of rock cover it. Only hard parts of the creature remain, e.g. bones, shells and teeth.

Over thousands of years, **sediment** might enter the mould to make a **cast fossil**. Bones may change to mineral but will stay the same shape.

Changes in sea level take place over a long period.

As **erosion** and weathering take place, eventually the fossil becomes exposed.



Key Vocabulary

seasons	There are four seasons each year, autumn , winter , spring and summer.
autumn	In autumn , the weather begins to get colder. The leaves start to fall from the trees. The amount of daylight becomes less. This means the daytimes are shorter and the night times are longer.
winter	In winter , the weather is much colder. Sometimes it is cold enough to freeze, leaving frost and ice on the ground. It sometimes snows. Many trees have bare branches as all their leaves have fallen off. The daytimes are the shortest in the year and the night times are the longest.
weather	The weather includes the temperature outside, the wind direction and strength, as well as rain, cloud, snow and sun.
daylight	Daylight is when it is light outside. The amount of daylight changes with each season .

autumn



winter



The Four Seasons

autumn

September
October
November

winter

December
January
February

spring

March
April
May

summer

June
July
August

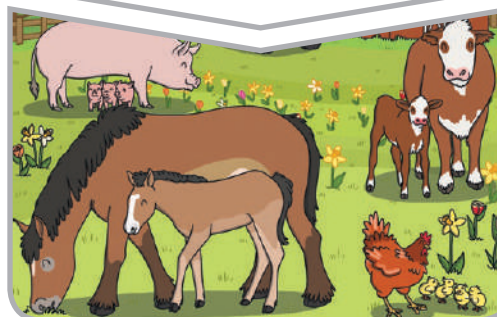
Daylight hours each month:

Month	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Hours of Daylight	13	11	9	8	8	10	12	14	15	16	16	14

Key Vocabulary

seasons	In places like the UK, there are four seasons each year, autumn, winter, spring and summer .
spring	In spring , the weather starts to get warmer. The leaves begin to grow on the trees and some trees may blossom (have flowers). Plants begin to grow and you may see baby animals like lambs around. The daytimes start to get longer.
summer	In summer , the weather gets hotter. The daytime is long and the nights are short. Summer has the longest days. The trees are full of leaves and there are lots of flowers, bees, butterflies and other insects.
weather	The weather includes the temperature outside, the wind direction and strength, as well as rain, cloud, snow and sun.
daylight	Daylight is when it is light outside. The amount of daylight changes with each season .

spring



summer



The Four Seasons

autumn
September
October
November

winter
December
January
February

spring
March
April
May

summer
June
July
August

Daylight hours each month:

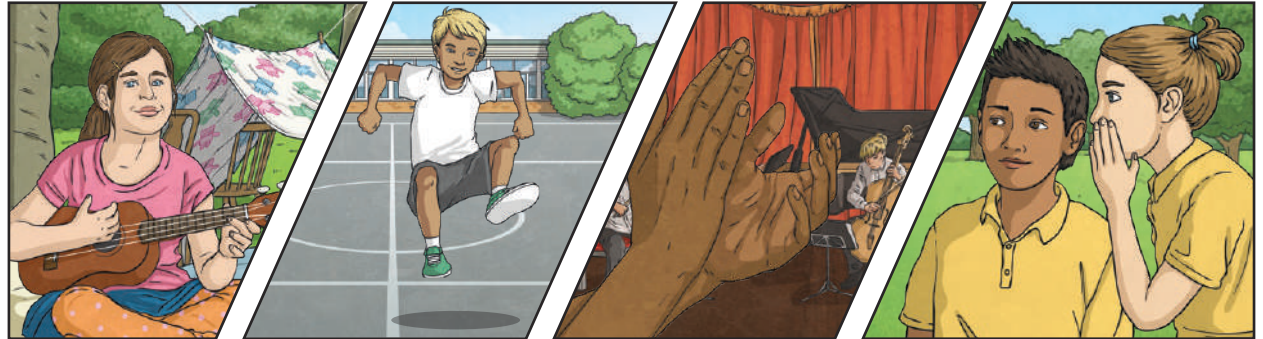
Month	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
Hours of Daylight	13	11	9	8	8	10	12	14	15	16	16	14

Key Vocabulary

vibration	A movement backwards and forwards.
sound wave	Vibrations travelling from a sound source.
volume	The loudness of a sound.
amplitude	The size of a vibration . A larger amplitude = a louder sound.
pitch	How low or high a sound is.

