

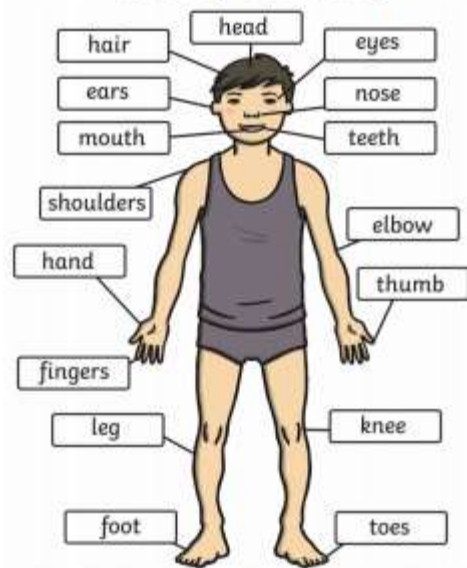


# Whitley Abbey Primary School

Hand in Hand We Learn











## Knowledge Organiser - Science – Animal Including Humans 1/2

### Parts of the body

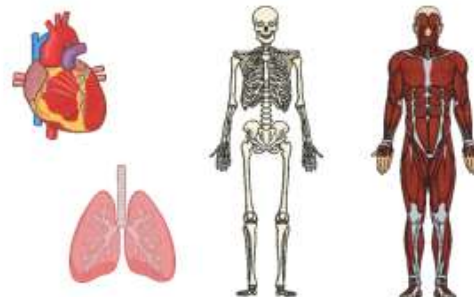


### The 5 Senses

Humans have five senses. The senses are linked to parts of the body.

Sense	Part of the body
 sight	 eyes
 smell	 nose
 touch	 hands, feet, etc.
 hearing	 ears
 taste	 tongue

How do you think exercise helps these parts of your body?



Exercise builds up your lungs so that they are using the oxygen well.

Exercise makes your bones and muscles stronger.

Your heart pumps faster when you are being active.

### Animal Groups

Animals are grouped together into '**families**' based on shared **properties**. There are 5 main animal groups.



**Mammals** – mammals have hair or fur. They give birth to live young. Mammals produce milk for their babies.



**Fish** – fish live in water. They have fins, scales and gills.



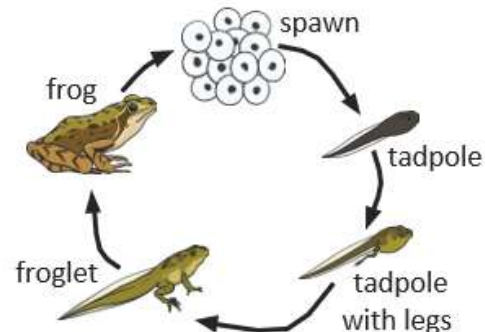
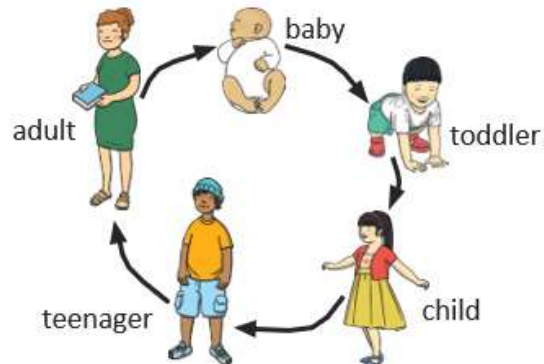
**Reptiles** – Reptiles have dry, scaly skin. They lay eggs on land.



**Amphibians** – Amphibians live on land or in water. They lay eggs in water.



**Birds** – Birds have 2 legs, wings and feathers. They have a beak or bill and hatch from eggs.



All living things **reproduce** and have **offspring**.

Some animals give birth to **live young**. Their offspring normally look like them when they are born.



Some animals lay eggs which hatch into live young. This **young** then develops into an **adult**.

When these eggs hatch, some animals look like their adult, e.g. birds and reptiles.

Other animals have offspring which do not look like them, e.g. fish and amphibians.







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## Knowledge Organiser - Science Materials and their properties –1/2

Key VOCABULARY	
<b>object</b>	A thing that can be used. For example a door, chair, car, table are all <b>objects</b> .
<b>MATERIAL</b>	<b>MATERIALS</b> are what an <b>object</b> is made from.
<b>HARD</b>	Not easily broken or bent.
<b>soft</b>	If something is <b>soft</b> , it is easy to cut, fold or change the shape of.
<b>stretchy</b>	Can be pulled to make it longer or wider without breaking.
<b>shiny</b>	Reflects light easily.
<b>dull</b>	Doesn't reflect light. Doesn't look bright or <b>shiny</b> .
<b>rough</b>	If something is <b>rough</b> , it feels and looks uneven or bumpy.
<b>smooth</b>	<b>Smooth objects</b> have no lumps or bumps.
<b>bendy</b>	<b>Bendy</b> things can be folded easily.
<b>not bendy</b>	If something is <b>not bendy</b> , it can't be folded easily.
<b>WATERproof</b>	If something is <b>WATERproof</b> , it keeps water out. It keeps things dry.
<b>not WATERproof</b>	<b>Not WATERproof MATERIALS</b> let water in.
<b>ABsorbent</b>	If something is <b>ABsorbent</b> , it soaks water up.
<b>not ABsorbent</b>	If something is <b>not ABsorbent</b> , it does not soak up water.
<b>TRANSPARENT</b>	<b>TRANSPARENT objects</b> can be seen through.
<b>OPAQUE</b>	<b>OPAQUE objects</b> can't be seen through.

### MATERIALS:



paper



brick



fabric



stone



water



glass



plastic



wood



metal

### Squashing, Bending, Twisting and Stretching



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.



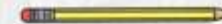
Stretch an object by pulling your hands slowly and gently apart.



Can you twist a ruler?



Can you squash a ruler?



Can you stretch a pencil?



Can you bend a pencil?





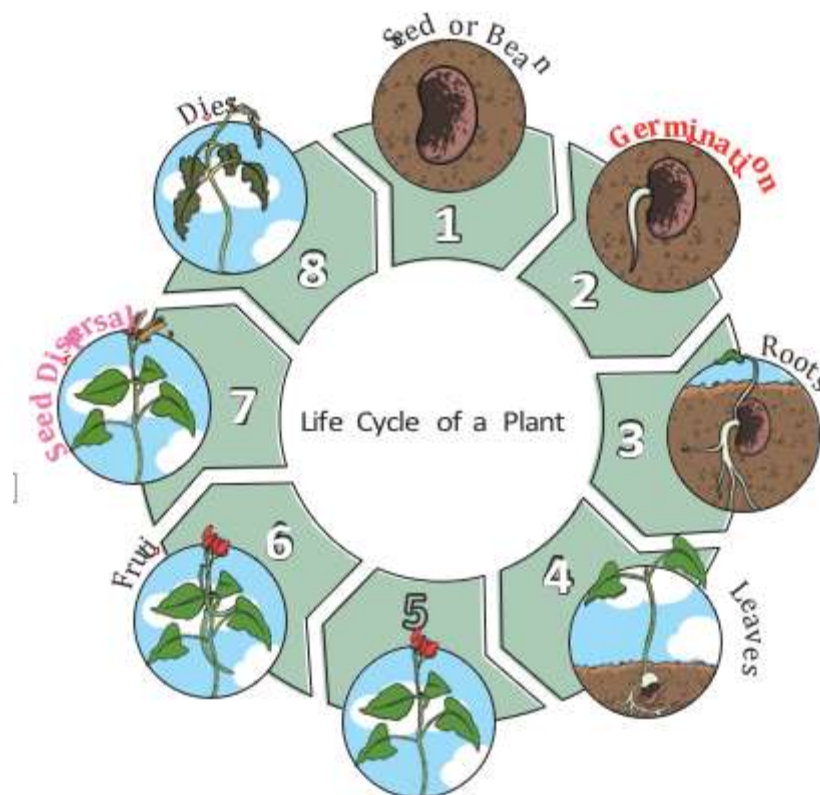


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## Knowledge Organiser - Science – Plants –1/2

