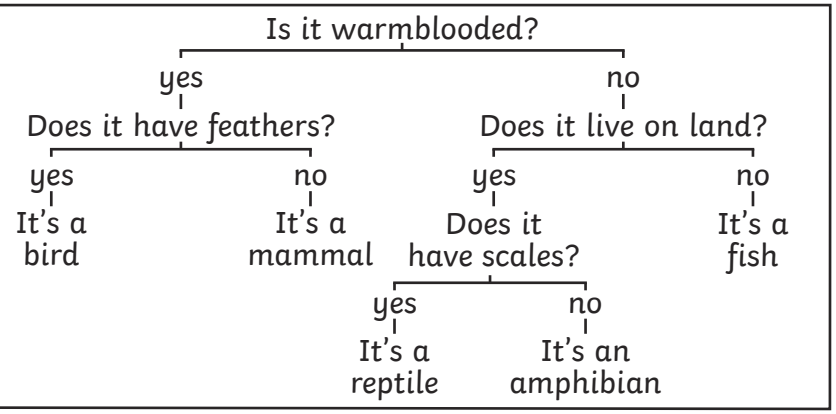
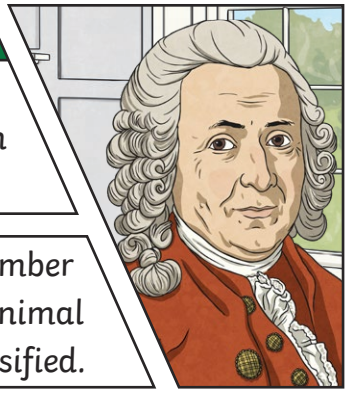
Key Vocabulary

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.



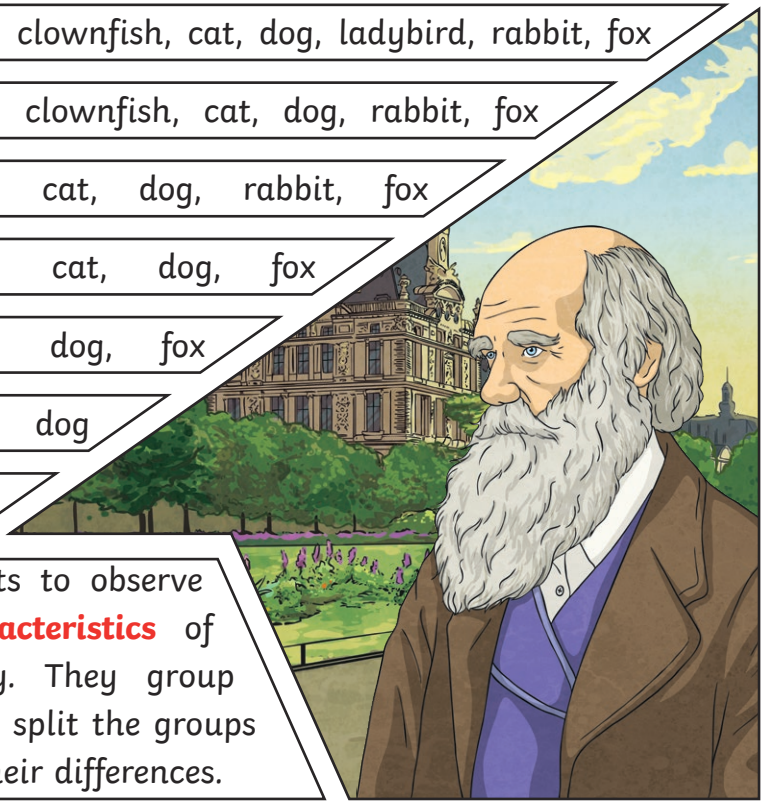
Classification



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: Animals	jackal, clownfish, cat, dog, ladybird, rabbit, fox
Phylum: Chorodata	jackal, clownfish, cat, dog, rabbit, fox
Class: Mammals	jackal, cat, dog, rabbit, fox
Order: Carnivore	jackal, cat, dog, fox
Family: Canidae	jackal, dog, fox
Genus: Canis	jackal, dog
Species: Lupus	dog



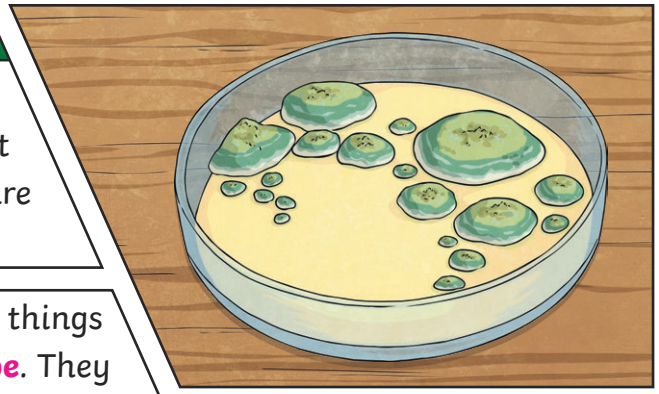
Each group allows scientists to observe and understand the **characteristics** of living things more clearly. They group similar things together then split the groups again and again based on their differences.

