



Welton St Mary's Church of England Primary Academy



# Science Curriculum



*"Don't let anyone rob you of your imagination, your creativity, or your curiosity."* - Mae Jemison.

## Science Intent

Children are naturally curious and we encourage them to ask questions, wonder, consider and reason. We want them to be **inspired** and inquisitive in order to apply a range of scientific enquiry skills to explore ideas independently and when working with others. Through our curriculum, we want to promote curiosity, provide **opportunities** for critical analysis and evaluation of evidence, allow children to **strive for excellence** and foster respect for all living and non-living things thus enriching their learning with a range of higher-level vocabulary and thinking skills which enables them to express their thoughts and aid communication. We aim to equip our children with the scientific enquiry skills and scientific knowledge to understand the uses and implications of science today and in the future thus becoming **advocates of positive change**; including what they need for their education, their careers and beyond.

## Principles for good science teaching in our school



Science comes to life when children are excited about their learning and are actively engaged in hands on investigations.

Children discover new things through the opportunities that are provided and experience genuine awe and wonder moments which remain in their memories for years, while developing an in-depth understanding of the world around them.

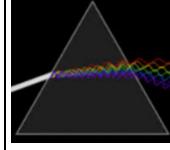
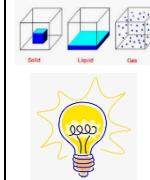
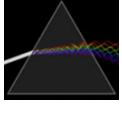
Children will be given the opportunity to recall, apply and share their understanding of scientific concepts through whole class and group discussion which promotes high order thinking skills.

Science is led through practical and visual prompts for children to question and further investigate. They will devise a hypothesis, carry out fair tests, record results and form conclusions which may lead to them asking further questions.

Children have time to explore and investigate for themselves first. They are then given opportunities to test their ideas and then re-test to find out more.

The world of science is embraced through making effective use of visits, visitors and use of the local outdoor environments around us.

# Science Overview

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 1	Plants 	Seasonal change 	Materials		Animals including humans 	
Year 2	Living things and their habitats 		Animals including humans 	Plants 	Materials and their properties 	Plants 
Year 3	Animals including humans 	Rocks 	Light 	Forces and magnets 	Plants 	Animals including humans 
Year 4	Sound 	Animals including humans 	States of matter & Electricity 	Living things and their habitats 		Electricity 
Year 5	Living Things and their Habitats 	Animals including humans 	Properties and Changes of Materials 		Earth and Space 	Forces 
Year 6	Animals including humans 	Electricity 	Evolution & inheritance 	Light 	Living things and their habitats 	

# Core Concepts

## CONCEPT – investigating, exploring, researching

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer different scientific questions about the world around them
- Observing over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing, researching using secondary courses

## CONCEPT - analysing and interpreting data

- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer different scientific questions about the world around them
- Apply mathematical knowledge to the understanding of science including collecting, presenting and analysing data

## CONCEPT –science explanation and communication

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer different scientific questions about the world around them
- Build up and extend specialist vocabulary

## CONCEPT – influences on life today

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- Are equipped with the scientific knowledge required to understand the uses and implications of science today and for the future



Knowledge Organisers

## Materials

Key Vocabulary	
<b>Hard</b>	Not easily broken or bent.
<b>Soft</b>	Easy to cut, fold or change shape of.
<b>Transparent</b>	It can be seen through.
<b>Opaque</b>	It <b>cannot</b> be seen through.
<b>Bendy</b>	It can be pulled and moved easily without breaking.
<b>Stretchy</b>	Can be pulled to make it longer or wider without breaking.
<b>Stiff</b>	<b>Cannot</b> be pulled to make it longer or wider without breaking.
<b>Waterproof</b>	It does not allow water to go through.
<b>Absorbent</b>	It soaks up water easily.
<b>Shiny</b>	Reflects light easily.
<b>Dull</b>	Doesn't reflect light.
<b>Rough</b>	It feels and looks bumpy or uneven.

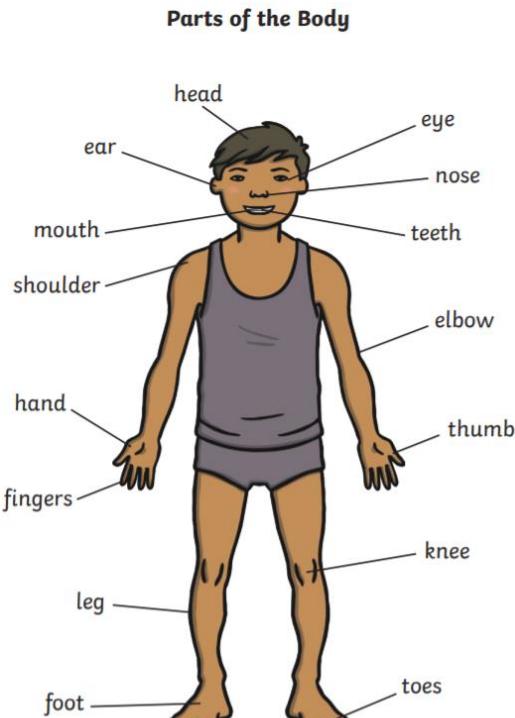
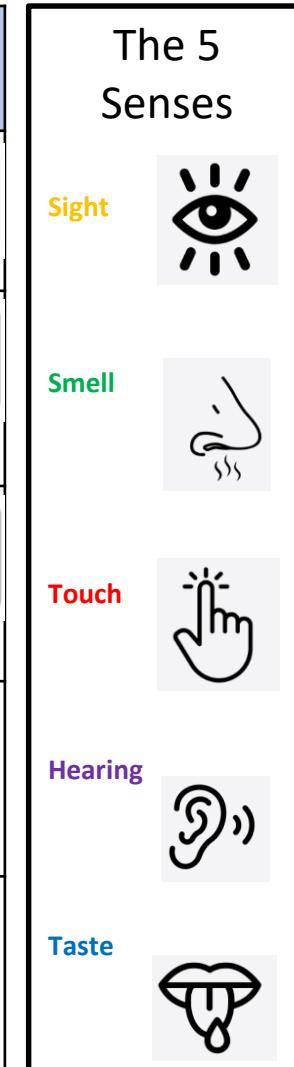
Materials	
Glass	
Wood	
Plastic	
Metal	
Water	
Rock	



## Animals Including Humans

Key Vocabulary	
senses	To understand and recognise something using <b>sight, smell, touch, hearing and taste.</b>
skeleton	The frame of bones that support a human or animals body.
external	Something that is on the outside.
internal	Something that is on the inside.
carnivore	An animal that eats other animals.
herbivore	An animal that eats plants.
omnivore	An animal that eats both animals and plants.

Types of common animals	Features of animals	Animals part of this group
Fish	scales, fins, gills, backbone.	goldfish tuna shark eel
Amphibians	webbed feet, smooth skin, 4 legs, cold-blooded. backbone.	frog toad newt salamander
Reptiles	dry, scaly skin, cold-blooded, tail, backbone.	snake tortoise lizard alligator
Birds	feathers, beak, claws, wings, backbone	penguin chicken seagull robin
Mammals	fur/hair, hooves, paws, feet, backbone.	human mouse dog cow



# Science: Year 1

## Key Vocabulary

Branch		Parts that grow out of a tree trunk.
Bud		A bud is a small pointed lump that appears on a tree or plant and develops into a leaf or flower.
Bulb		A root shaped like an onion that grows into a flower/plant.
Common		Something found in large numbers / happens often.
Flower		The part of a plant which is often brightly coloured and grows out the stem.
Fruit		Grows on a tree/bush and contains seeds/stones.
Leaf/leaves		Flat, thin and usually green.
Petal		Thin coloured parts which form part of a flower.
Roots		The parts of a plant that grow under the ground.
Seeds		Seeds are small, hard parts of a plant from which a new plant grows.
Stalk		The thin upright part of a plant on which the flowers and leaves grow.
Trunk		The large main stem from which branches grow.

## Plants

A plant is one of a large group of living things that use sunlight to make their own food. Most plants have leaves, stems, roots and either flowers or cones.

Trees are tall, woody plants. They usually have a stem called a trunk.

Trees can be **deciduous** (leaves turn brown and fall off in Autumn).

Or trees could be **evergreen** (they stay green all year round).

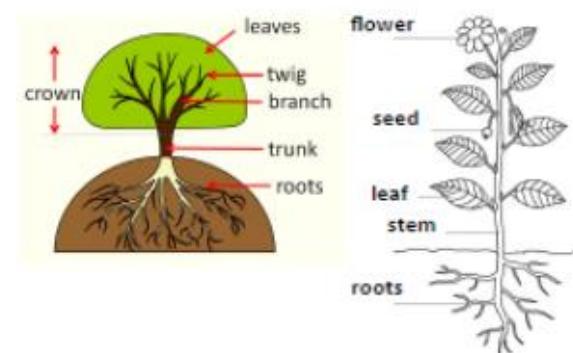


Deciduous

Evergreen

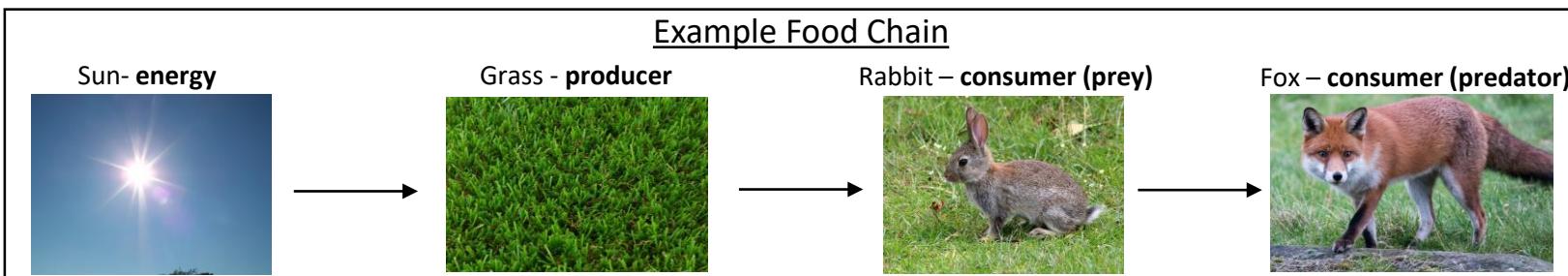
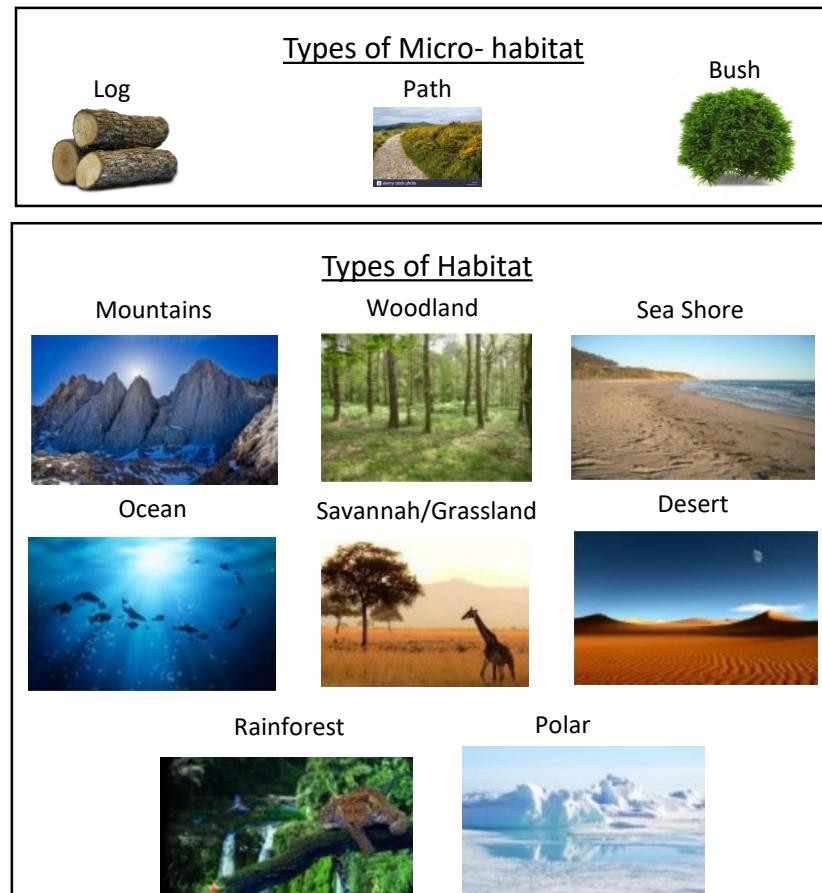
## Common Plants