Key VOCABULARY	
<b>roots</b>	<b>Roots</b> take in water and nutrients from the soil.
<b>stem</b>	The <b>stem</b> holds the plant up and carries the water and nutrients from the <b>roots</b> to the <b>LEAVES</b> and <b>flowers</b> .
<b>LEAVES</b>	<b>LEAVES</b> catch sunlight to make energy.
<b>flowers</b>	<b>Flowers</b> attract insects and birds.
<b>petals</b>	<b>Petals</b> are the <u>colourful</u> part of the <b>flower</b> .
<b>fruit</b>	<b>Fruit</b> contains the plant's <b>seeds</b> . Sometimes humans try to grow <b>fruit</b> without <b>seeds</b> because it's easier to eat.
<b>seed</b>	<b>Seeds</b> grow into new plants.
<b>bulb</b>	<b>Bulbs</b> grow into new plants.
<b>sunlight</b>	All plants need light from the sun to grow well. Some plants need lots of <b>sunlight</b> . Some plants only need a little <b>sunlight</b> .
<b>Water</b>	All plants need <b>Water</b> to grow. Without <b>Water</b> , <u>seeds</u> and bulbs will not <b>GERMINATE</b> .
<b>temperature</b>	<b>Temperature</b> is how warm or cold <u>something</u> or <u>somewhere</u> is. <u>Some plants</u> like cooler <b>temperatures</b> and some like warmer <b>temperatures</b> .
<b>nutrition</b>	Food or nourishment. Plants make their own food in their leaves using <b>sunlight</b> .



### Wild PLANTS



dandelion



daisy



buttercup



nettles



ivy



dog rose



clover



brambles

### Trees

cedar



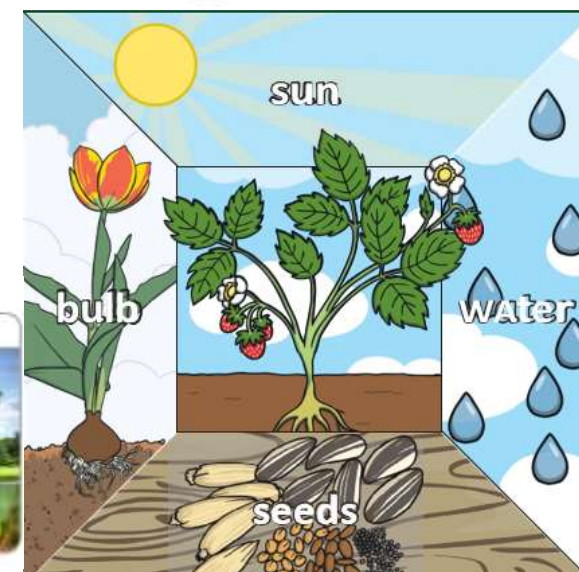
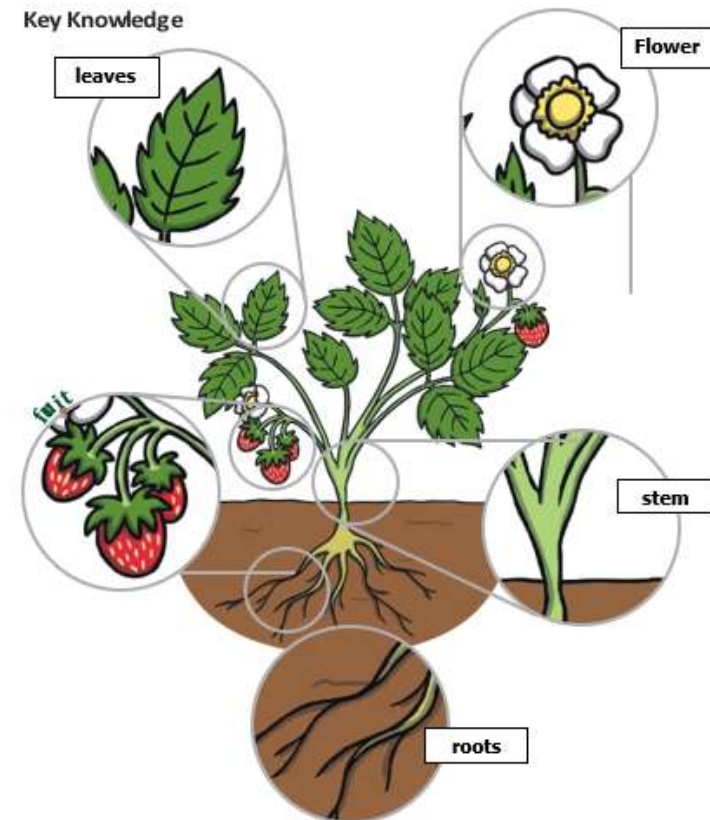
horse chestnut



oak



### Key Knowledge





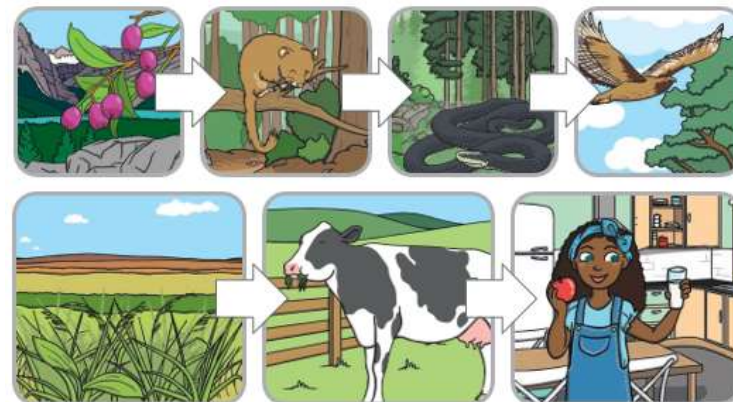


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## Knowledge Organiser - Living Things and habitats –1/2

**Food CHAINS.** The arrows mean 'is eaten by'.



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

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

### Key Knowledge



living



DEAD



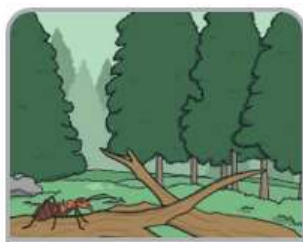
never living



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





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## Knowledge Organiser - Seasons-1/2

### Key Vocabulary

<b>seasons</b>	There are four <b>seasons</b> each year, <b>autumn</b> , <b>winter</b> , spring and summer.
<b>autumn</b>	In <b>autumn</b> , the <b>weather</b> begins to get colder. The leaves start to fall from the trees. The amount of <b>daylight</b> becomes less. This means the daytimes are shorter and the night times are longer.
<b>winter</b>	In <b>winter</b> , the <b>weather</b> 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.
<b>weather</b>	The <b>weather</b> includes the temperature outside, the wind direction and strength, as well as rain, cloud, snow and sun.
<b>daylight</b>	<b>Daylight</b> is when it is light outside. The amount of <b>daylight</b> changes with each <b>season</b> .

### Deciduous



They lose their leaves in Autumn.

### Evergreen



They stay leafy all year round.

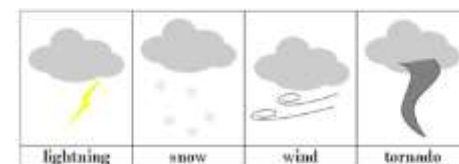
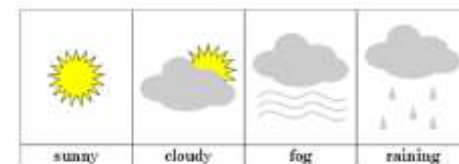
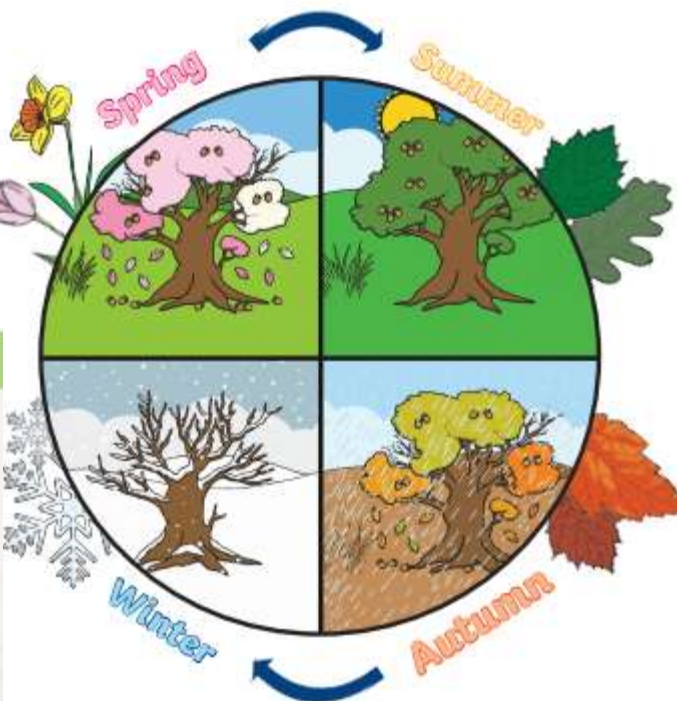
There are two types of tree:



deciduous



evergreen



**Daylight** hours each month:

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





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## Knowledge Organiser - –Rocks - 3