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.

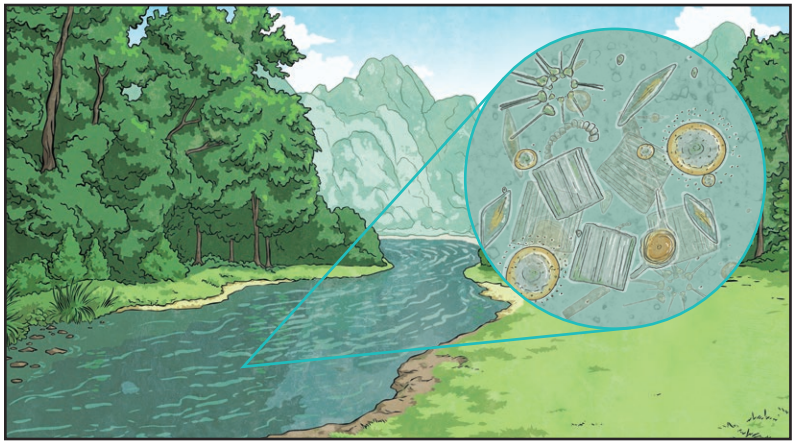
Helpful Microbes	Harmful Microbes
Bacteria – cheese	Bacteria – salmonella is a bacterium that can lead to food poisoning
Yeast – wine	Virus – chicken pox and flu are examples of viral diseases
Bacteria – yoghurt	Fungi – athlete's foot
Yeast – bread dough	Bacteria – plaque
Penicillium fungi - antibiotics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

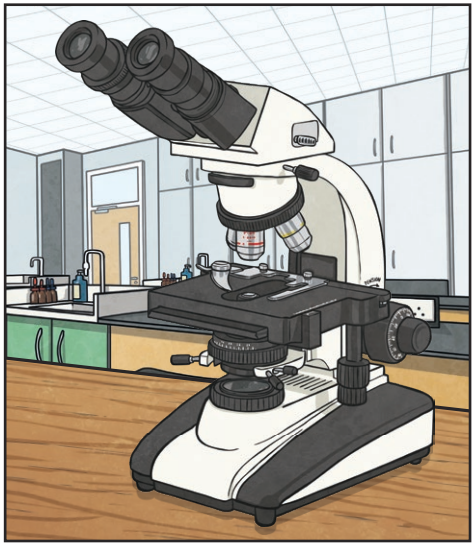
Microorganisms

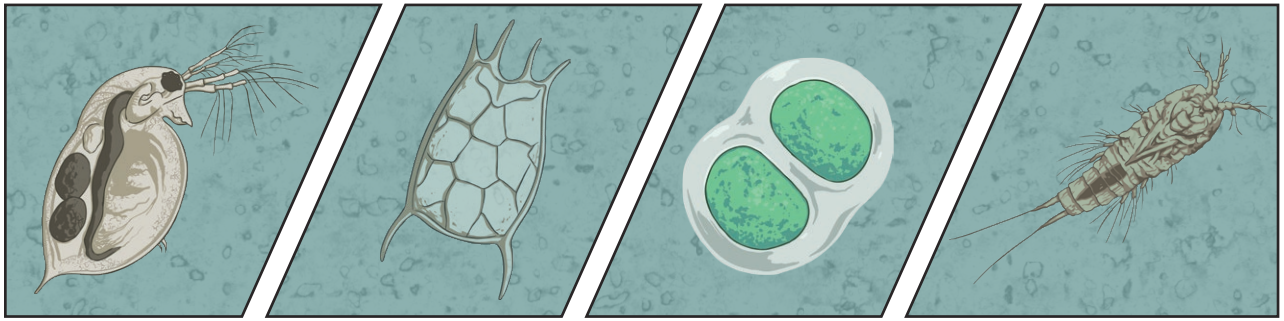
Microorganisms are viruses, bacteria, moulds and yeast. Some animals (dust mites) and plants (phytoplankton) are also microorganisms.