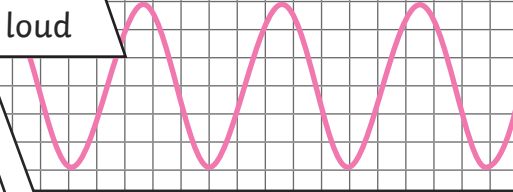
Key Knowledge

Sound is a type of energy. Sounds are created by **vibrations**. The louder the sound, the bigger the **vibration**.

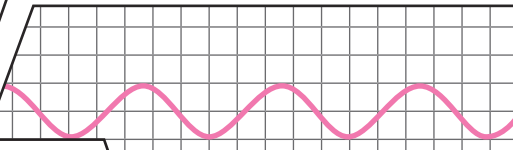


The size of the **vibration** is called the **amplitude**. Louder sounds have a larger **amplitude**, and quieter sounds have a smaller **amplitude**.

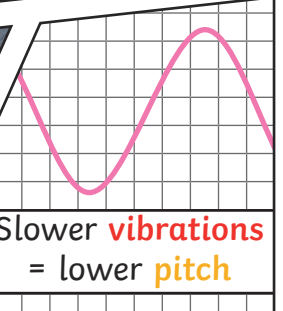
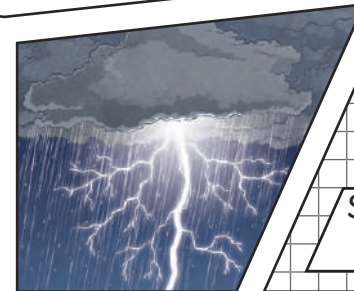
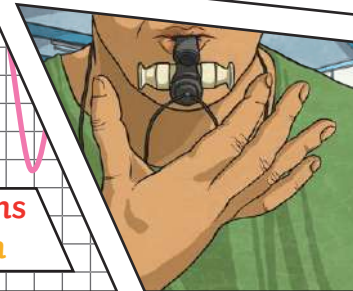
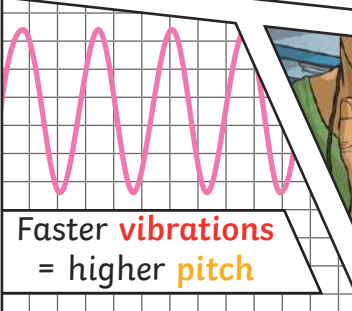
loud



quiet

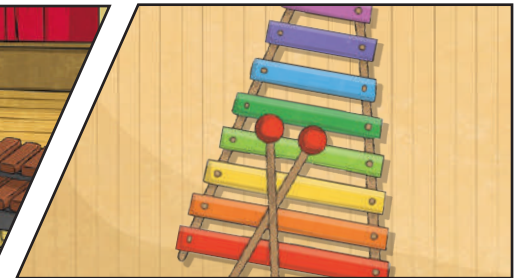


Pitch is a measure of how high or low a sound is. A whistle being blown creates a high-**pitched** sound. A rumble of thunder is an example of a low-**pitched** sound.



You can change the **pitch** of a sound in different ways depending on the type of instrument you are playing.

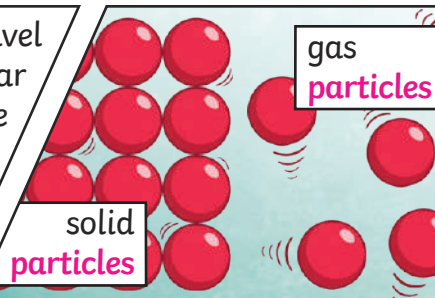
For example, if you are playing a xylophone, striking the smaller bars with the beater causes faster **vibrations** and so a higher **pitched** note. Striking the larger bars causes slower **vibrations** and produces a lower note.