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

Key Knowledge			
There are three types of naturally occurring rock.			
NATURAL Rocks			
<b>Igneous</b>	<b>Sedimentary</b>	<b>Metamorphic</b>	<b>HUMAN-MADE Rocks</b>
Obsidian	Chalk	Marble	Brick
Granite	Sandstone	Quartzite	Concrete
Basalt	Limestone	Slate	Coade Stone

Key Knowledge	
Soil	
<p>Soil is the uppermost layer of the Earth. It is a mixture of different things:</p> <ul style="list-style-type: none"> <li>minerals (the minerals in soil come from finely broken-down rock);</li> <li>air;</li> <li>water;</li> <li>organic matter (including living and dead plants and animals).</li> </ul>	

Key VOCABULARY	
<b>FOSSILISATION</b>	The process by which fossils are made.
<b>PALAEONTOLOGY</b>	The study of fossils.
<b>erosion</b>	When water, wind or ice wears away land.

<p>Caves are formed when water <b>PERMEATES</b> through the base rock and <b>erodes</b> some of the rock away. Over thousands of years these caves can become very large.</p>	
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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).

<p><b>FOSSILISATION</b></p> <p>An animal dies. It gets covered with <b>sediments</b> which eventually become rock.</p>	<p>More layers of rock cover it. Only <b>hard parts</b> of the creature remain, e.g. bones, shells and teeth.</p>	<p>Over <b>thousands</b> of years, <b>sediment</b> might enter the <b>mould</b> to make a <b>CAST fossil</b>. <b>Bones may</b> change to mineral but will stay the same shape.</p>	<p>Changes in sea level take place over a long period.</p>	<p>As <b>erosion</b> and weathering take place, eventually the fossil becomes exposed.</p>





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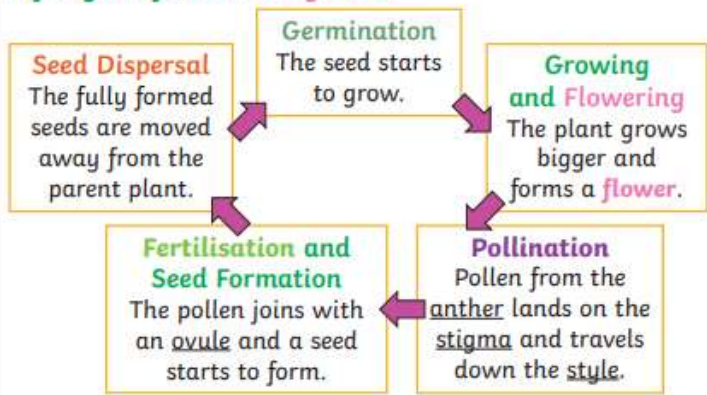
Hand in Hand We Learn

## Knowledge Organiser - Plants - 3

### Key Vocabulary

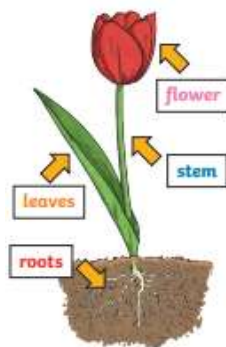
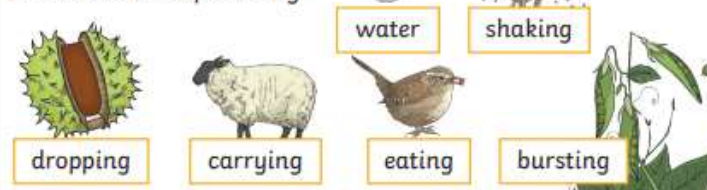
<b>fertilisation</b>	When the male and female parts of the <b>flower</b> have mixed in order to make seeds for new plants.
<b>petal</b>	The brightly coloured part of the <b>flower</b> that attracts insects to <b>pollinate</b> the plant.
<b>stamen</b>	The male parts of the <b>flower</b> . The <b>stamen</b> 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.
<b>carpel (pistil)</b>	The female parts of the <b>flower</b> . 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 <b>pollinator</b> brushes by it. The ovary contains the ovules, which are the part of the <b>flower</b> that gets fertilised and eventually becomes the new seed.
<b>sepal</b>	Leaf-like structures that protect the <b>flower</b> and <b>petals</b> before they open out.
<b>pollination</b>	When pollen (a fine powdery substance produced by a <b>flowering</b> plant) is moved from the male anther of a <b>flower</b> to the female stigma.
<b>pollinator</b>	Animals or insects which carry pollen between plants. Examples include birds, bees and bats.
<b>germination</b>	When a seed starts to grow.
<b>seed dispersal</b>	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



### Seed Dispersal

Seeds can be dispersed by:

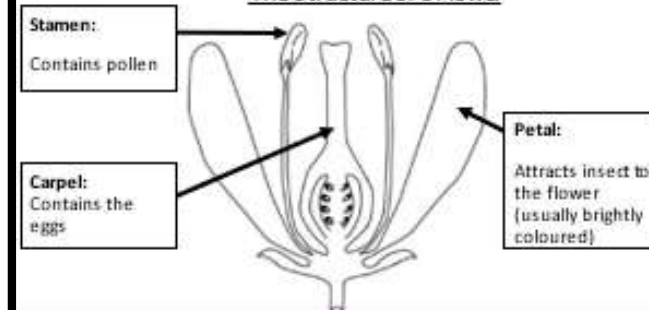


### Diagrams and Symbols

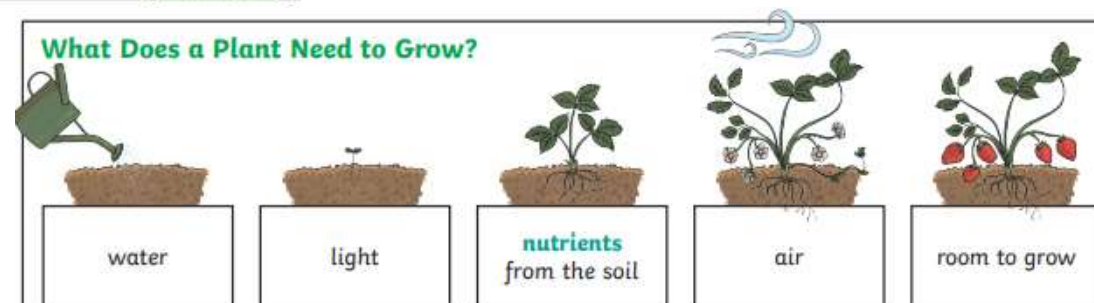
#### How a plant takes in water



#### The Structure of a Flower



### 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.



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Hand in Hand We Learn

## Knowledge Organiser - Animals Including Humans– 3

Key Vocabulary	
<b>vertebrate</b>	animals with backbones
<b>invertebrate</b>	animals without backbones
<b>muscles</b>	soft tissues in the body that contract and relax to cause movement
<b>tendons</b>	cords that join muscles to bones
<b>joints</b>	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).