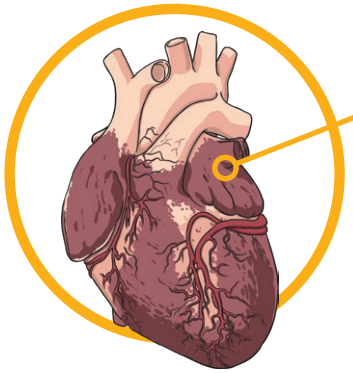
Microorganisms are very tiny living things that can only be seen using a microscope. They can be found in and on our bodies, in the air, in water and on objects around us.







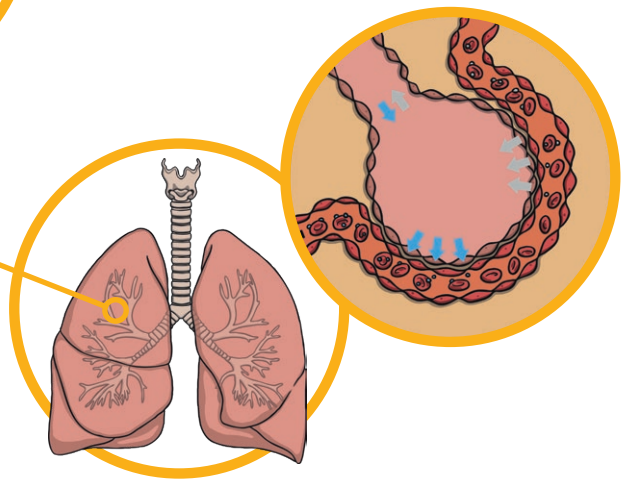
Key Knowledge



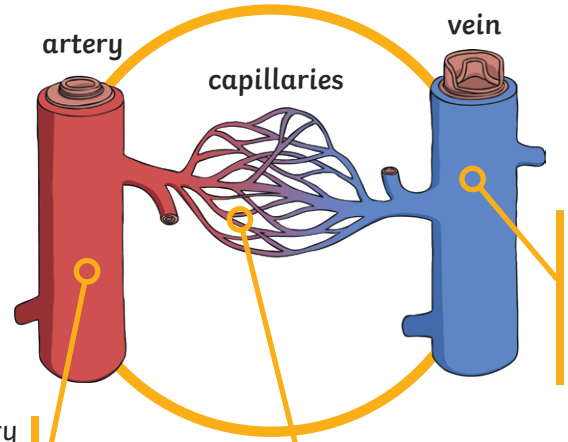
The **heart** pumps blood to the lungs to get oxygen.

It then pumps this oxygenated blood around the body.

Gas exchange takes place in the **alveoli** in the lungs.



Blood Vessels



Veins carry de-oxygenated blood toward the **heart**.

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

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.

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**.
pulmonary	Relating to the lungs.
alveoli	Tiny air sacs in the lungs where **gas exchange** takes place.
gas exchange	The process by which oxygen enters the bloodstream from the lungs and the lungs receive carbon dioxide from the blood to breathe out. This process happens in the **alveoli** and the capillaries around the **alveoli**.

To look at all the planning resources linked to the Animals Including Humans unit, click here.

Key Knowledge

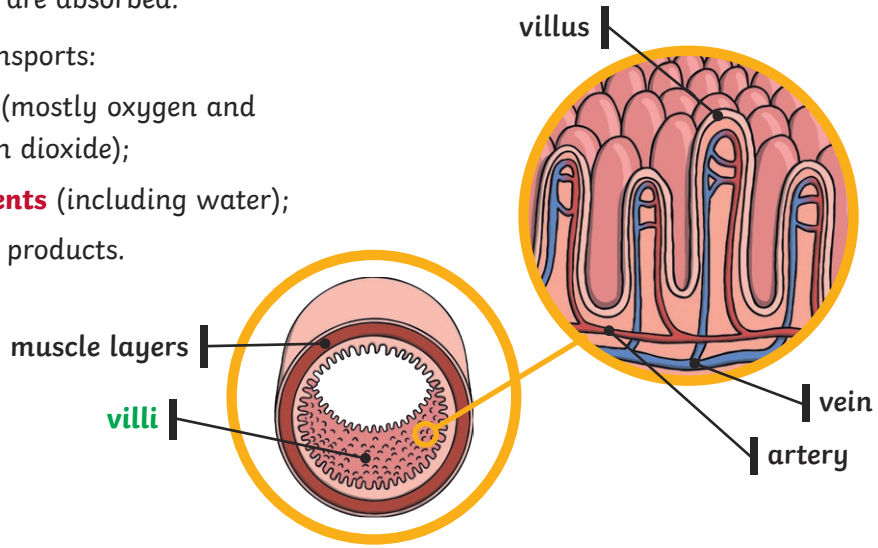
Inside the Small Intestine

The **nutrients** pass through the **villi** and are absorbed into the blood vessels.