Key Vocabulary

ear	An organ used for hearing.
particles	Solids, liquids and gases are made of particles . They are so small we are unable to see them.
distance	A measurement of length between two points.
soundproof	To prevent sound from passing.
absorb sound	To take in sound energy. Absorbent materials have the effect of muffling sound.
vacuum	A space where there is nothing. There are no particles in a vacuum.
eardrum	A part of the ear which is a thin, tough layer of tissue that is stretched out like a drum skin. It separates the outer ear from the middle and inner ear . Sound waves make the eardrum vibrate .

Sound energy can travel from **particle** to **particle** far easier in a solid because the **vibrating particles** are closer together than in other states of matter.



Key Knowledge

Sound can travel through solids, liquids and gases. Sound travels as a **wave**, **vibrating** the **particles** in the medium it is travelling in. Sound cannot travel through a **vacuum**.

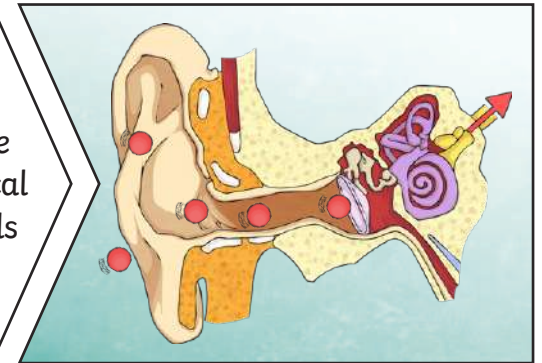
When you hit the drum, the drum skin **vibrates**. This makes the air **particles** closest to the drum start to **vibrate** as well.



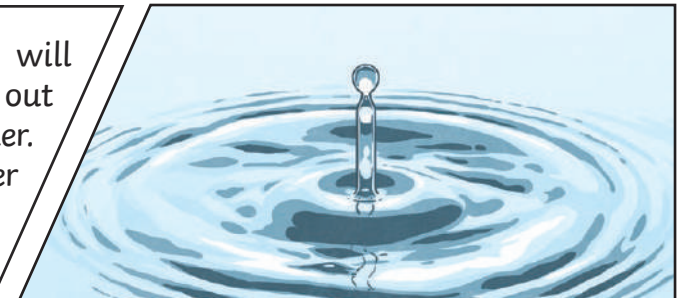
The **vibrations** then pass to the next air **particle**, then the next, then the next. This carries on until the air **particles** closest to your ear **vibrate**, passing the **vibrations** into your **ear**.



Inside your **ear**, the **vibrations** hit the **eardrum** and are then passed to the middle and then the inner **ear**. They are then changed into electrical signals and sent to your brain. Your brain tells you that you are hearing a sound.



If you throw a stone in a pond, it will produce ripples. As the ripples spread out across the pond, they become smaller. When sound **vibrations** spread out over a **distance**, the sound becomes quieter, just like ripples in a pond.

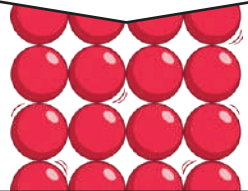
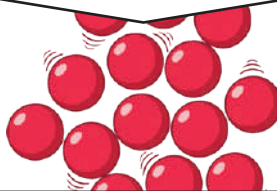
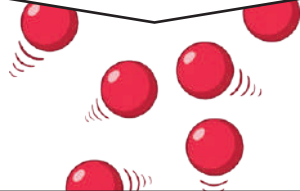