**contract**

**relax**

**invertebrate**

exoskeleton      hydrostatic skeleton



**vertebrate**

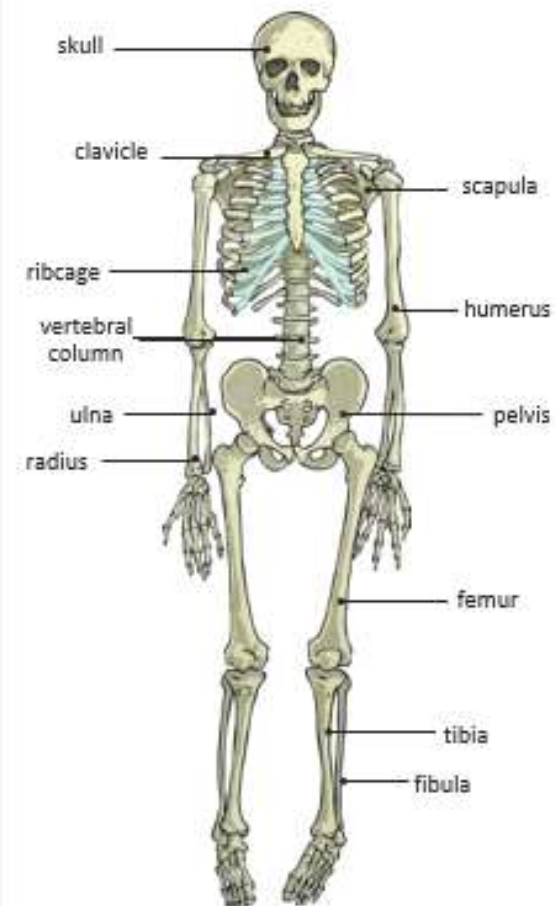
↓

endoskeleton



- 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 <b>energy</b>
protein		helps growth and repair
fibre		helps you to digest the food that you have eaten
fats		provide <b>energy</b>
vitamins		keep you <b>healthy</b>
minerals		keep you <b>healthy</b>
water		moves <b>nutrients</b> around your body and helps to get rid of waste



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





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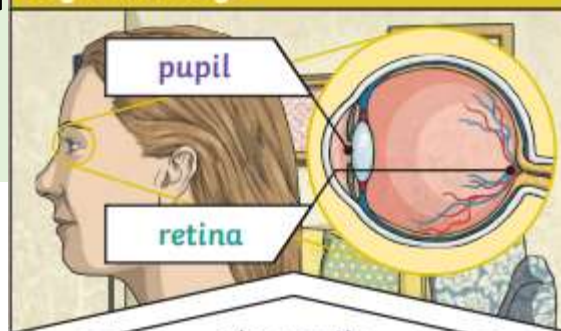
Hand in Hand We Learn

## Knowledge Organiser - Light– 3

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

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

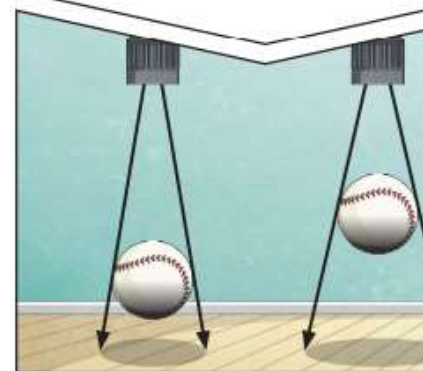
### Key Knowledge



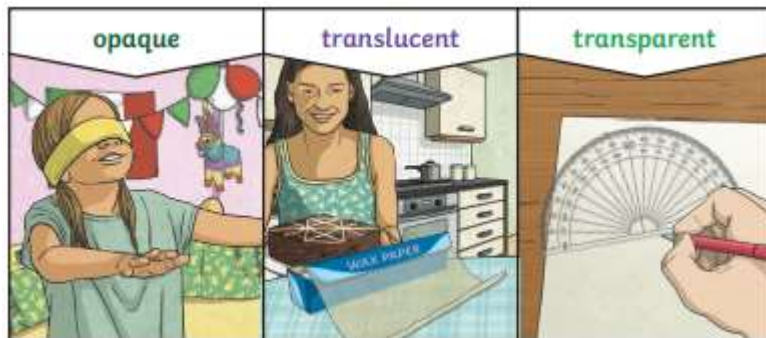
#### The pupils

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**.

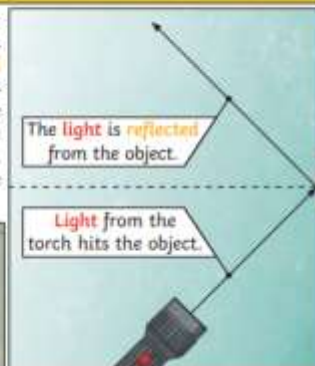


Mirrors **reflect light** very well, so they create a clear image. An image in a mirror appears to be reversed. For example, if you look in a mirror and raise your right hand, the mirror image appears to raise its left hand.



### 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...







# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser –States of Matter – 4/5

Key Vocabulary	
<b>states of matter</b>	Materials can be one of three states: <b>solids</b> , <b>liquids</b> or <b>gases</b> . Some materials can change from one state to another and back again.
<b>solids</b>	These are materials that keep their shape unless a force is applied to them. They can be hard, soft or even squashy. <b>Solids</b> take up the same amount of space no matter what has happened to them.
<b>liquids</b>	<b>Liquids</b> 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.
<b>gases</b>	<b>Gases</b> 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.
<b>water vapour</b>	This is water that takes the form of a <b>gas</b> . When water is boiled, it <b>evaporates</b> into a <b>water vapour</b> .

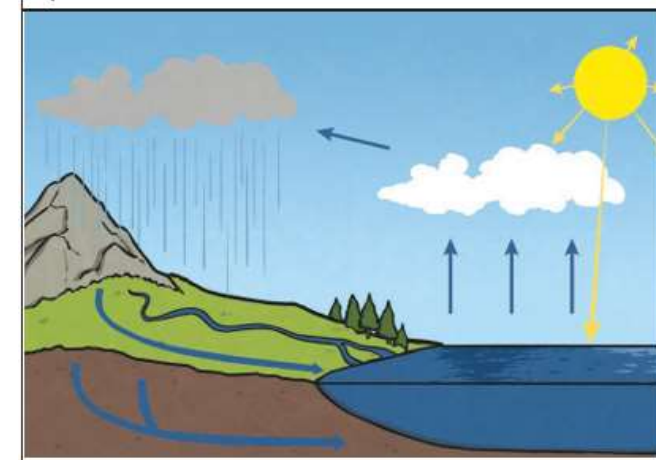
Key Knowledge		
There are three states of matter.		
<b>Solid</b> 	<b>Liquid</b> 	<b>Gas</b> 
Particles in a <b>solid</b> are close together and cannot move. They can only vibrate.	Particles in a <b>liquid</b> are close together but can move around each other easily.	Particles in a <b>gas</b> are spread 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.

<b>solid</b> 	<b>liquid</b> 
If a <b>solid</b> is heated to its <b>melting</b> point, it <b>melts</b> and changes to a <b>liquid</b> . This is because the particles start to move faster and faster until they are able to move over and around each other.	
<b>liquid</b> 	<b>solid</b> 
When <b>freezing</b> occurs, the particles in the <b>liquid</b> begin to slow down as they get colder and colder. They can then only move gently on the spot, giving them a <b>solid</b> structure.	

Key Knowledge		
Reversible changes, such as mixing and dissolving <b>solids</b> and <b>liquids</b> together, can be reversed by:		
<b>Sieving</b> 	<b>Filtering</b> 	<b>Evaporating</b> 
Smaller <b>materials</b> are able to fall through the holes in the sieve, separating them from larger particles.	The <b>solid</b> particles will get caught in the filter paper but the <b>liquid</b> will be able to get through.	The <b>liquid</b> changes into a <b>gas</b> , leaving the <b>solid</b> particles behind.

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



<b>Evaporation</b> 	<b>Condensation</b> 
<b>Evaporation</b> occurs when water turns into <b>water vapour</b> . This happens very quickly when the water is hot, like in a kettle, but it can also happen slowly, like a puddle <b>evaporating</b> in the warm air.	<b>Condensation</b> is when <b>water vapour</b> is cooled down and turns into water. You can see this when droplets of water form on a window. The <b>water vapour</b> in the air cools when it touches the <b>cold</b> surface.