Water is absorbed in the small intestine in exactly the same way as other **nutrients** are absorbed.

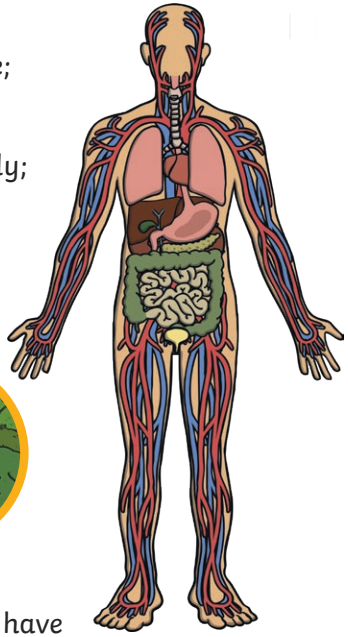
Blood transports:

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



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.



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

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

Key Vocabulary

villi	Structures in the small intestine which help absorb nutrients.
nutrients	Substances that animals need to stay alive and healthy.
kidneys	Organs which filter blood and make urine from waste and excess water.
liver	An organ which processes waste from the blood and produces bile.
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.

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.

To look at all the planning resources linked to the Evolution and Inheritance unit, click here.

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

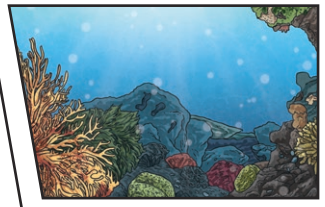
Eye colour is an example of an inherited trait, but so are things like hair colour, the shape of your earlobes and whether or not you can smell certain flowers.

Habitats

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

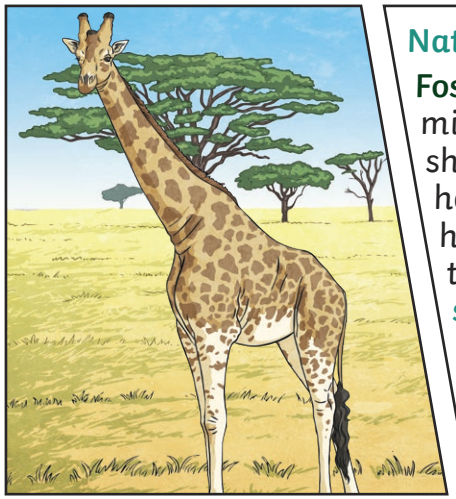
Environments

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



Key Vocabulary

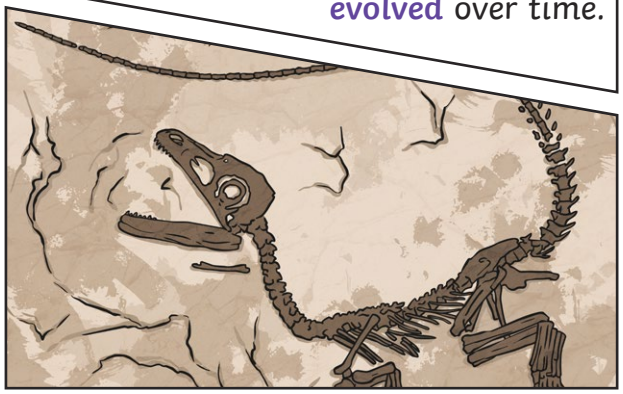
evolution	Adaptation over a very long time.
natural selection	The process where organisms that are better adapted to their environment tend to survive and produce more offspring.
fossil	The remains or imprint of a prehistoric plant or animal, embedded in rock and preserved.
adaptive traits	Genetic features 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.