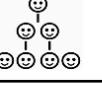
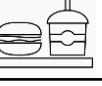
dandelion		poppy	
daisy		daffodil	
buttercup		pansy	
nettle		tulip	
clover		Rose	
sunflower		bluebell	



## Living things and their habitats – Which habitats do worms prefer?

<b>Habitat</b>	A natural home in which plants and animals live.
<b>Micro-habitat</b>	A very small habitat within a habitat.
<b>Food chain</b>	How plants and animals are linked through what they eat.
<b>Herbivore</b>	
<b>Carnivore</b>	
<b>Omnivore</b>	

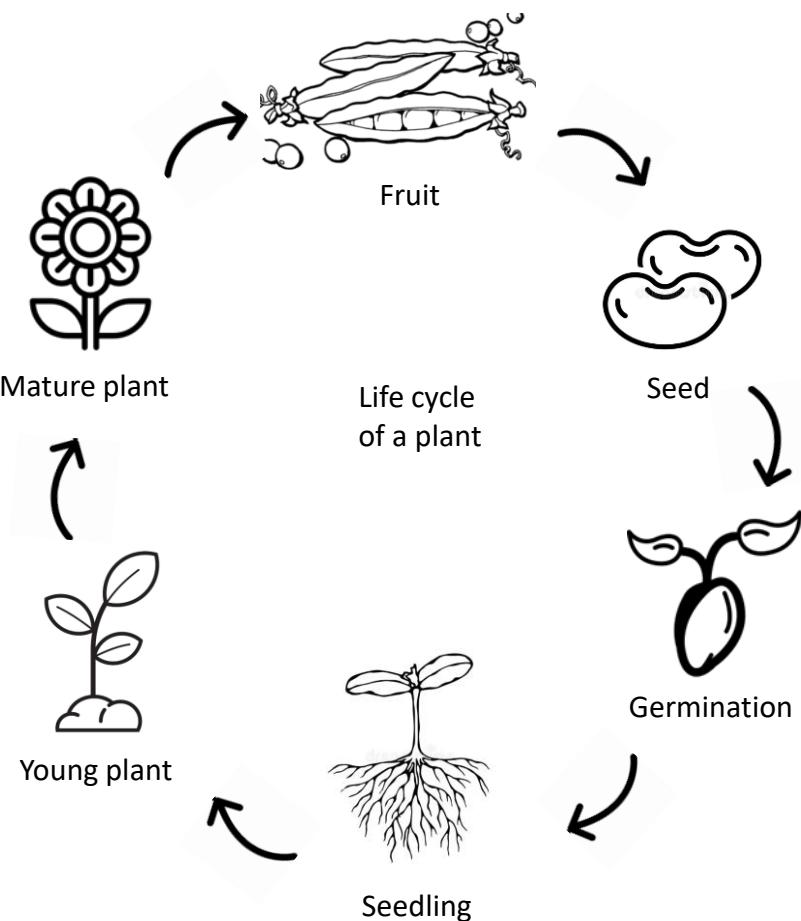


<b>M</b>	Movement	
<b>R</b>	Respiration	
<b>S</b>	Sensitivity	
<b>G</b>	Growth	
<b>R</b>	Reproduction	
<b>E</b>	Excretion	
<b>N</b>	Nutrition	

## Plants

Key Vocabulary	
 seeds	Seeds are small, hard parts of a plant from which a new plant grows.
 bulbs	Bulbs are parts of some plants, mostly under the dirt, that store food while the plants are resting from growing.
 germination	<b>Germination</b> is the process of a seed or a bulb starting to grow to create a new plant.
 planting	Planting is a putting a seed or a bulb in the ground so that it can grow.
What plants need to grow	
 sunlight	All plants need <b>sunlight</b> to grow well. Some plants need lots of light while others prefer partial or full shade.
 water	All plants need <b>water</b> to grow. Without water, seeds and bulbs will not germinate.
 temperature	Some plants like warm <b>temperatures</b> and some like cool <b>temperatures</b> .
 food	Plants make their own <b>food</b> in their leaves using sunlight. They also get nutrients through their roots.

A plant is one of a large group of living things that use sunlight to make their own food. Most plants have leaves, stems, roots and either flowers or cones.

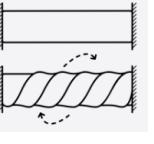
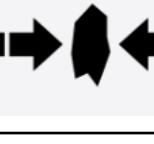


Plants as living things		
<b>M</b>	<b>Movement</b>	
<b>R</b>	<b>Respiration</b>	
<b>S</b>	<b>Sensitivity</b>	
<b>G</b>	<b>Growth</b>	
<b>R</b>	<b>Reproduction</b>	
<b>E</b>	<b>Excretion</b>	
<b>N</b>	<b>Nutrition</b>	

## Materials and Their Properties

Key Vocabulary	
materials	What objects are made of.
properties	Describes what a material is like and how it behaves (stretchy, bendy, waterproof).
suitable	Right or appropriate for what it is being used for.
opaque	A material you <b>cannot</b> see through.
transparent	A material you can see through.
translucent	A material that allows some light to pass through it.
reflective	A material that shines the light back.
non-reflective	A material that does not shine the light back.
flexible	Easy to bend.
rigid	Unable to be bent out of shape.

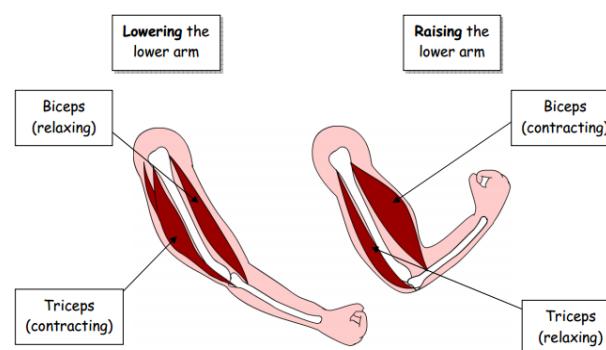
Material	Properties	Uses
wood	 strong, opaque, stiff, hard	Chairs, tables, furniture, floors
plastic	 bendy, smooth, waterproof, translucent, stretchy	Window frames, food packaging
glass	 transparent, hard, smooth, waterproof	Windows, bottles, kitchen utensils
brick	 rough, strong, opaque, dull	Walls and building work
paper	 Lightweight, flexible	Books, notepads
cardboard	 Strong, light, stiff	Food packaging,
metal	 Shiny, strong, opaque, hard	Food packaging, coins, table legs, screws
rock	 Rough, strong, opaque, hard	Worktops, houses, concrete

Solids can be changed by ...
 bending
 twisting
 stretching
 squashing

## Animals, Including Humans

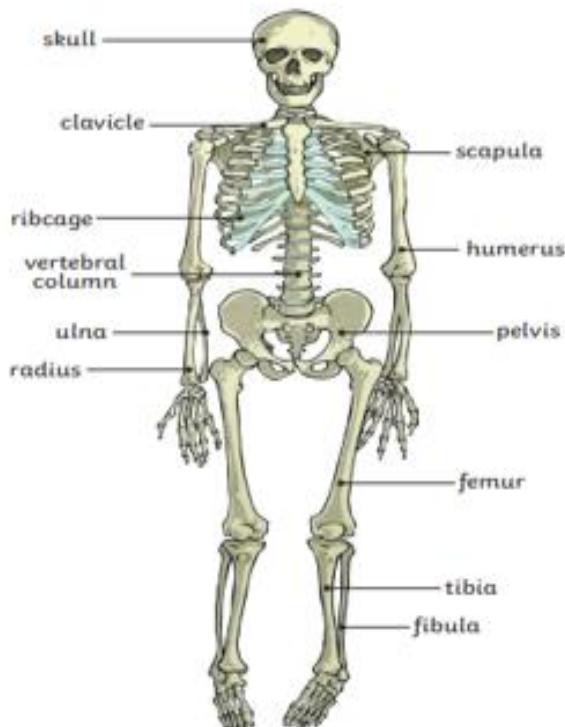
Key Vocabulary	
Healthy	In a good physical and mental condition.
Nutrients	Substances that animals need to stay alive and healthy.
Vertebrate	Animals <u>with</u> backbones.
Invertebrate	Animals <u>without</u> backbones.
Muscles	Soft tissues in the body that contract and relax to cause movement.
Joints	Areas where two or more bones are fitted together.
Endoskeleton	Skeletons that are inside the body of creatures are called <b>endoskeleton</b>
Exoskeleton	Some animals, such as insects, crabs and lobsters, have a skeleton outside their body. Such skeletons are called <b>exoskeletons</b> .
Hydrostatic skeleton	A <b>hydrostatic skeleton</b> , or hydro skeleton, is a flexible skeleton supported by fluid pressure.