Key Vocabulary

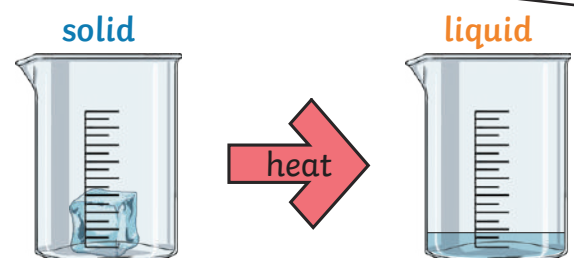
states of matter	Materials can be one of three states: solids , liquids or gases . Some materials can change from one state to another and back again.
solids	These are materials that keep their shape unless a force is applied to them. They can be hard, soft or even squashy. Solids take up the same amount of space no matter what has happened to them.
liquids	Liquids take the shape of their container. They can change shape but do not change the amount of space they take up. They can flow or be poured.
gases	Gases can spread out to completely fill the container or room they are in. They do not have any fixed shape but they do have a mass.
water vapour	This is water that takes the form of a gas . When water is boiled, it evaporates into a water vapour .

Key Knowledge

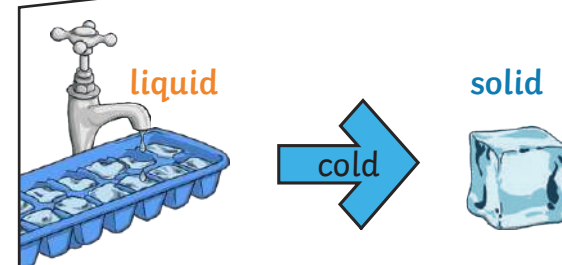
There are three states of matter.

Solid	Liquid	Gas
		
Particles in a solid are close together and cannot move. They can only vibrate.	Particles in a liquid are close together but can move around each other easily.	Particles in a gas are spread out and can move around very quickly in all directions.

When water and other **liquids** reach a certain temperature, they change state into a **solid** or a **gas**. The temperatures that these changes happen at are called the boiling, **melting** or **freezing** point.



If a **solid** is heated to its **melting** point, it **melts** and changes to a **liquid**. This is because the particles start to move faster and faster until they are able to move over and around each other.



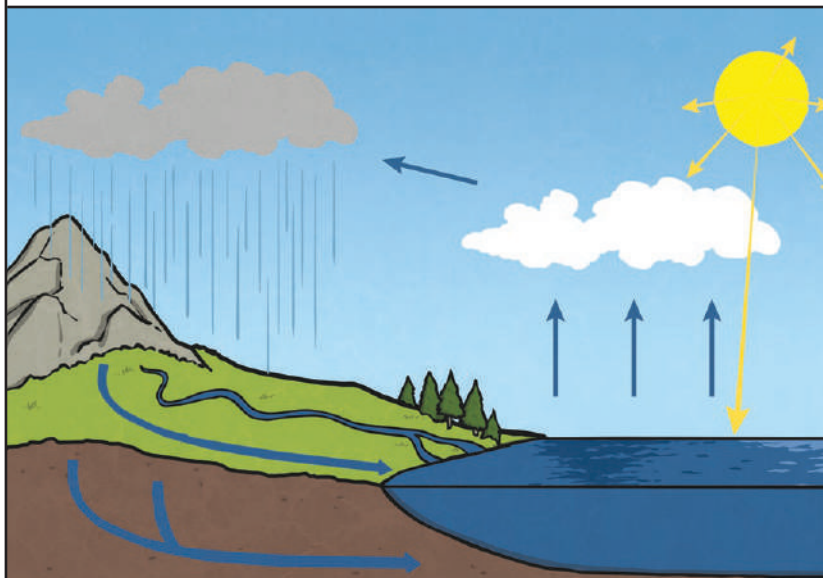
When **freezing** occurs, the particles in the **liquid** begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a **solid** structure.

To look at all the planning resources linked to the States of Matter unit, [click here](#).