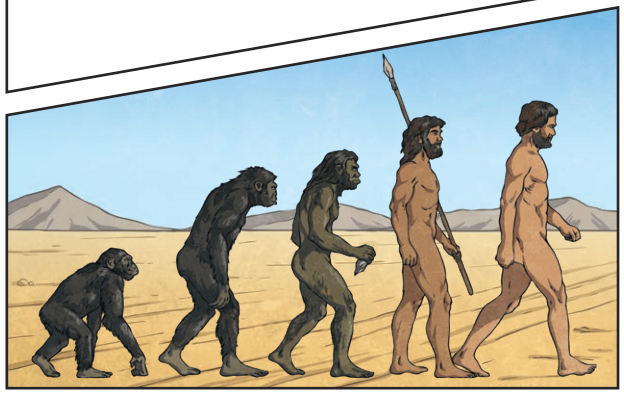
Natural Selection

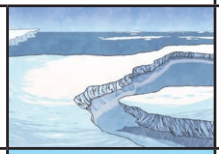
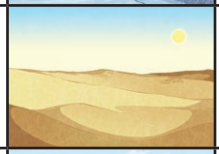
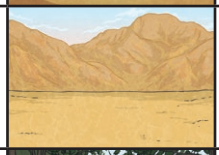
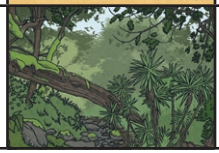
Fossils of giraffes from millions of years ago show that they used to have shorter necks. They have gradually **evolved** through **natural selection** to have longer necks so that they can reach the top leaves on taller trees.

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!