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



Skeletons do three important jobs:

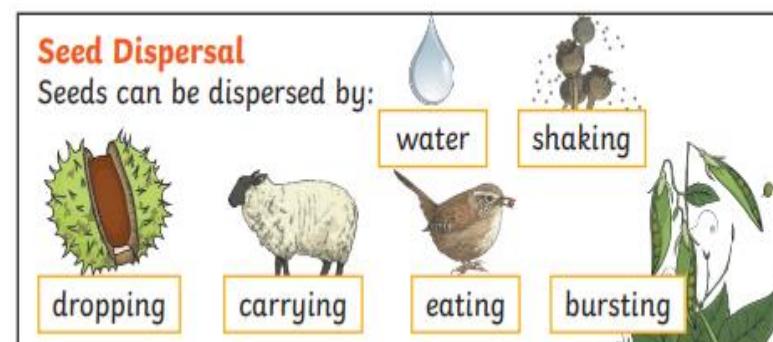
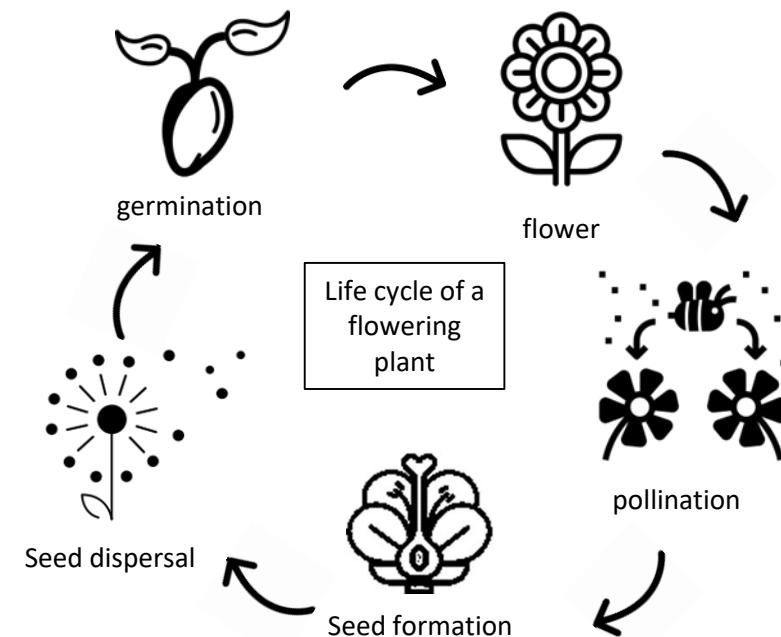
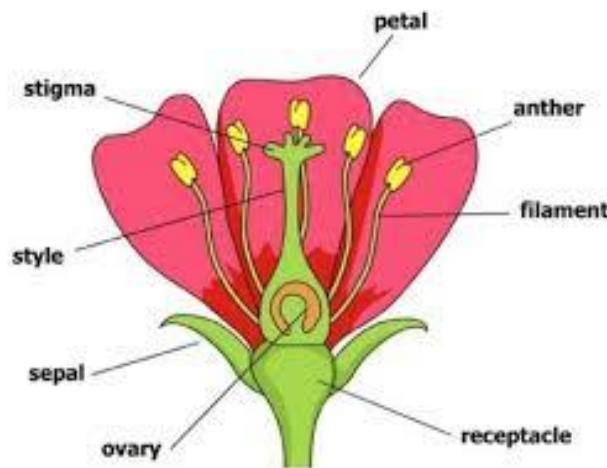
- protect organs inside the body;
- allow movement;
- support the body and stop it from falling on the floor.



## Plants

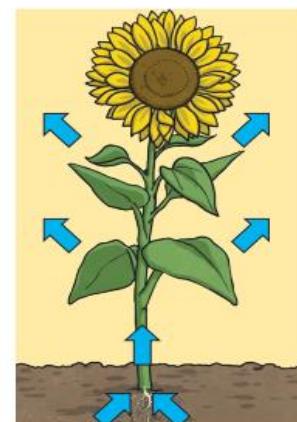
## Key Vocabulary

<b>petals</b>	The separate leaves that form the outside part of a flower head and usually attract insects.
<b>flower</b>	The part of a plant which allows it to reproduce.
<b>seed</b>	Produced the fertilisation ovule, seeds allow a plant to reproduce.
<b>nutrients</b>	A substance that provides nourishment for growth. All living things need nutrition.
<b>photosynthesis</b>	The process that plants use light to create their own food.
<b>transportation</b>	The movement of things from one place to another.
<b>pollination</b>	The process in which pollen is taken from one plant or part of a plant to another so that new plant seeds can be produced.
<b>dispersal</b>	The action of spreading across or moving away over a large area.



#### 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.

# Rocks

## Key Vocabulary

<b>Igneous rock</b>	Rock that has been formed from magma or lava
<b>Sedimentary rock</b>	Rock that has been formed by layers of sediment being pressed down hard and sticking together.
<b>Metamorphic rock</b>	Rock that started out as igneous or sedimentary but changed due to being exposed to extreme heat.
<b>Magma</b>	Molten rock that remains underground.
<b>Lava</b>	Molten rock that comes out of the ground is called lava.
<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 liquid to pass through it.
<b>Impermeable</b>	Does not allow liquids to pass through it.
<b>fossilisation</b>	The process by which fossils are made.
<b>Paleontology</b>	The study of fossils.
<b>Erosion</b>	When water, wind or ice wears away land.

Rocks are made of one or more minerals. There are three main classifications of rock which are based on the way the rock was formed: sedimentary, metamorphic and igneous.

Soil is formed of fine rock particles mixed with air, water and particles from dead plant and animal matter. There are three main types of soil which are classified according to the amount of sand and clay in them.



<b>IGNEOUS</b>	<b>SEDIMENTARY</b>	<b>METAMORPHIC</b>
 Granite	 Scoria	
	 Sandstone	 Limestone
 Pumice	 Obsidian	 Marble
	 Conglomerate	 Slate
	 Shale	 Gypsum
		 Quartzite
		 Gneiss

## Fossilisation

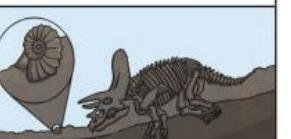
An animal dies. It gets covered with sediments which eventually become rock.

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

ver thousands of years, sediment might enter the shell 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.



Mary Anning was an English fossil collector, dealer, and paleontologist who became known around the world for important finds she made in Jurassic marine fossil beds in the cliffs along the English Channel at Lyme Regis.

# Light

## Key Vocabulary

<b>light</b>	A type of energy. We need light to see. Light comes from different light sources.
<b>light source</b>	An object that makes its own light. Our main natural light source is the sun.
<b>dark</b>	Dark is the absence of light.
<b>reflection</b>	The process when light hits the surface of an object and then that light travels to our eyes so we can see.
<b>spectrum</b>	A range of colours which is produced when light passes through a glass prism or water. A rainbow shows the colours in the spectrum.
<b>pupil</b>	The black part of the eye which lets light in.
<b>retina</b>	A layer at the back of the eye that takes the light the eye receives then changes it into nerve signals to send to the brain.
<b>shadow</b>	An area of darkness where light has been blocked.
<b>opaque</b>	Describes objects that do not let any light pass through them.
<b>translucent</b>	Describes an object that lets some light through but scatters the light so we can't see through them properly.
<b>transparent</b>	Describes objects that let light travel through them easily, meaning that you can see through the object.

Shiny surfaces reflect light well



spectrum



Shadows

An opaque object blocks the light from going through. A dark shape is formed called a shadow.



Shadows change depending on the distance the object is from the light source and the position of the light source.



## Key Information

Light travels in a straight line and travels faster than sound.

A light year is a unit of measurement for distance. It is the distance light can travel in a year.

The moon does not emit its own light – it reflects the sun.

Ultraviolet (UV) light is a type of radiation which you can't see but can be dangerous. UV rays come from the sun.

The pupils control the amount of light entering the eye

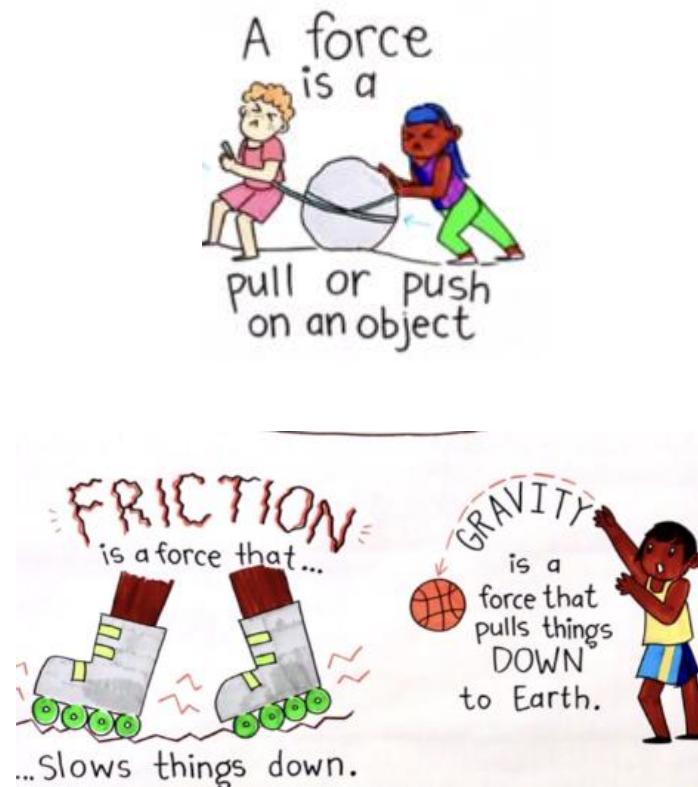


## Forces and Magnets

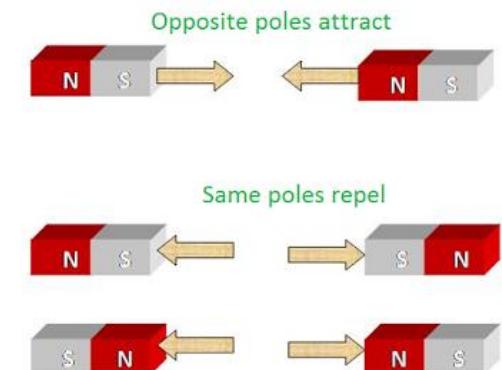
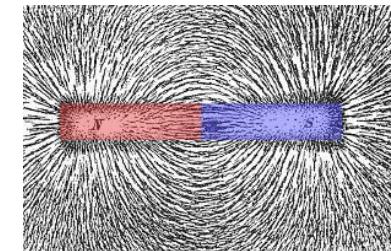
**Key Vocabulary**

<b>Force</b>	A push or a pull
<b>Friction</b>	A force that acts between two surfaces or objects that are moving or trying to move across each other.
<b>surface</b>	The top layer of something.
<b>Magnet</b>	An object which produces a magnetic force that pulls certain objects towards it.
<b>magnetic</b>	Objects which are attracted to a magnet are magnetic. Objects containing iron, nickel or cobalt metals are magnetic.
<b>Magnetic field</b>	The area around a magnet where there is a magnetic force which will pull magnetic objects towards the magnet.
<b>Poles</b>	North and south poles are found at different ends of a magnet.
<b>Repel</b>	Repulsion is a force that pushes objects away. E.g. when a north pole is placed near a north pole of another magnet, the two poles repel each other.
<b>Attract</b>	Attraction is a force that pulls objects together. E.g. when a north pole is placed near the south pole of another magnet the two poles attract.

Forces can change an object's speed, its direction, and even its shape. Magnetic forces can act without direct contact, unlike most forces.



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 it.