Dissolving A solution is made when <b>solid</b> particles are mixed with <b>liquid</b> particles. <b>Materials</b> that will dissolve are known as soluble. <b>Materials</b> that won't dissolve are known as insoluble. A suspension is when the particles don't dissolve.	<b>Sugar is a soluble material.</b> 
	<b>Sand is an insoluble material.</b> 

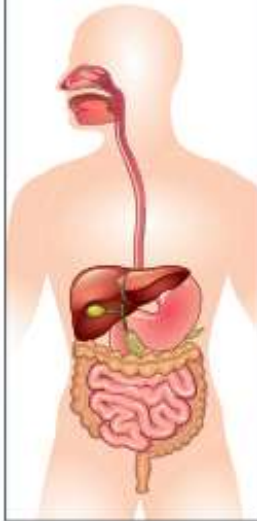








Glossary	
<b>Teeth</b>	A set of hard structures found in the mouth for chewing and biting.
<b>Incisor</b>	Type of tooth shaped for cutting.
<b>Canine</b>	Type of tooth shaped for gripping and tearing.
<b>Premolar</b>	Type of tooth shaped for crushing, tearing and grinding.
<b>Molar</b>	Type of tooth shaped for crushing, chewing and grinding.
<b>Milk Teeth</b>	A name sometimes given to the first set of human teeth.
<b>Decay</b>	When something begins to rot away.
<b>Enamel</b>	The hard white coating on the outside of our teeth.
<b>Dentine</b>	The softer, more yellow layer of our teeth found under the enamel.
<b>Pulp</b>	The softest inner part of our teeth where the nerves are found.
<b>Plaque</b>	A build-up of food, sugar and bacteria on our teeth.
<b>Digestive System</b>	The system our body has for turning food into energy.
<b>Oesophagus</b>	A long tube from our mouth to our stomach.
<b>Liver</b>	An organ which produces bile.
<b>Stomach</b>	An organ which is part of the digestive system.
<b>Intestine</b>	Includes the small and large intestines.
<b>Gall Bladder</b>	Stores bile from the liver.
<b>Pancreas</b>	A gland found behind the stomach – it helps with digestion.
<b>Rectum</b>	The final section of the large intestine.
<b>Anus</b>	Where waste food leaves our body.

#### What happens when we eat?

When we eat, our food enters our digestive system. The human digestive system includes many different organs that process our food – turning it into something our bodies can use and getting rid of what our bodies cannot use. Without our digestive system, our bodies would not function and we would have no energy.



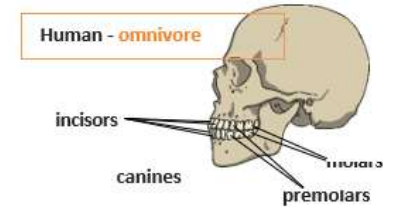
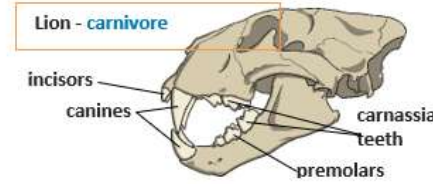
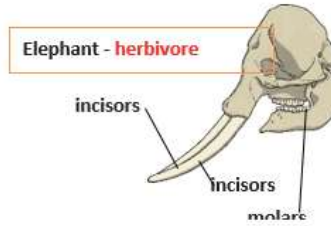
Types of Teeth			
			
<b>Incisors</b>	<b>Canines</b>	<b>Premolars</b>	<b>Molars</b>
The incisors at the front of the mouth have a sharp biting surface and are used for cutting or shearing food into small chewable pieces.	The canines are on either side of the incisors. They have a sharp, pointed biting surface. Their function is to grip and tear food.	The premolars are towards the back of the mouth. They are the largest of the teeth and have a large flat biting surface. Their function is to tear and crush food.	The molars are at the back of the mouth. They are the largest of the teeth and have a large flat biting surface. The function of the molars is to chew, crush and grind food.

# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser –Animals and humans– 4/5



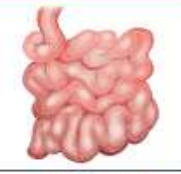

The teeth of an animal are designed to eat different foods depending on the diet of the animal. Examples of a **herbivore**, a **carnivore** and an **omnivore** skull:



#### What journey does our food take through our digestive system?

Once food has been chewed and swallowed, it travels down the oesophagus and enters the stomach. The stomach breaks down our food. From the stomach, the food travels into the small intestine, where our body absorbs what it needs. Then the food travels onto the large intestine. The rectum and anus get rid of the food our bodies did not use.

#### What do some of our digestive organs look like?

			
<b>Stomach</b>	<b>Liver</b>	<b>Small Intestine</b>	<b>Large Intestine</b>
Food stays here for around four hours. Here the food is broken down into smaller pieces mixed into a paste. The acid in our stomach kills a lot of bad bacteria that could make us sick.	Food does not pass through or into our liver but the liver plays an important role in our digestive system. The liver produces bile which helps break up fat into smaller pieces.	In the small intestine, food is mixed with juices from the liver and pancreas. After this, the food is absorbed from the small intestine and around our body through our blood.	The last stage of the digestive system. Here, any of the food that our body cannot use or does not need is stored until it makes its way out of our body as waste.

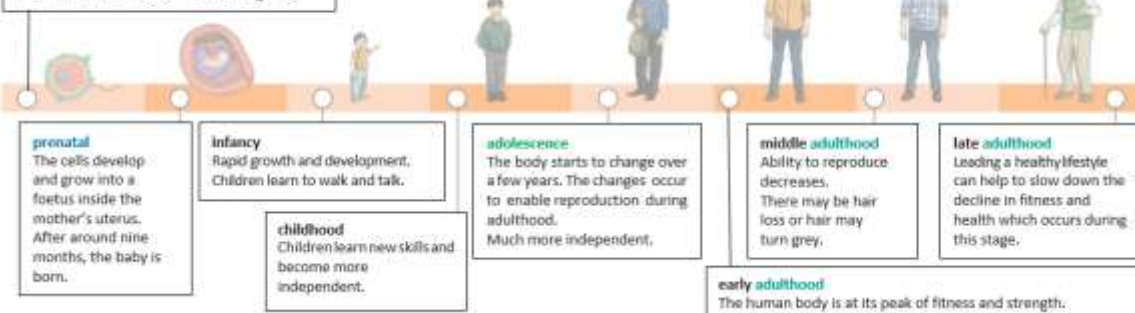
#### Key Vocabulary

<b>herbivore</b>	An animal that eats plants.
<b>carnivore</b>	An animal that feeds on other animals.
<b>omnivore</b>	An animal that eats plants and animals.
<b>producer</b>	A plant that produces its own food.
<b>predator</b>	An animal that hunts and eats other animals.
<b>prey</b>	An animal that gets hunted and eaten by another animal.

#### Key Knowledge

##### fertilisation

The male and female sex cells fuse together.



#### What are our teeth made from?

Our teeth are made of pulp, dentine and enamel. The enamel is the white, outside layer of the tooth. The dentine is the soft, more yellow layer underneath and the pulp is where the nerves are found. The part of the tooth above the surface is the crown and the part found in the gum is the root.







# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser –Electricity– 4

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

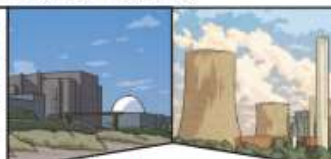
### Key Knowledge

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**.

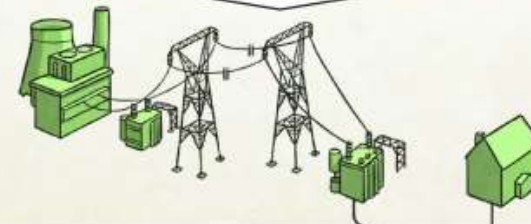
**Electricity** can be **generated** from wind power used to turn windmills and hydroelectric power from water used in dams. The Sun's rays can be converted into **electricity** by solar panels.



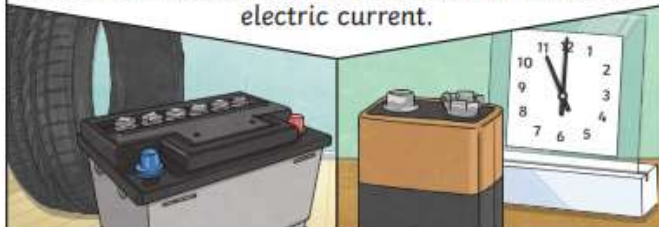
Nuclear energy is created when atoms are split. This creates heat which can be used to **generate electricity**. Geothermal energy is heat from the Earth that is converted into **electricity**.