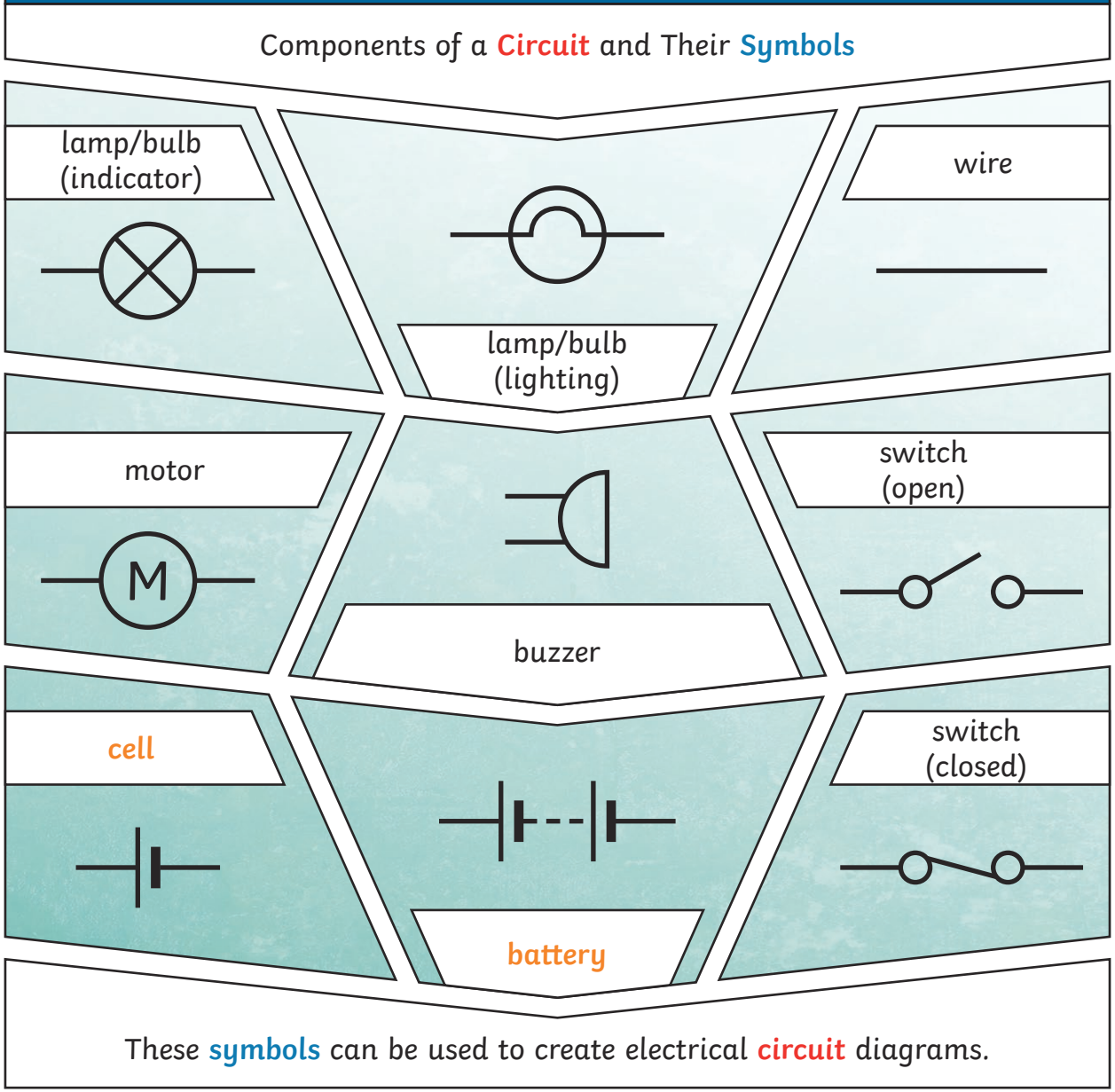


Living Things		Habitat		Adaptive Traits
polar bear		arctic		Its white fur enables it to camouflage in the snow.
camel		desert		It has wide feet to make it easier to walk in the sand.
cactus		desert		It stores water in its stem.
toucan		rainforest		Its narrow tongue allows it to eat small fruit and insects.

Key Vocabulary

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 energy as a chemical 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

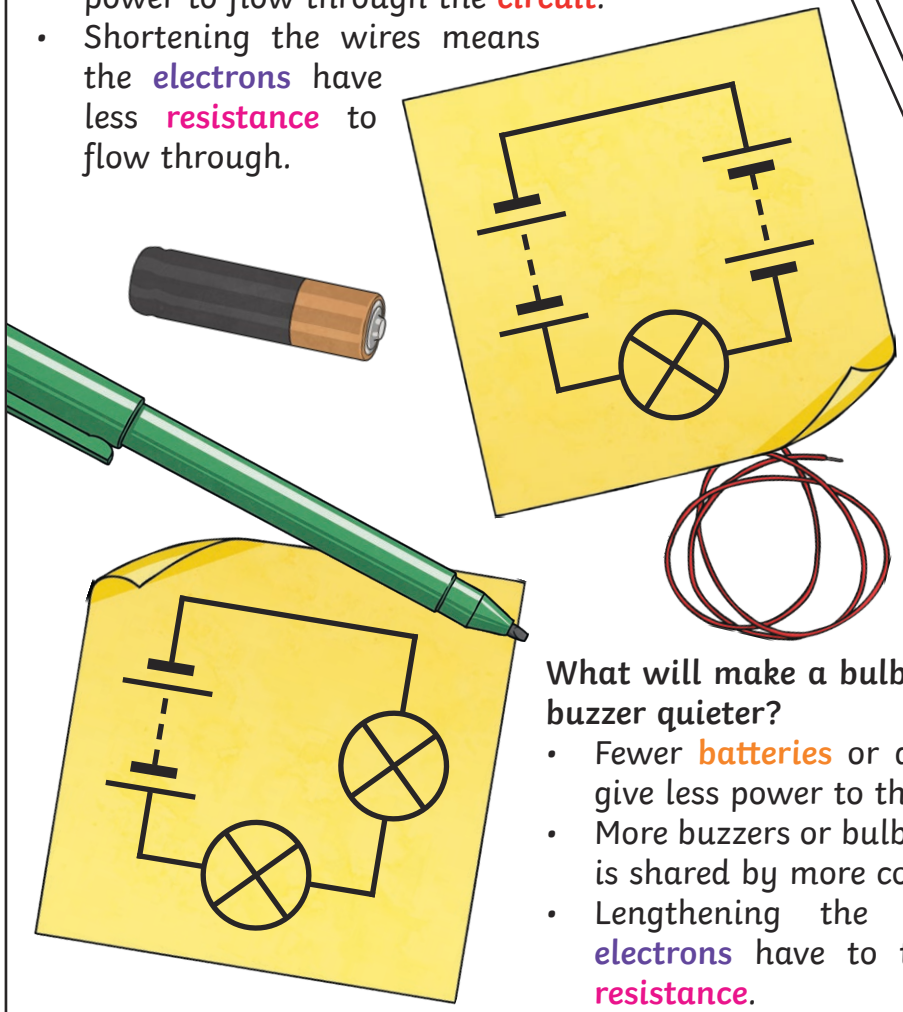


To look at all the planning resources linked to the Electricity unit, click here.

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.