# Sound

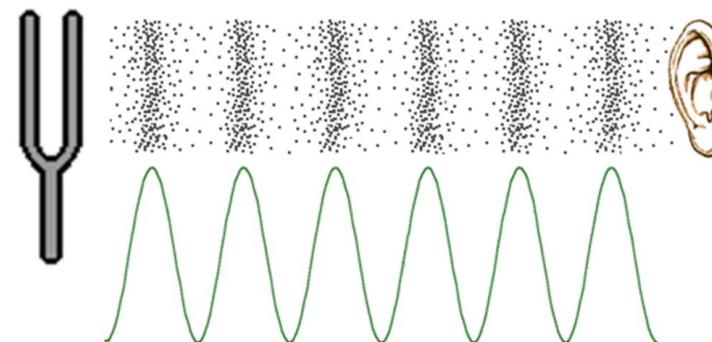
## Key Vocabulary

amplitude	A measure of the strength of a sound wave.
decibel	A measure of how loud a sound is.
frequency	A measure of how many times per second the sound wave cycles.
instrument	There are five key families of instrument: brass, keyboard, percussion, string and woodwind.
insulate	The process of muffling the volume of sound.
pitch	How high or low a sound is.
soundwaves	Invisible waves that travel through air, water, and solid objects as vibrations.
source	Where something comes from, e.g. a sound.
transmit	To pass from one place or person to another.
travel	How something moves around, e.g. sound.
vibrations	Invisible waves that move quickly from the source to our ear.
volume	How loud or quiet a sound is.

## Sound

Sound is anything that can be heard and the object that makes that sound is referred to as the source. This sound is created by vibrations that are passed through the air around them until they reach your ear – these are called sound waves.

Sound travels in invisible waves through the air/water, etc... until it reaches the ear and can be heard. The brain recognises these vibrations as sound.



How the particles look when creating a sound wave

## Pitch:

High pitch sounds are created by short soundwaves.



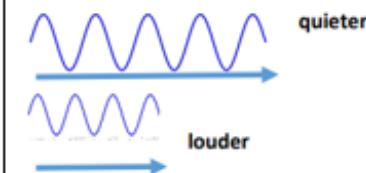
Low pitched sounds are created by long soundwaves.



## Volume:

The closer you are to the source of the sound, the louder the sound will be.

The further away you are from the source of the sound, the quieter the sound will be.



1. Sound source



2. Travels in waves



3. Reaches the ear drum



4. Nerves pass this to the brain



5. Our brain alerts us to the noise



## Animals Including Humans

### Ecosystems

An ecosystem is how living things react together in their environment. A balanced ecosystem is when animals and plants live together harmoniously.

### Digestive System

Our Digestive System is the process by which we eat and store food ready to be used as energy. The digestion of food starts with the mouth before moving through other parts of our internal organs to be released as waste.



### Producers

Eaten by → **Prey**

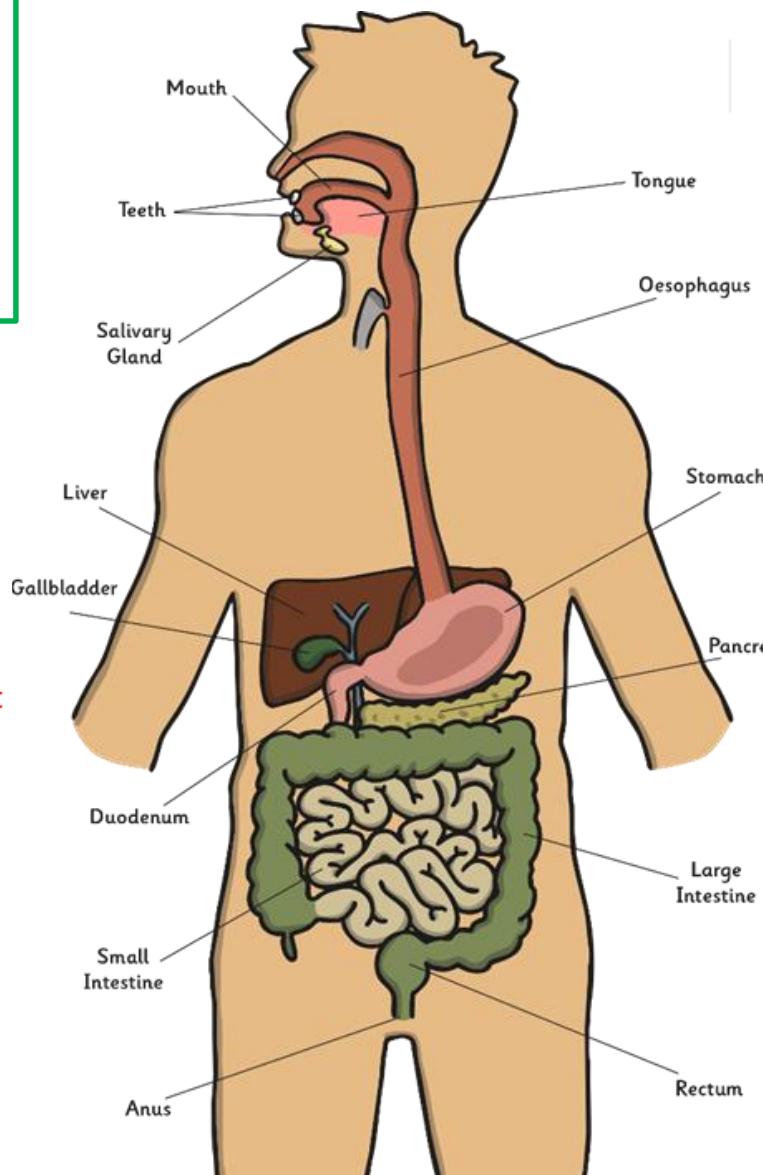
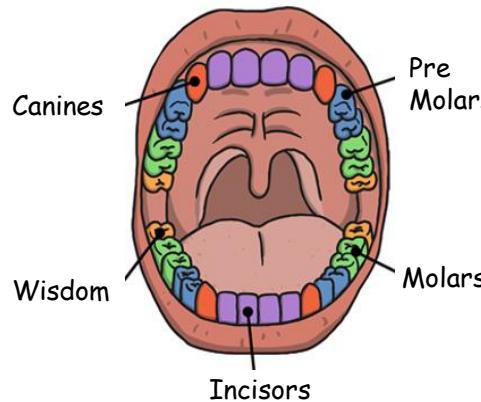
Eaten by →

### Predators

**Producers** are growing things that get their energy from the sun

**Consumers** can be **Herbivores** and **Omnivores** who get energy by eating plants

**Consumers** can also be **Carnivores** and **Omnivores** get energy by eating other animals.



### Key Vocabulary

food chain	A series of animals (organisms) that are linked by what they eat.
carnivore	An animal that eats meat.
herbivore	An animal that eats plants.
omnivore	An animal that eats both plants and other animals.
predator	An animal that hunts and eats prey animals.
prey	An animal that is eaten by other animals.
producer	Plants in a food chain.
consumer	An organism that eats to produce energy.
digest	Break down food so that it can be used by the body.
incisors	Teeth that are used for biting and cutting food.
canines	Teeth that are used for tearing and ripping food.
premolars	Teeth that are used to hold and crush food.
molars	Teeth that are used to grind food.
wisdom teeth	Third set of molar teeth that are no longer required by humans.
oesophagus	A muscular tube which forms the path from the mouth to the stomach.
small intestine	Absorbs nutrients from food.
large intestine	Absorbs water from waste food and transports the waste for the body to get rid.
stomach	An organ in the body where food is digested.
enzymes	These are chemical reactions that help break down food in our body.

# Science: Year 4

## States of Matter

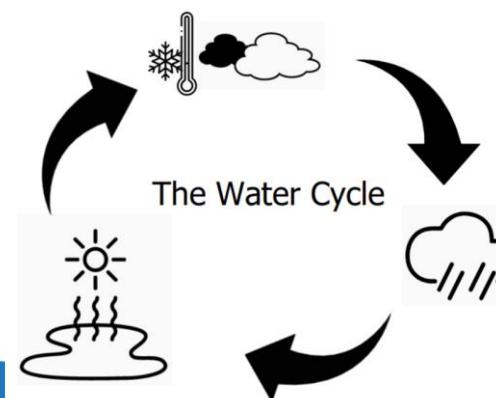
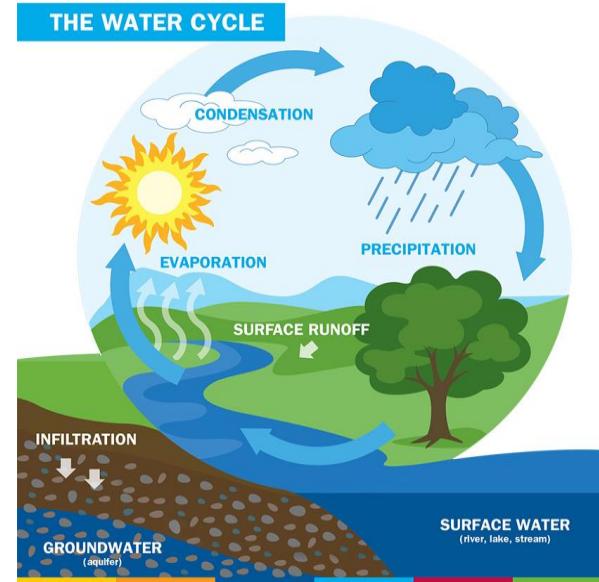
### Key Vocabulary

<b>solid</b>	Materials that keep their shape unless a force is applied to them.
<b>liquid</b>	Materials that take the shape of the container that they are in and can flow and be poured.
<b>gas</b>	Materials that spread to completely fill the area that they are in. They do not keep their shape.
<b>reversible change</b>	A change that can be undone, e.g. water can be melted and frozen.
<b>irreversible change</b>	A change that cannot be undone, e.g. wood can be burned but not un-burned.
<b>melting point</b>	The temperature at which a solid melts and becomes a liquid.
<b>freezing point</b>	The temperature at which liquid becomes a solid.
<b>particle</b>	A very small piece of matter that make up solids, liquids and gases.

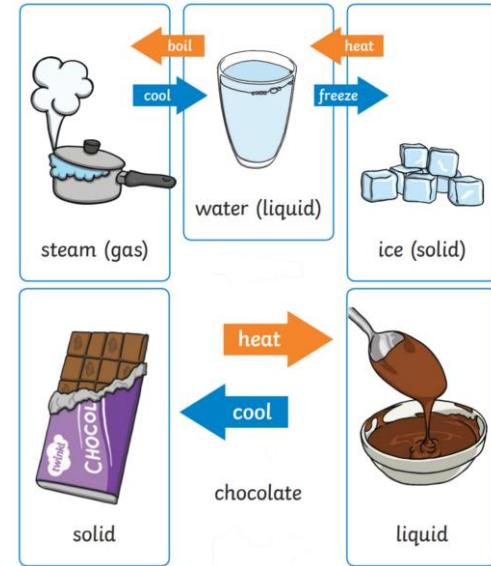
### Key Vocabulary

<b>Water Cycle</b>	The on-going process where water moves around the Earth and changes state.
<b>evaporation</b>	The process where liquids change to a gas or vapour.
<b>condensation</b>	The process by which vapour changes back into liquid.
<b>precipitation</b>	The technical term for rain, sleet, snow or hail falling from the sky.
<b>vapour</b>	The gas phase of water.