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**.

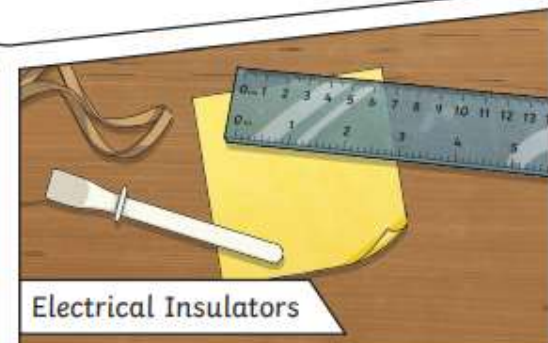
Switches can be used to open or close a **circuit**. When off, a switch 'breaks' the **circuit** to stop the flow of **electricity**. When on, a switch 'completes' the circuit and allows the **electricity** to flow.



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





# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser –Sound – 4

### Key Vocabulary

<b>vibration</b>	A quick movement back and forth.
<b>sound wave</b>	<b>Vibrations</b> travelling from a sound source.
<b>volume</b>	The loudness of a sound.
<b>amplitude</b>	The size of a <b>vibration</b> . A larger <b>amplitude</b> = a louder sound.
<b>pitch</b>	How low or high a sound is.

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

### Key Knowledge

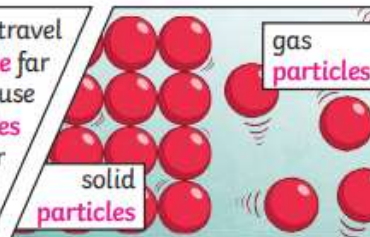
Sound is a type of energy. Sounds are created by **vibrations**. The louder the sound, the bigger the **vibration**.



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.



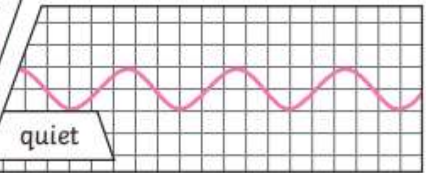
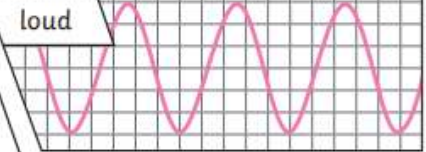
Sound energy can travel from **particle** to **particle** far easier in a solid because the **vibrating particles** are closer together than in other states of matter.



**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.



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



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**.







# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser –Living Things – 4/5

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

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



Life Processes	
To stay alive and healthy, all living things need certain conditions that let them carry out the seven life processes:	
Movement	Growth
Respiration	Reproduction
Sensitivity	Excretion
	Nutrition

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.



### Reproduction - 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.



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

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

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

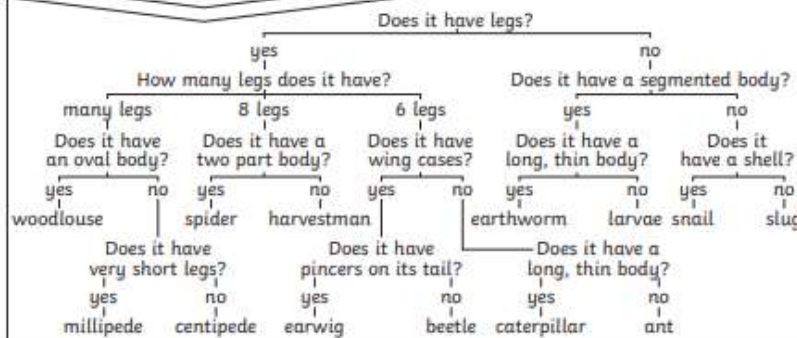
vertebrates					invertebrates			
mammals	fish	birds	reptiles	amphibians	insects	spiders	worms	slugs and snails

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

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

# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser –Earth and Space – 5

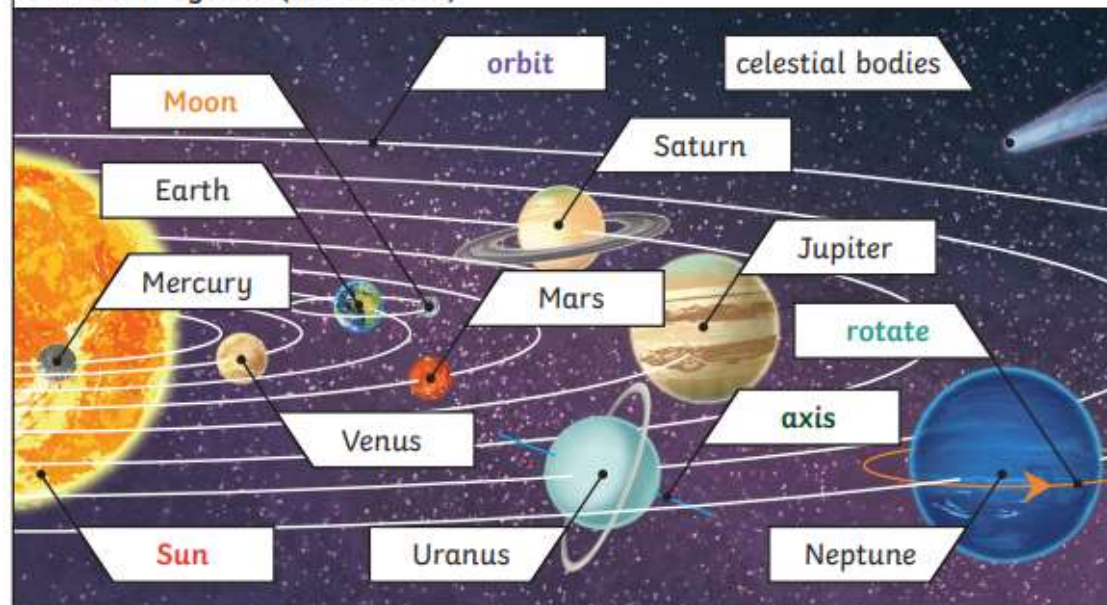


The **Moon** **orbits** Earth in an oval-shaped path while spinning on its **axis**. At various times in a month, the **Moon** appears to be different shapes. This is because as the **Moon** **rotates** round Earth, the **Sun** lights up different parts of it.

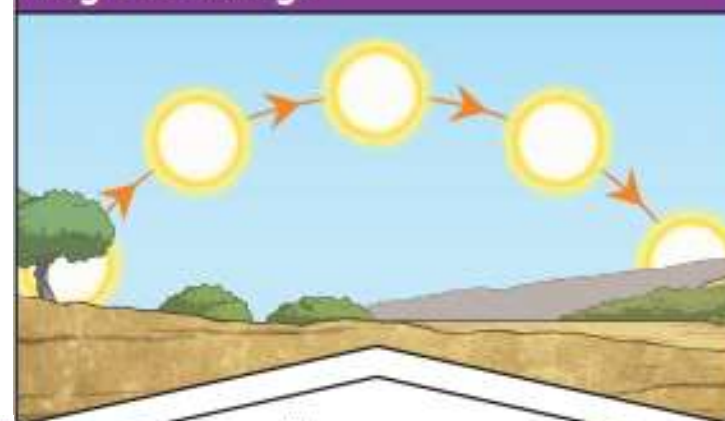
### Key Knowledge

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)