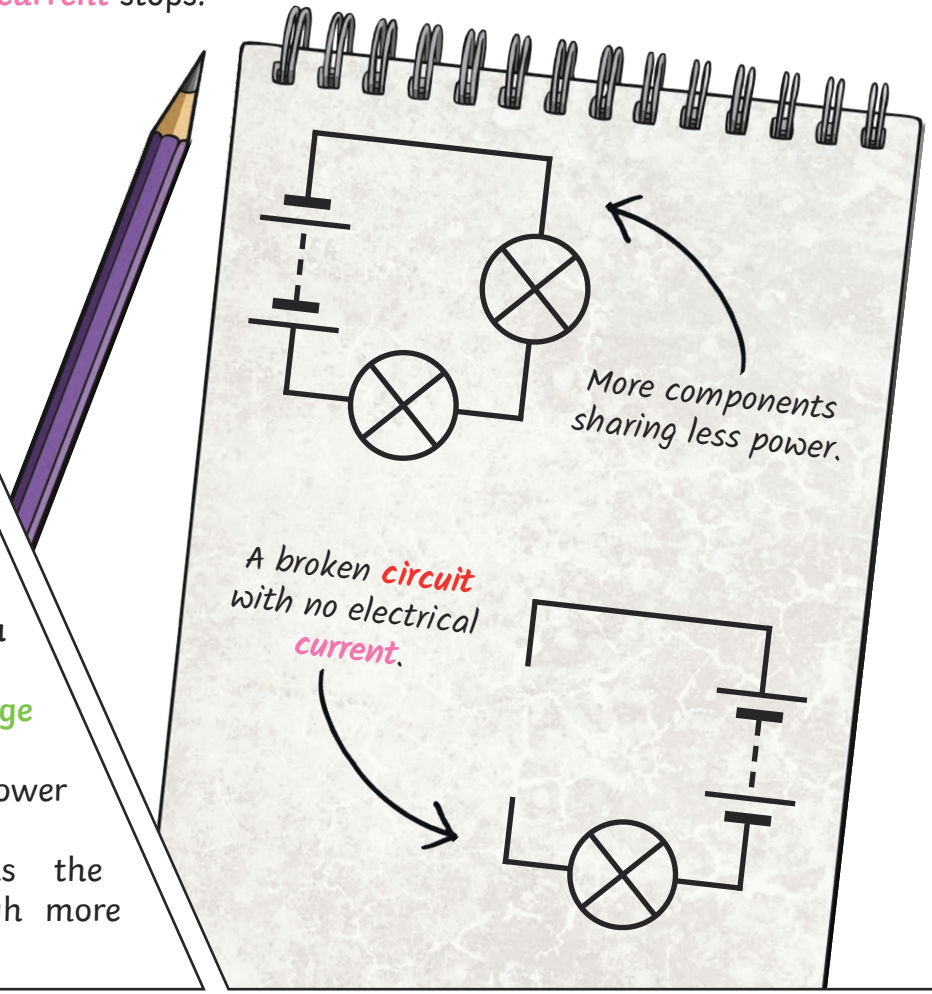


What will make a bulb dimmer or a buzzer quieter?

- 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.



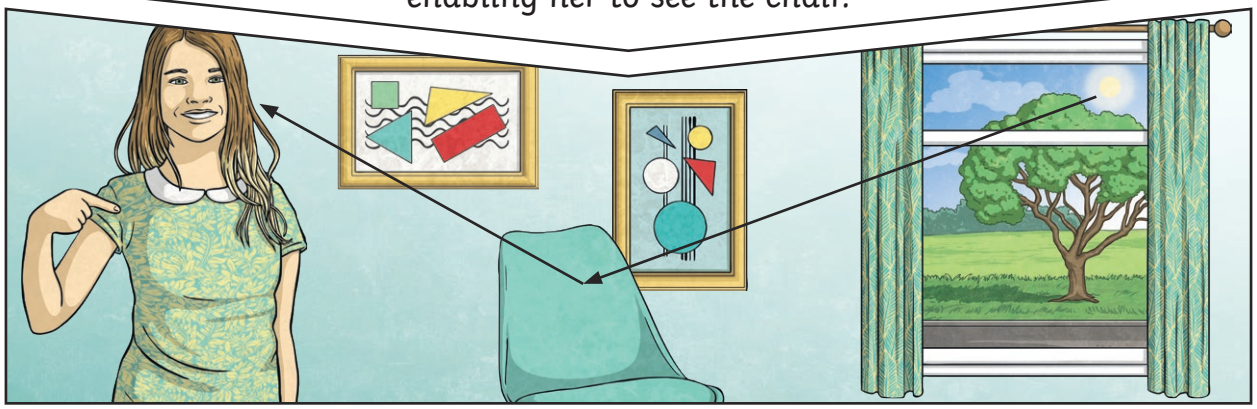
Key Vocabulary

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**.