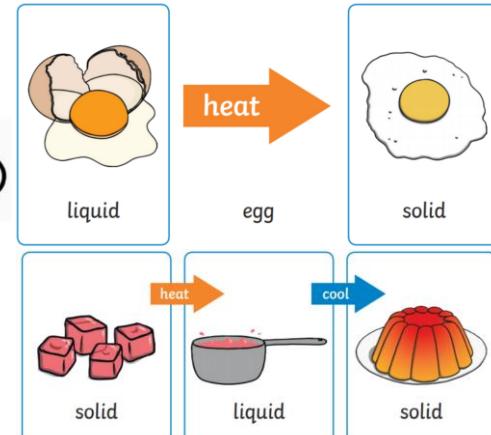
States of Matter	Properties				
	Can Be Weighed	Occupies Space	Fixed Shape	Fixed Volume	Can Be Compressed
Solids	✓	✓	✓	✓	✗
Liquids	✓	✓	✗	✓	✗
Gases	✓	✓	✗	✗	✓



### Reversible Changes



### Irreversible Changes

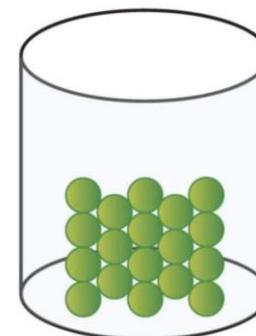


# Science: Year 5 – Properties and Changes of Materials.

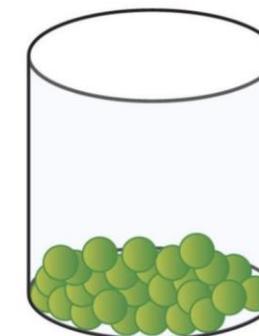
## Key Vocabulary

<b>transparent</b>	Allows light to pass through so that objects behind can be seen.	<b>opaque</b>	Can't be seen through, not transparent.
<b>rigid</b>	Unable to bend or be forced out of shape.	<b>flexible</b>	Capable of bending easily without breaking.
<b>conductor</b>	A material or device which allows heat or electricity to carry through.	<b>Insulator</b>	A substance which does not readily allow the passage of heat or sound.
<b>magnetic</b>	Capable of being magnetised or attracted by a magnet.	<b>thermal</b>	Relating to heat.
<b>states of matter</b>	Different types of matter – solid, liquid or a gas.	<b>solid</b>	Firm and stable in shape, not a liquid or fluid.
<b>liquid</b>	A substance that flows freely but can be measured by volume e.g. water or oil .	<b>gas</b>	An air-like fluid substance which expands freely to fill any space available.
<b>reversible</b>	Able to be reversed back to its original state.	<b>irreversible</b>	Cannot be reversed back to its original state.
<b>evaporation</b>	The process of turning from liquid to vapour.	<b>dissolve</b>	When something solid mixes with a liquid and becomes part of the liquid.
<b>soluble</b>	Able to be dissolved, especially in water.	<b>solution</b>	solvent + solute
<b>solute</b>	A solid that can dissolve in a liquid	<b>solvent</b>	A liquid which will dissolve a solid

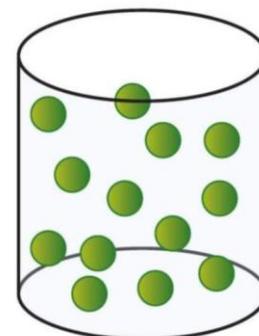
## States of matter



**Solid**

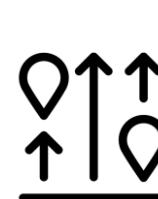


**Liquid**



**Gas**

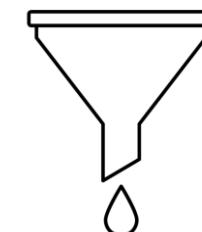
## Reversible changes



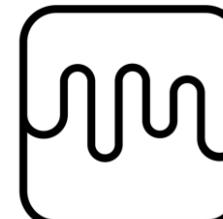
**Evaporating**



**Sieving**



**Filtering**



**Melting**



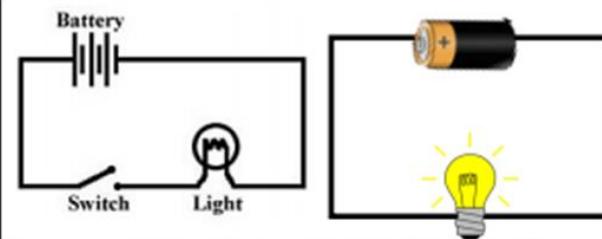
**Dissolving**

# Electricity

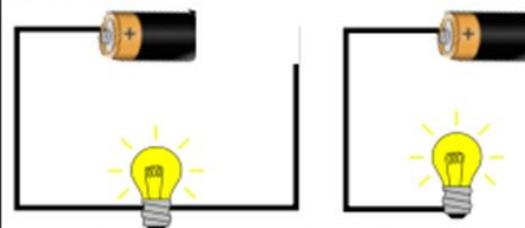
## Key Vocabulary

<b>electrical component</b>	A device that requires electricity to work and is used to build circuits.
<b>circuit</b>	A set of electrical components connected by wires. Can be either complete or incomplete.
<b>cell</b>	A portable single unit that converts chemical energy for a short period of time e.g. AA battery
<b>battery</b>	A Portable collection of cells that stores and provides energy over a long period of time e.g. car battery.
<b>electrical insulator</b>	Material that prevents electricity from flowing through it.
<b>electrical conductor</b>	Material that allows electricity to flow through it.
<b>electrons</b>	Electrons allow the electricity to flow through a wire.
<b>energy</b>	The power from sources such as electricity that makes machines work or provides heat.
<b>current</b>	A flow of electricity through a wire or circuit.

## Circuit Diagram



These **circuits will not work as they are incomplete.**



Common appliances that use electricity – some use cells, batteries or main electricity.



## Electrical Components For a Circuit Diagram



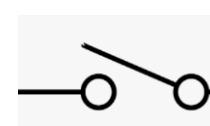
Cell



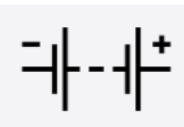
Wire



Buzzer



Switch off



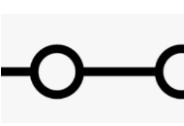
Battery



Bulb



Motor



Switch on

## Electrical Conductors

copper  
iron  
steel  
silver  
gold

## Electrical Insulators

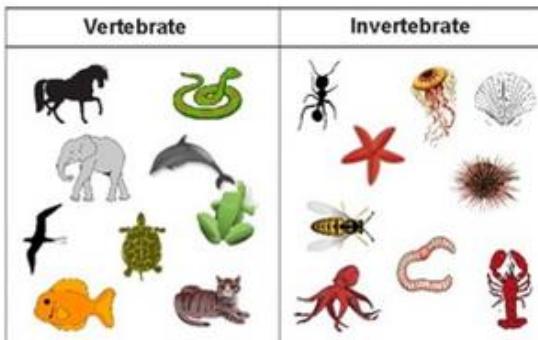
rubber  
wood  
plastic  
Paper

## Living Things and Their Habitats

## Key Vocabulary

<b>organism</b>	An animal or a plant.
<b>characteristic</b>	A property that something has.
<b>vertebrate</b>	An animal with a backbone.
<b>invertebrate</b>	An animal without a backbone that has an exoskeleton.
<b>backbone</b>	Spine – a collection of bones forming a backbone.
<b>classify</b>	To group together based on characteristics.
<b>environmental danger</b>	Anything in a natural habitat that can cause harm to an organism.
<b>endangered species</b>	Organisms that are at risk of becoming extinct.
<b>extinct</b>	An organism is extinct when there are none of them left at all on Earth.
<b>human impact</b>	The affect humans have on an environment which can be positive or negative.

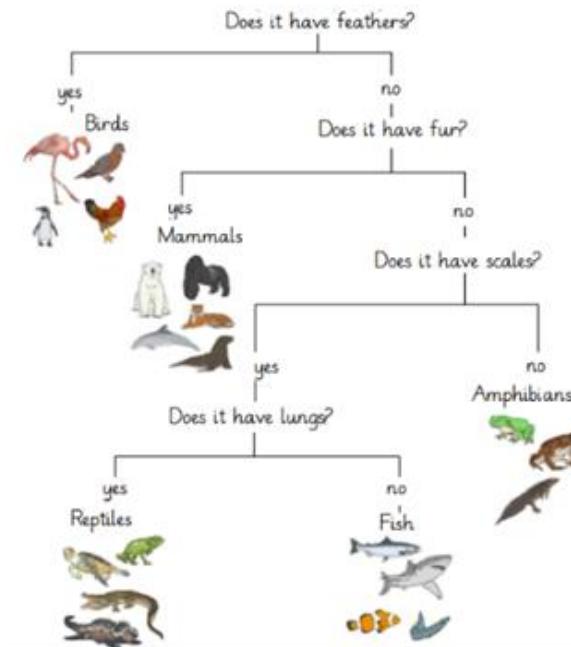
## Vertebrates and Invertebrates



## Features of living things

M	Movement 
R	Respiration 
S	Sensitivity 
G	Growth 
R	Reproduction 
E	Excretion 
N	Nutrition 

## Classification branching diagram



## What causes an environment to change?

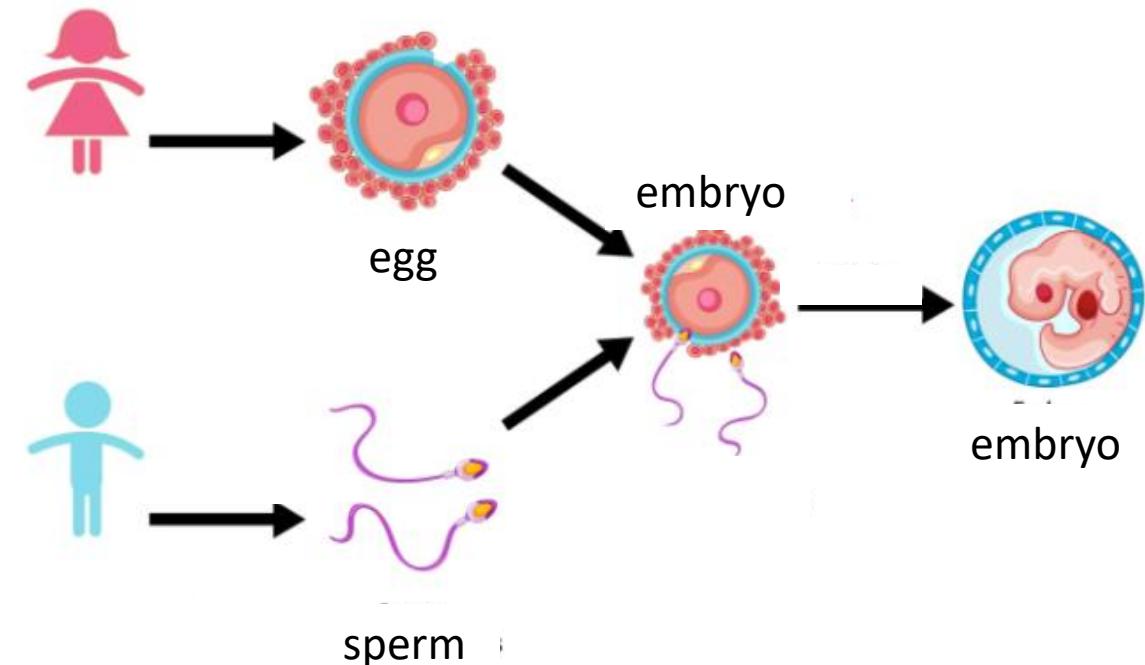
Natural	Human-made negative	Human-made positive
Earthquakes	Plastic pollution	Nature reserves
Volcanos	deforestation	Creating ponds
Storms	urbanisation	Tree planting
Wild fires	littering	Park areas
Floods	Increase in population	Wildflower meadows
Droughts	Fires	Rewilding
Seasons	Intensive farming	Animal protection