### 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.

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







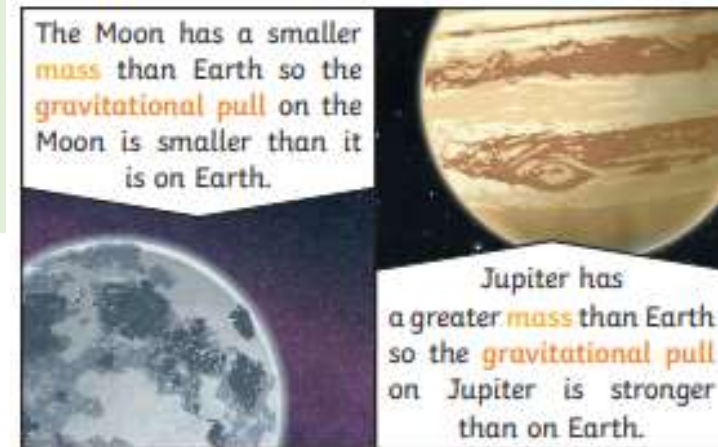
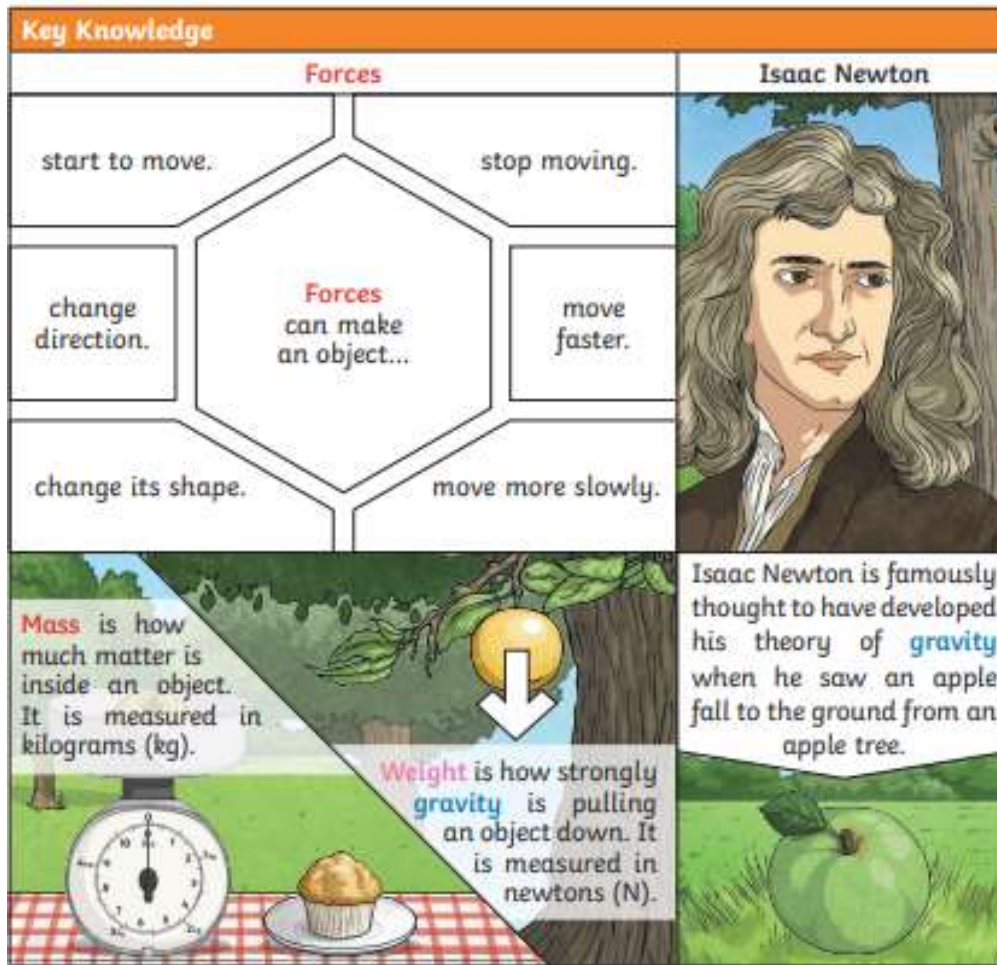
# Whitley Abbey Primary School







Hand in Hand We Learn

## Knowledge Organiser –Forces– 5

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

Key Vocabulary	
<b>friction</b>	A <b>force</b> that acts between two surfaces or objects that are moving, or trying to move, across each other.
<b>air resistance</b>	A type of <b>friction</b> caused by air pushing against any moving object.
<b>water resistance</b>	A type of <b>friction</b> caused by water pushing against any moving object.
<b>buoyancy</b>	An object is buoyant if it floats. This is because the weight of the object is equal to the <b>upthrust</b> .
<b>streamlined</b>	When an object is shaped to minimise the effects of <b>air</b> or <b>water resistance</b> .
<b>mechanism</b>	Mechanisms are simple machines with moving parts that change input forces and movement into a set of useful output forces. Examples of <b>mechanisms</b> are pulleys, gears and levers.
<b>upthrust</b>	A <b>force</b> that pushes objects up, usually in water.



Key Knowledge		
Examples of <b>forces</b> in action:		
		
<p>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.</p>		
Pulleys	Gears/Cogs	Levers
		
Pulleys can be used to make a small <b>force</b> lift a heavier load. The more wheels in a pulley, the less <b>force</b> is needed to lift a <b>weight</b> .	Gears or cogs can be used to change the speed, <b>force</b> or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.	Levers can be used to make a small <b>force</b> lift a heavier load. A lever always rests on a pivot.





# Whitley Abbey Primary School

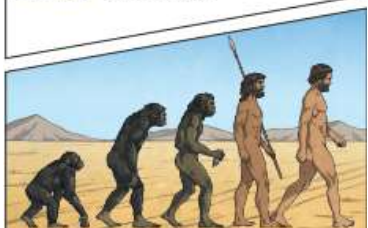
Hand in Hand We Learn

## Knowledge Organiser —Evolution and Inheritance 6

### Key Vocabulary

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

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!



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

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.

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.



### 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.

### 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.



### 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.





# Whitley Abbey Primary School

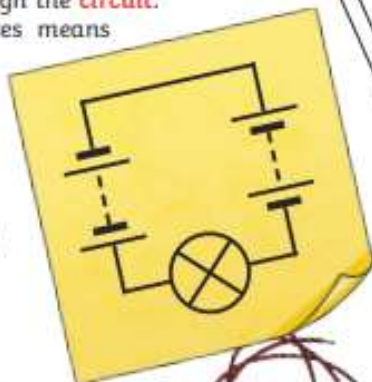
Hand in Hand We Learn

## Knowledge Organiser — Electricity - 6

### 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.

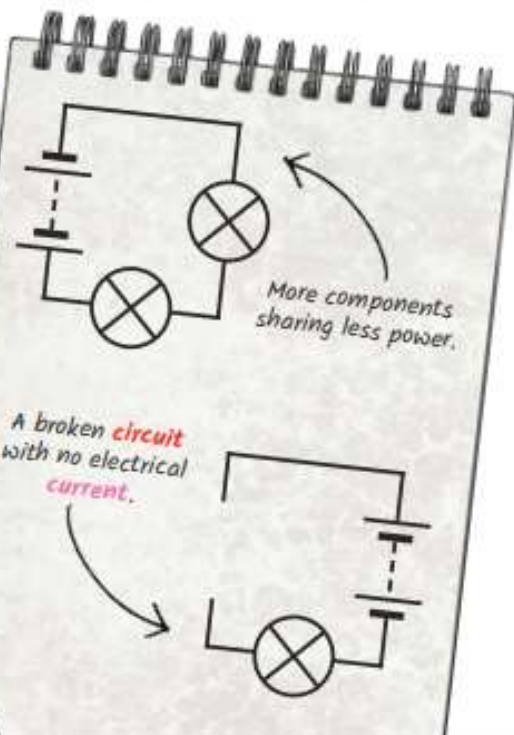


What will make a bulb dimmer or a buzzer quieter?

- 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.

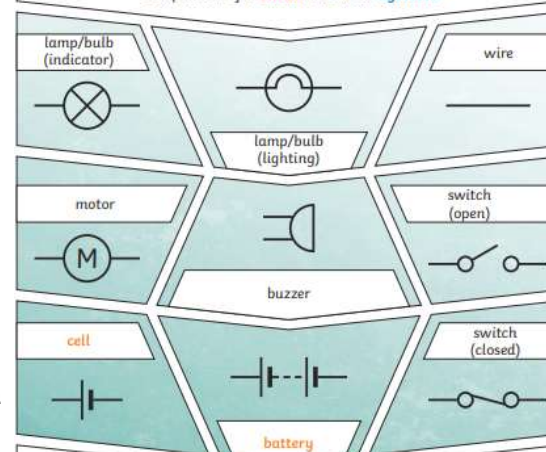


### Key Vocabulary

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

### Key Knowledge

#### Components of a Circuit and Their Symbols



These symbols can be used to create electrical circuit diagrams.





# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser — Light - 6

### Key Vocabulary

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

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**.

angle of **reflection**

**reflected ray**

normal line

**incident ray**

angle of **incidence**

### Key Vocabulary

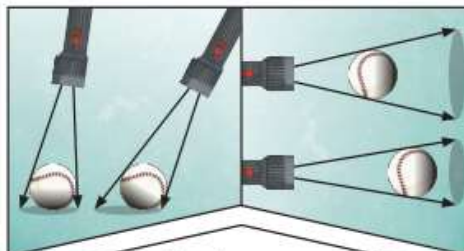
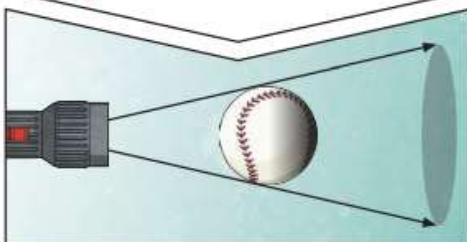
<b>refraction</b>	This is when <b>light</b> bends as it passes from one medium to another. E.g. <b>Light</b> bends when it moves from air into water.
<b>visible spectrum</b>	<b>Light</b> that is visible to the human eye. It is made up of a colour <b>spectrum</b> .
<b>prism</b>	A <b>prism</b> is a solid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

### Key Knowledge



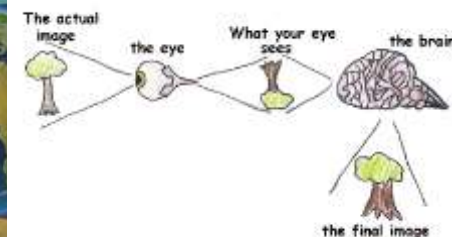
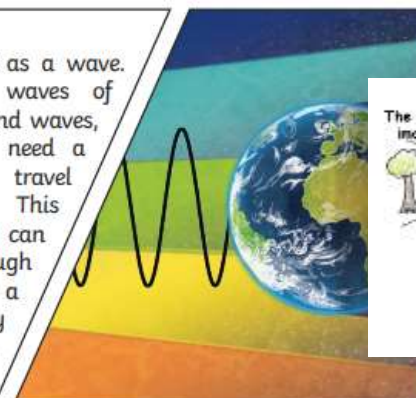
The spoon in this water looks as if it is bent. This is because **light** bends when it moves from air to water. When **light** bends in this way, it is called **refraction**.

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.



**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**.

**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.







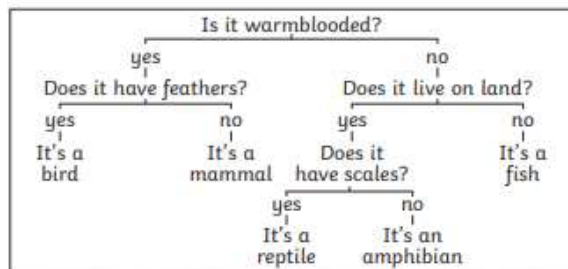
# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser — Living things and habitats - 6

Key Vocabulary	
<b>characteristics</b>	Special qualities or appearances that make an individual or group of things different to others.
<b>classify</b>	To sort things into different groups.
<b>taxonomist</b>	A scientist who classifies different living things into categories.
<b>key</b>	A <b>key</b> is a series of questions about the <b>characteristics</b> of living things. A <b>key</b> 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.

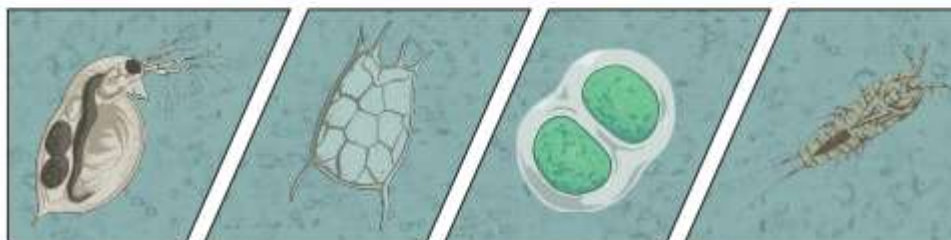
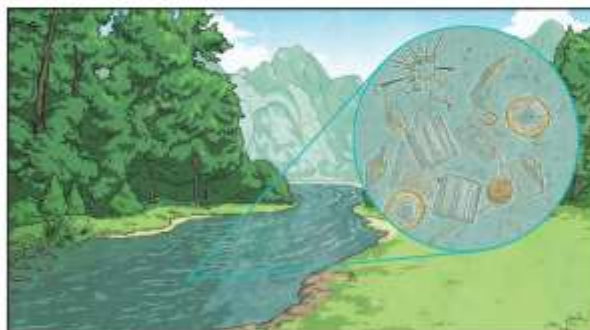
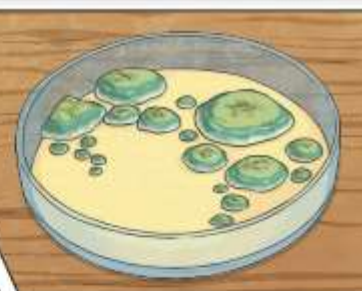


Helpful Microbes	Harmful Microbes
<b>Bacteria</b> – cheese	<b>Bacteria</b> – salmonella is a bacterium that can lead to food poisoning
Yeast – wine	Virus – chicken pox and flu are examples of viral diseases
<b>Bacteria</b> – yoghurt	Fungi – athlete's foot
Yeast – bread dough	<b>Bacteria</b> – plaque
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 Vocabulary

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

### 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.

<b>Domain: Eukarya</b>	jackal, clownfish, cat, dog, ladybird, daisy, rabbit, fox
<b>Kingdom: Animalia</b>	jackal, clownfish, cat, dog, ladybird, rabbit, fox
<b>Phylum: Chordata</b>	jackal, clownfish, cat, dog, rabbit, fox
<b>Class: Mammalia</b>	jackal, cat, dog, rabbit, fox
<b>Order: Carnivora</b>	jackal, cat, dog, fox
<b>Family: Canidae</b>	jackal, dog, fox
<b>Genus: Canis</b>	jackal, dog
<b>Species: Lupus</b>	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.







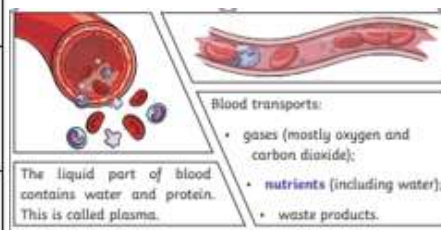
# Whitley Abbey Primary School

Hand in Hand We Learn

## Knowledge Organiser — Animals Including humans - 6

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

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



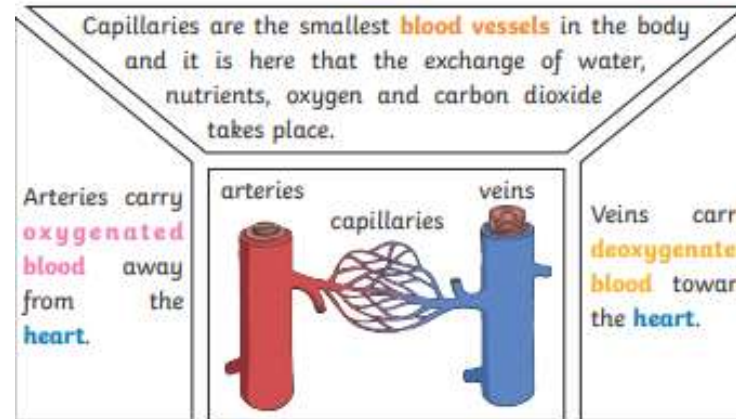
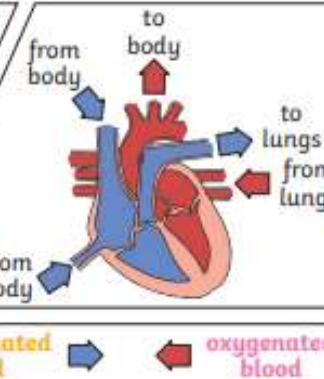
Regular exercise:

- 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.



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.



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

The **heart** pumps blood to the lungs to get oxygen. It then pumps this **oxygenated blood** around the body.