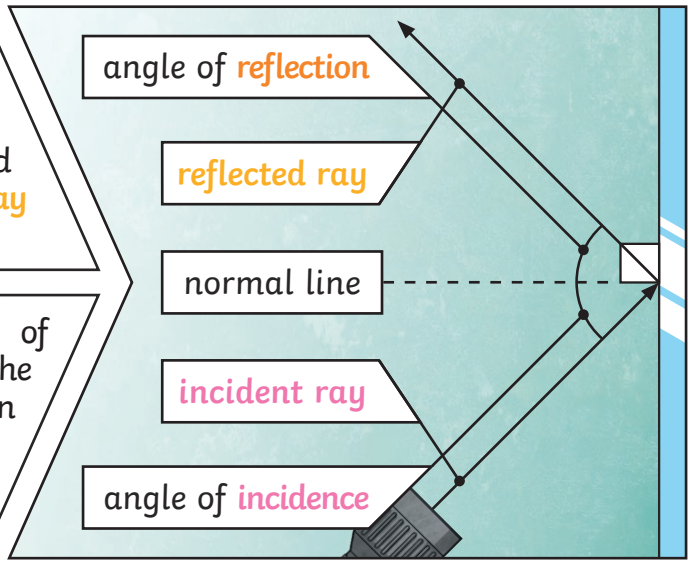
Light from the sun travels in a straight line and hits the chair. The **light** ray is then **reflected** off the chair and travels in a straight line to the girl's eye, enabling her to see the chair.



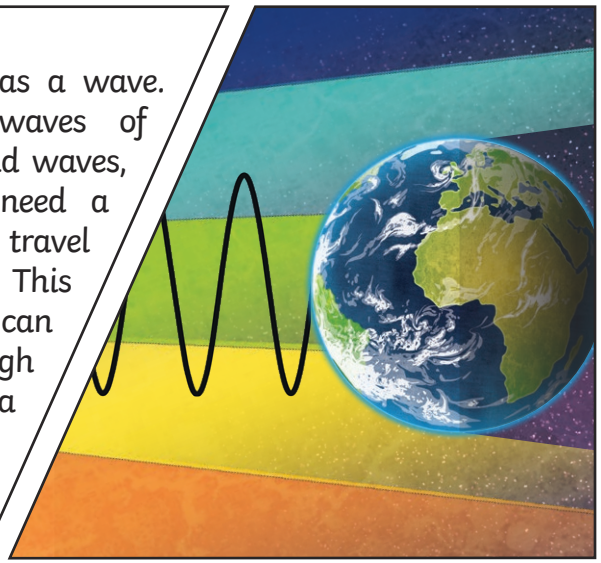
The law of reflection states that the angle of **incidence** is equal to the angle of **reflection**. Whenever **light** is **reflected** from a surface, it obeys this law.

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

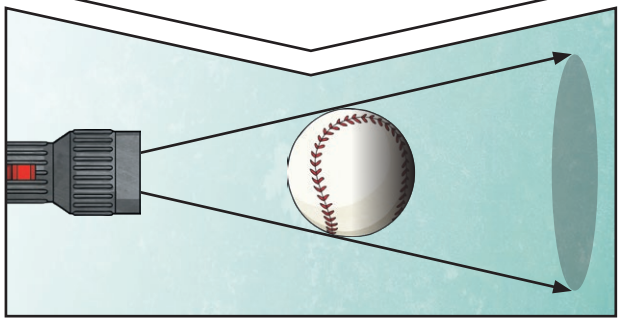
refraction	This is when **light** bends as it passes from one medium to another. E.g. **Light** bends when it moves from air into water.
visible spectrum	**Light** that is visible to the human eye. It is made up of a colour **spectrum**.
prism	A **prism** is a solid 3D shape with flat sides. The two 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.

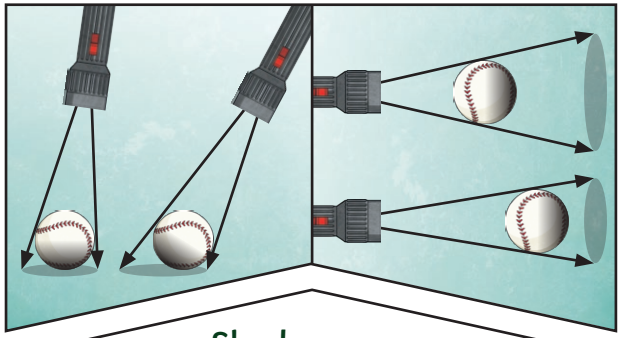
Key Knowledge

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**.