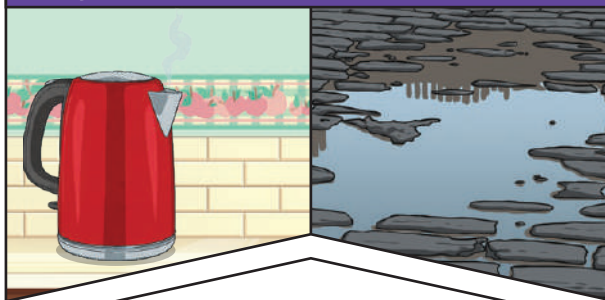
Key Vocabulary

melt	This is when a solid changes to a liquid .
freeze	Liquid turns to a solid during the freezing process.
evaporate	Turn a liquid into a gas .
condense	Turn a gas into a liquid .
precipitation	Liquid or solid particles that fall from a cloud as rain, sleet, hail or snow.

Condensation and **evaporation** occur within the water cycle.



Evaporation



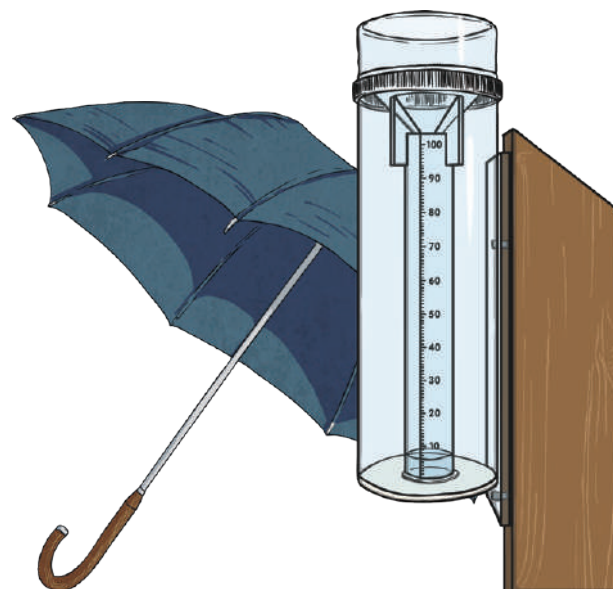
Evaporation occurs when water turns into **water vapour**. This happens very quickly when the water is hot, like in a kettle, but it can also happen slowly, like a puddle **evaporating** in the warm air.

Condensation



Condensation is when **water vapour** is cooled down and turns into water. You can see this when droplets of water form on a window. The **water vapour** in the air cools when it touches the cold surface.

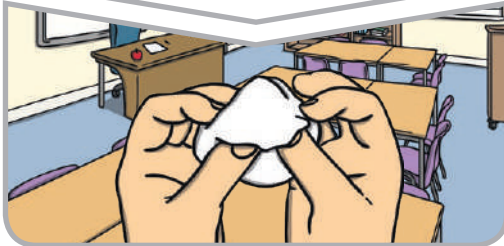
1. Water from lakes, puddles, rivers and seas is **evaporated** by the sun's heat, turning it into **water vapour**.
2. This **water vapour** rises, then cools down to form water droplets in clouds (**condensation**).
3. When the droplets get too heavy, they fall back to the earth as rain, sleet, hail or snow (**precipitation**).



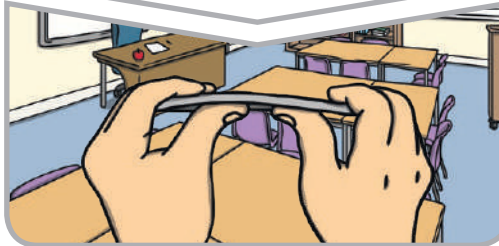
Key Vocabulary

materials	Materials are what objects are made from.
suitability	Suitability means having the properties which are right for a specific purpose.
properties	This is what a material is like and how it behaves (soft, stretchy, waterproof).

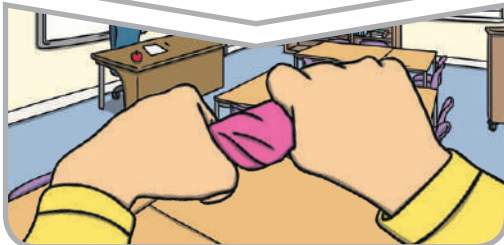
Squash an object by pushing both hands together.