# Science: Year 5 – Animals, Including Humans.

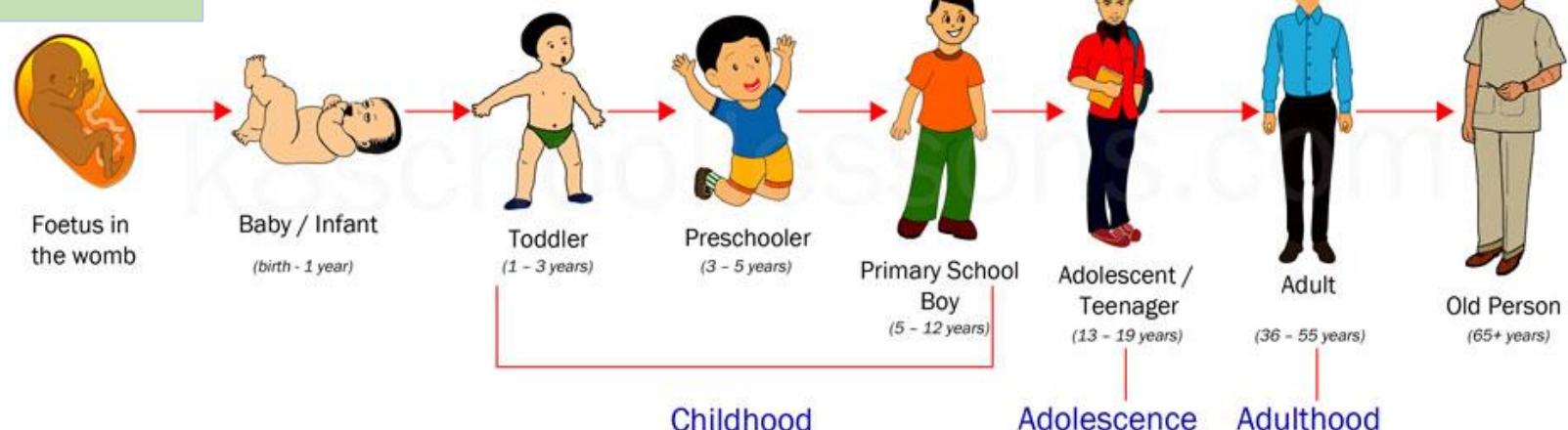
## Key Vocabulary

<b>child</b>	A young human being below the age of puberty.	<b>adolescent</b>	The process of development between a child and an adult (teenager).
<b>adult</b>	A person who is fully grown or developed.	<b>puberty</b>	The process of physical change through which a child's body matures.
<b>conception</b>	The point at which an egg is fertilised.	<b>gestation</b>	The process of developing inside the womb between conception and birth.
<b>foetus</b>	An unborn or unhatched offspring of a mammal.	<b>embryo</b>	An unborn offspring in the initial stages of development after fertilisation.
<b>reproduction</b>	The production of offspring by a sexual or asexual process.	<b>fertilisation</b>	The process in which male and female genes combine, allowing life to begin.
<b>life expectancy</b>	The average period that you may expect to live.	<b>offspring</b>	A person's child or children/ an animal's young.

## Reproduction process of humans



## Stages of human development

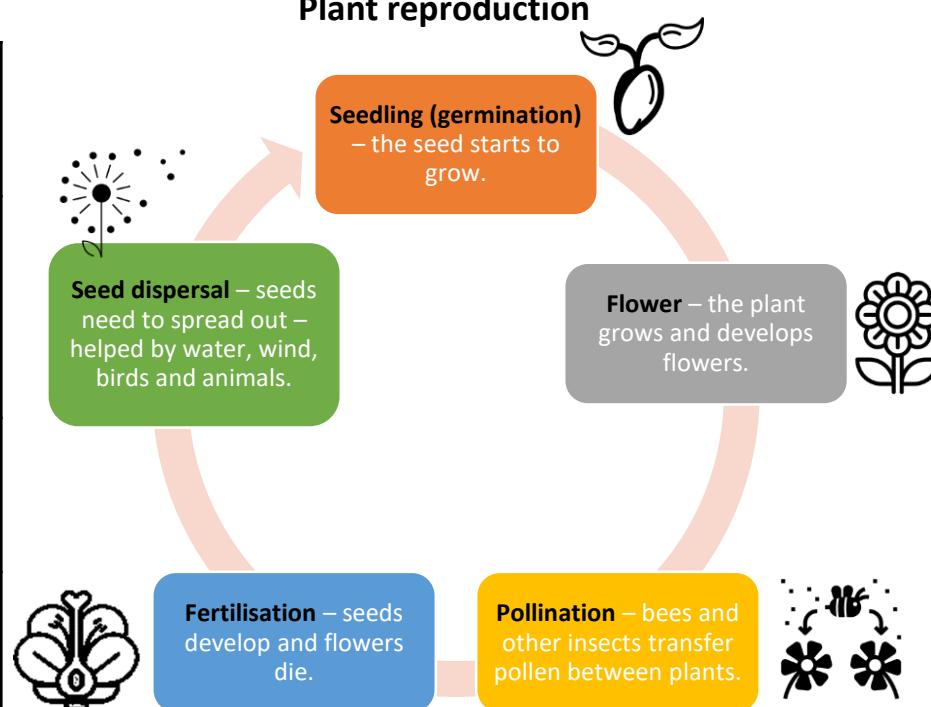


## Living Things and Their Habitats

## Key vocabulary

<b>life cycle</b>	The series of changes in the life of an organism including reproduction.
<b>fertilisation</b>	The process of combining male and female cells in a plant or animal so that a new life can be created.
<b>asexual reproduction</b>	Offspring get genes from one parent so are clones of their parents.
<b>metamorphosis</b>	The process of transformation from an immature form to an adult form in two or more distinct stages
<b>reproduction</b>	The process of new living things being made
<b>pollination</b>	The transfer of pollen to a stigma to allow fertilization.
<b>sexual reproduction</b>	Offspring get genes from both mum and dad, inheriting a mix of features from both.

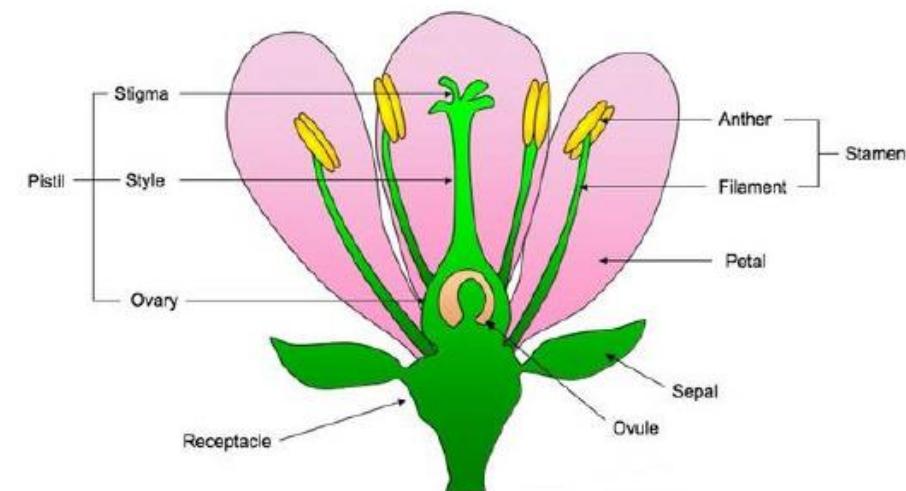
## Plant reproduction



**For most animals which live on the land, offspring are fertilised inside the mother's body. This happens in 1 of 3 ways:**

- 1) The young develop inside the female and are born alive (most mammals).
- 2) Fertilised eggs are laid outside the female's body and develop in the egg getting nourishment from the yolk.
- 3) In some animals the eggs are held within the female and hatch as they are laid e.g. a fruit fly.

## Parts of a plant



## Sexual reproduction

Needs a male and female part of the plant to reproduce.

Can produce a variety of plants so more likely to survive disease.

Plants will be more spread out.

Initial growth can be slower

## Asexual reproduction

Only needs the female or the male to reproduce – NOT both.

Off-spring are genetically similar so don't get the variation.

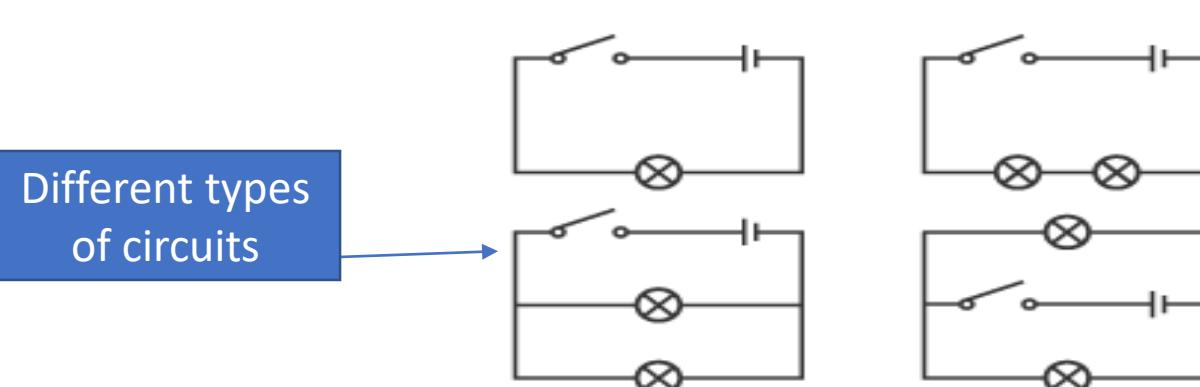
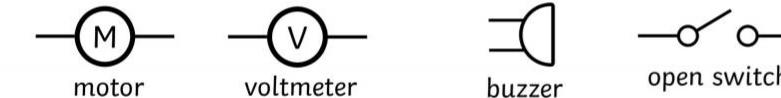
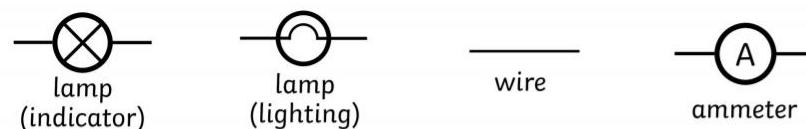
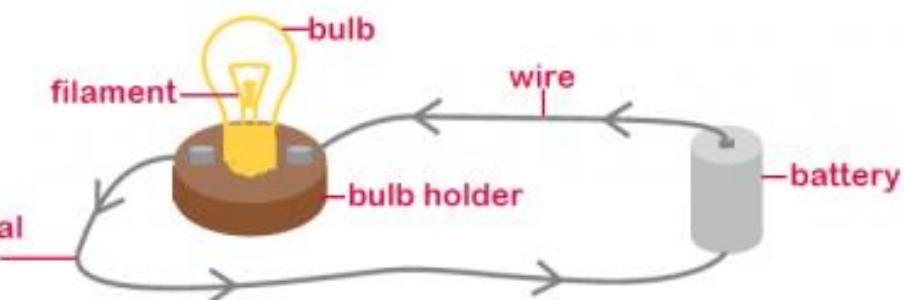
Tend to be closer together.

Initial growth is quick.

## Key Vocabulary

Battery	A container consisting of one or more cells where chemical energy is converted into electricity and used as a source of power.
Bulb	A glass bulb which provides light by passing an electrical current through a filament.
Buzzer	An electrical device that makes a buzzing noise and is used for signalling.
Cell	A device containing electrodes that is used for generating current.
Circuit	A complete and closed path around which a circulating electric current can flow.
Conductor	A material or device which allows heat or electricity to carry through.
Current	A flow of electricity which results from the ordered directional movement of electrically charged particles.
Electricity	A form of energy resulting from the existence of charged particles.
Filament	A conducting wire or thread with a high melting point that forms part of an electric bulb.
Motor	A machine powered by electricity that supplies motive power for a vehicle or other moveable device.
Switch	A device for making and breaking the connection in an electric circuit.
Voltage	An electrical force that makes electricity move through a wire, measured in volts.

## Electricity



**Circuit symbols**

**Earth and Space.****Key Vocabulary**

<b>star</b>	A burning mass of gas that makes heat and light energy (E.g. the Sun) held together by gravity.	<b>sun</b>	A huge star that Earth and the other planets in our solar system orbit.
<b>moon</b>	A natural satellite which orbits Earth or other planets.	<b>planet</b>	An astronomical object that orbits a star and does not emit its own light.
<b>Solar System</b>	A star with objects (such as planets) revolving around it.	<b>universe</b>	All of space and everything in it (including stars, planets and galaxies).
<b>galaxy</b>	An extremely large group of stars and planets held together by gravity (E.g. Milky Way and Andromeda).	<b>astronomy</b>	The branch of science that deals with space and the physical universe as a whole.

**Key knowledge**

- The Earth takes 365½ days (1 year) to orbit the Sun.
- The Earth take 24 hours to rotate on its axis.
- The moon orbits the Earth every 29 and a half days.
- Our Solar System has eight planets.
- Pluto was declassified as a dwarf planet in 2006.
- It is not safe to look directly at the Sun, even when wearing dark glasses.**

**Movement of the Earth**

orbit



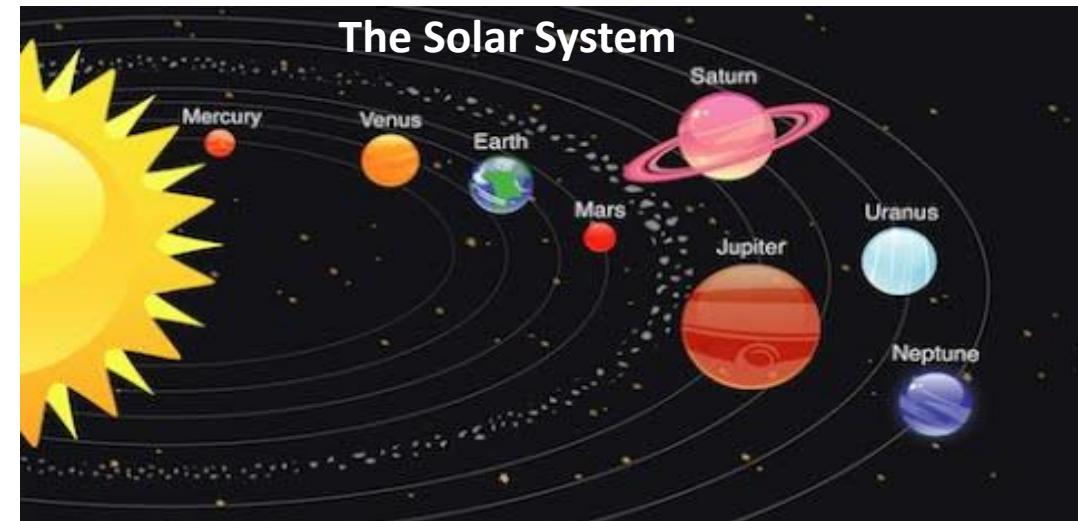
rotate



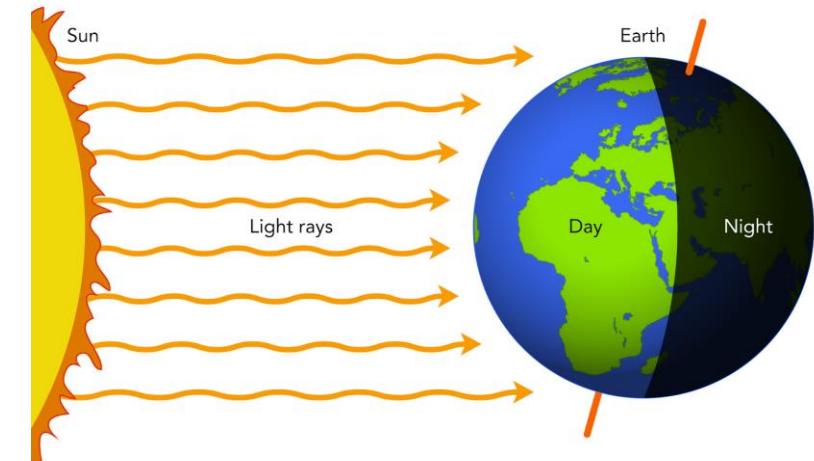
Axis



satellite



**My Very Enthusiastic Mother Just Served Us Noodles!**



# Science: Year 5 – Forces.

## Key Vocabulary

<b>force</b>	A push or pull upon an object resulting from its interaction with another object.		
<b>pull force</b>	To move something towards yourself, sometimes with great physical effort.	<b>push force</b>	To move something forwards or further away using physical pressure.
<b>attraction</b>	A force that pulls objects together. E.g. when a north pole is placed near the south pole of another magnet.	<b>repulsion</b>	A force that pushes two objects apart. E.g. when two like poles of a magnet are next to each other.
<b>mass</b>	A measure of the amount of matter in any solid object. Mass is measured in g , kg.	<b>Weight (gravity)</b>	Is the force of gravity acting on an object. Weight can change depending on how much gravity is acting on it. Measured in Newtons.
<b>resistance</b>	A force that acts to stop the progress of something or make it slower.	<b>mechanism</b>	A system of parts working together in a machine.

## Mechanisms

Allow a smaller force to have a greater effect.



Pulley



Lever

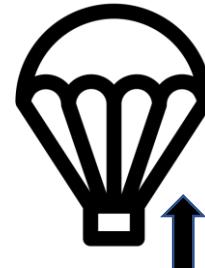


Gears

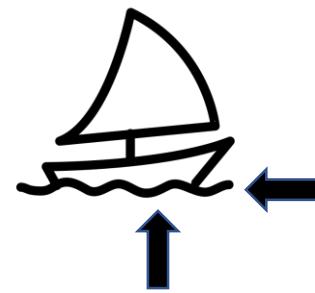
## Types of forces



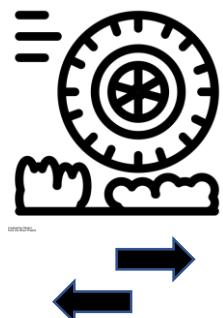
Gravity



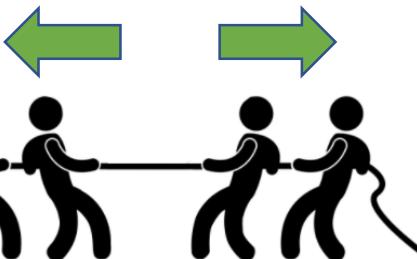
Air Resistance



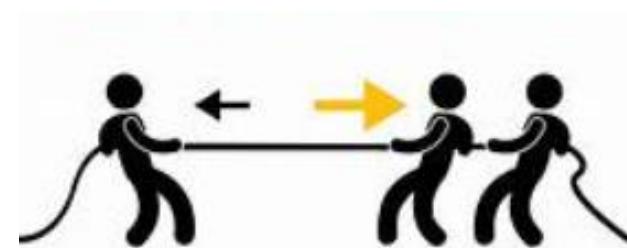
Water Resistance



Friction



Balanced Force



Unbalanced Force

Forces are measured in **Newton**s using a Newton meter.



## Key Vocabulary

Eyes	Globular organs of sight in the head of humans and vertebrate animals.
Filter	Pass through a device to remove unwanted material (liquid, gas, light or sound).
Light	The natural agent that stimulates sight and makes things visible.
Light source	Something that provides light, whether it be a natural or artificial source of light (e.g. the sun, a torch).
Periscope	An apparatus consisting of a tube attached to a set of mirrors or prisms through which an observer can see things that are otherwise out of sight.
Rainbow	An arch of colours visible in the sky, caused by the refraction and dispersion of the sun's light by rain or other water droplets in the atmosphere.
Reflection	The throwing back by a body or surface of light, heat or sound without absorbing it.
Refraction	The bending of light as it passes from one substance to another with the bending caused by the difference in density between two substances.
Shadow	A dark area or shape produced by a body coming between rays of light and a surface.
Spectrum	A band of colours, as seen in rainbows, produced by separation of the components of light by their different degrees of refraction.

### Overview

- Light appears to travel in straight lines
- Because light travels in straight lines, objects are seen because they give out or reflect light into the eye.
- We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- Because light travels in straight lines, shadows have the same shape as the objects that cast them.

Figure 1. How we see light sources

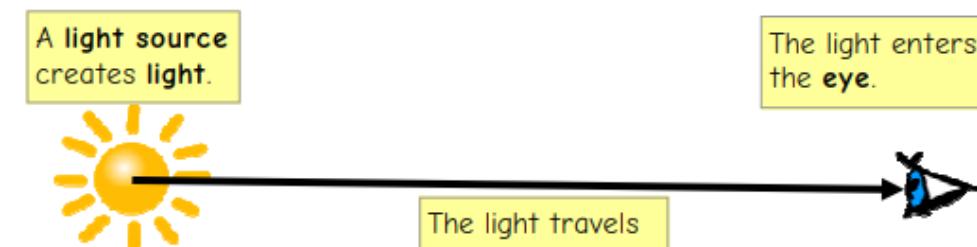
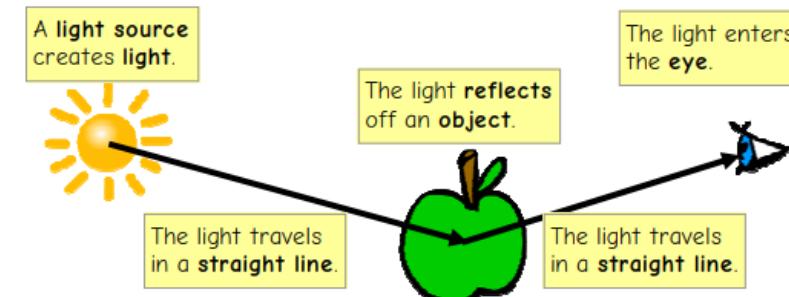


Figure 2. How we see objects that are not light sources



## Key Vocabulary

Adaption	An adaption is a trait (characteristic) changing to increase a living thing's chances of surviving and reproducing in a given environment.
Ancestor	A person or animal from whom one is descended.
Breeding	The process of producing plants or animals by reproduction.
Characteristic	A feature or quality belonging typically to a person, place, or thing, making them recognisable.
Environment	The circumstances, people, things or events which surround a person, animal, or plant.
Evolution	Adaptations that take place in a species over a long period of time in response to the environment.
Extinct	No longer has any living members, either in a particular place or in the world.
Fossil	The remains of an imprint of a prehistoric plant or animal which is embedded in rock and preserved.
Genes	A part of the DNA in a cell that controls the physical development, behaviour, etc. of an individual plant or animal and is passed on from its parents
Inherit	If you inherit a characteristic, you were born with it because your parents or ancestors also had it.
Natural Selection	The process whereby organisms that are better adapted to their environment tend to survive and produce more offspring.
Offspring	A person's child by birth or animal's young.
Reproduction	When an animal or plant produces one or more individuals similar to itself.
Species	A class of plants or animals whose members have the same main characteristics and are able to breed with each other.
Theory	A formal idea that is intended to explain something.
Variation	A change or slight difference.