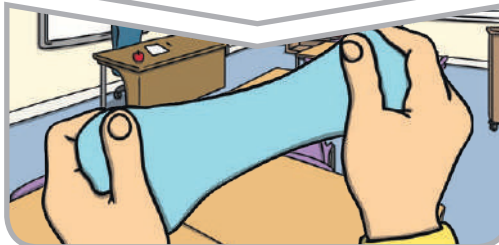
Bend an object by grabbing both ends of the object and bringing the ends inwards together.



Twist an object by turning your hands in opposite directions.



Stretch an object by pulling your hands slowly and gently apart.



Key Knowledge

Properties of Materials



wood:
hard, stiff,
strong, opaque,
can be carved
into any
shape.



glass:
waterproof,
transparent,
hard, smooth.



plastic:
waterproof,
strong, can
be made to be
flexible or stiff,
smooth or rough.



metal:
strong, hard,
easy to wash.



paper:
lightweight,
flexible.



cardboard:
strong, light,
stiff.



fabric:
soft, flexible,
hard-wearing,
can be stretchy,
warm, absorbent.



rubber:
hard-wearing,
elastic, flexible,
strong.

Key Knowledge

John McAdam	John McAdam was a Scottish engineer who experimented with using new materials to build roads, inventing a new process called ' macadamisation '.
John Dunlop	John Dunlop was a Scottish inventor who invented the air-filled rubber tyre. It was originally invented in 1887 to use with bicycles, and then became very useful when automobiles were developed.
Charles Macintosh	Charles Macintosh was a Scottish inventor and chemist who invented waterproof fabrics in 1818. The Mackintosh raincoat was introduced in 1824.
Macadamisation	Macadamisation was the name given to John McAdam's construction process of building roads. The name tarmac means a road made like this using tar.

People who developed new **materials**:

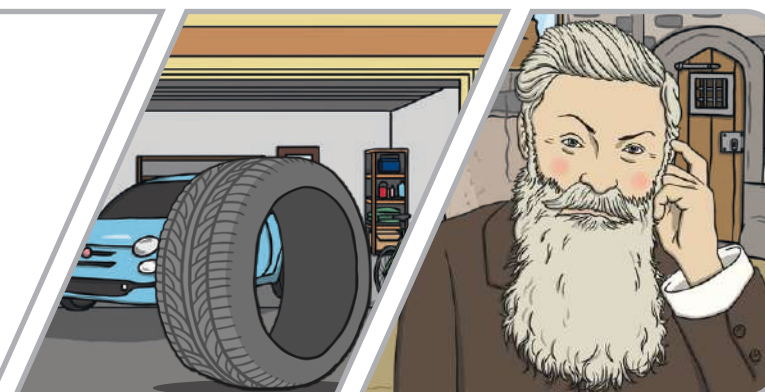
John McAdam's

process was so successful that roads were built in this way right across the world.



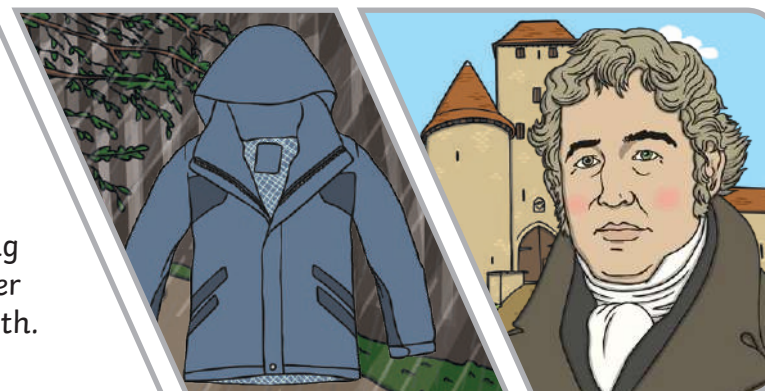
John Dunlop

originally used rubber to make tyres for his son's tricycle.



Charles Macintosh

invented the first waterproof fabric by painting a dissolved rubber solution onto cloth.



To look at all the planning resources linked to the Uses of Everyday Materials unit, [click here](#).