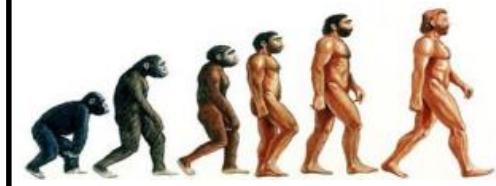
**Charles Darwin's theory of evolution**

The theory of evolution by natural selection is the process by which organisms change over a long period of time as a result of changes in response to the environment

Animals change over time and adapt to the surroundings in which they live. Darwin observed that there were many different forms of finch that had different beak sizes and shape. Once he considered the food source for each finch, he noted the reason for these adaptations.

A fossil is the remains or impression of a prehistoric plant or animal embedded in a rock and preserved. Fossils can provide information about living things that inhabited the Earth millions of years ago.

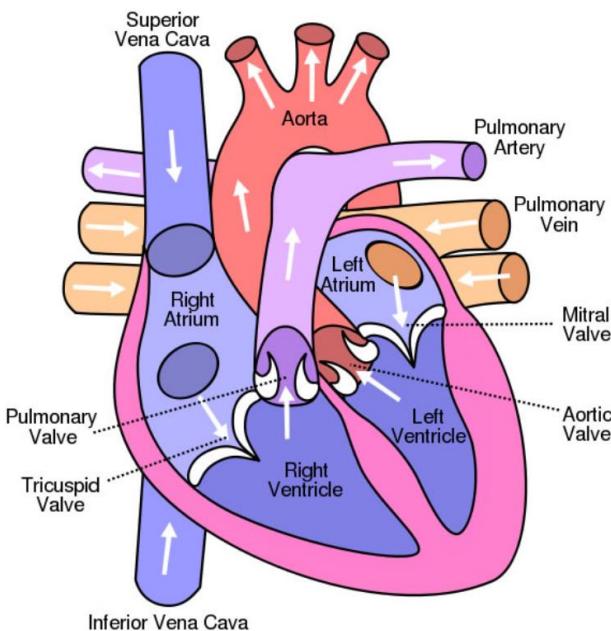
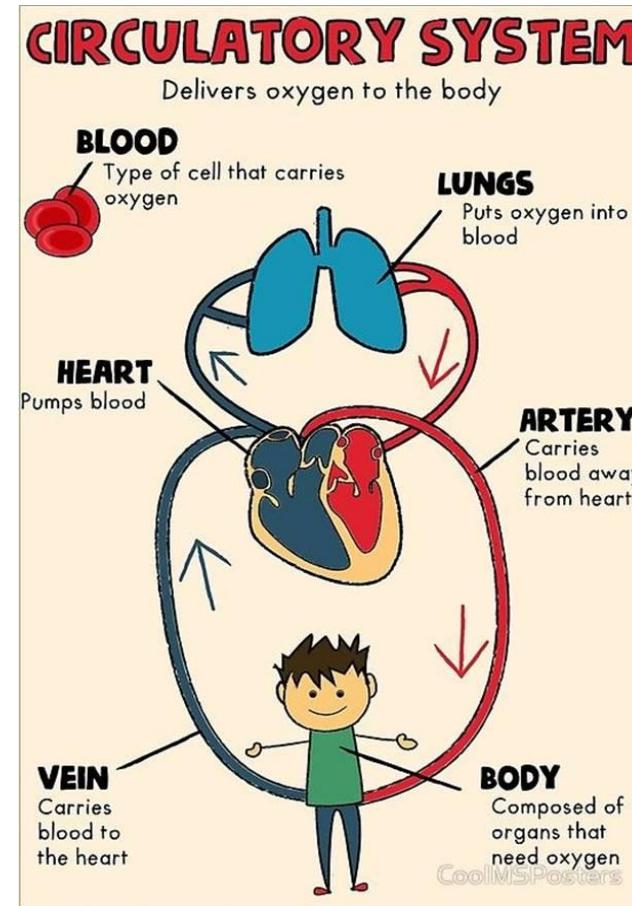
Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. In the same way that there is variation between parents and their offspring, there is variation within any species, even plants.



## Animals Including Humans

### Key Vocabulary

circulatory system	The system responsible for circulating blood through the blood that supplies nutrients and oxygen.
aorta	The main artery through which blood leaves your heart before it flows through the rest of your body.
arteries	A tube in your body that carries oxygenated blood from the heart to the rest of the body.
atrium	One of the upper chambers in the heart.
Ventricle	One of the lower chambers in the heart.
blood vessels	The narrow tubes through which your blood flows – arteries, veins and capillaries.
capillaries	Tiny blood vessels in your body.
carbon dioxide	A gas produced by animals and humans breathing out.
oxygen	A colourless gas that plants and animals need to survive.
deoxygenated	Blood that does not contain oxygen.
oxygenated	Blood that contains oxygen.
Respiration	A process of breathing – inhaling and exhaling air.
pulse	The regular beating of blood through your body.
veins	A tube in your body that carries deoxygenated blood to your heart.
vena cava	A large vein that carries deoxygenated blood to your heart.

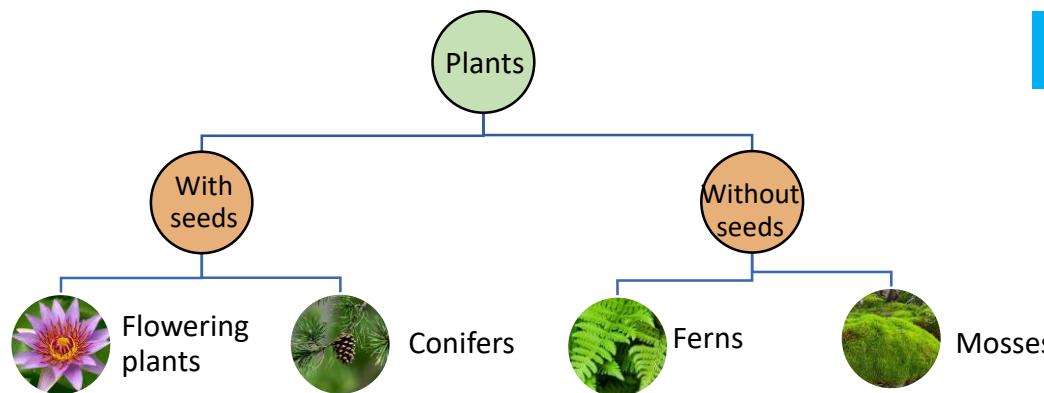
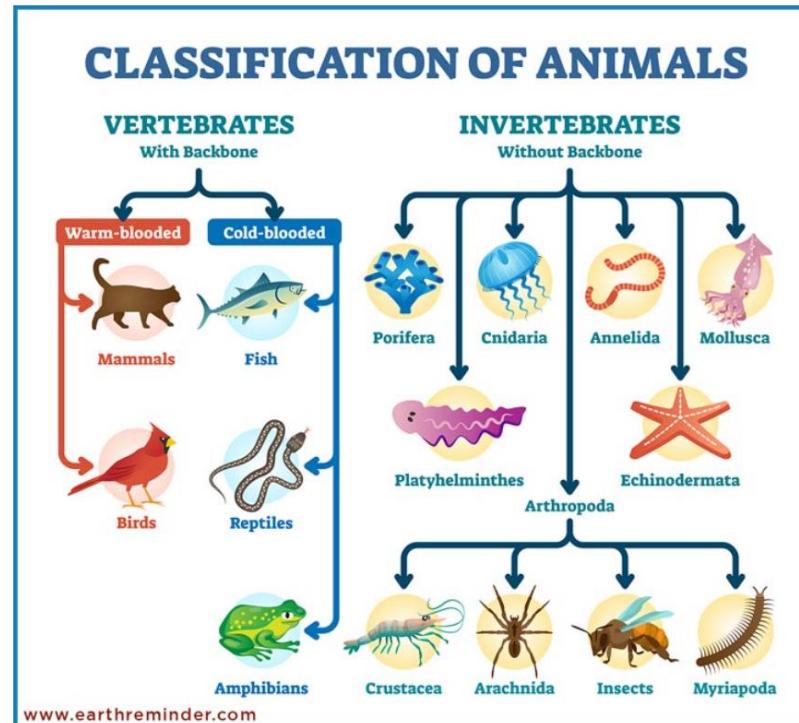


### Choices that can harm the circulatory system:

- Some choices such as smoking, drinking alcohol and lack of exercise can be harmful to our health.
- Tobacco can cause short-term effects such as shortness of breath, difficulty sleeping and long-term effects such as lung and heart disease.

## Living Things and Their Habitats

Key Vocabulary	
amphibian	Cold-blooded vertebrate that can live on both land and water. Lays eggs in water.
bird	Warm-blooded vertebrate with feathers and wings, usually can fly. Lays eggs.
insects	Invertebrate creature with 3 pairs of legs and 3 body parts. Often have wings.
mammals	Warm-blooded vertebrate that breathes air. Gives birth to live young.
reptiles	Cold-blooded vertebrate whose skin is covered in scales. Lays eggs.
characteristics	The qualities or features that belong to something and make them recognisable.
classification key	A system which divides things into groups or types.
cold-blooded	Animals whose body temperature depends on the environment they live in.
criteria	A factor on which something is judged.

**Carl Linnaeus**

- A Swedish scientist (18<sup>th</sup> Century).
- Famous for his work in taxonomy –the science of identifying, naming and classifying species (plants, animals etc)

Domain



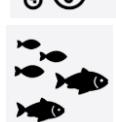
Kingdom



Phylum



Class



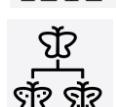
order



Family



Genus



Species





Assessment in science

EYFS	To ask scientific questions	To plan an enquiry	To make a prediction	To observe closely	To take measurements	To gather/record results	To present results	To interpret results	To draw conclusions	To evaluate an enquiry
Classification	Be able to ask questions about familiar objects or surroundings when sorting	Suggest / add items of similar type to given groups (add extra blue objects, shiny objects)	Ask children what they think might happen...in familiar situations	Be able to say something about / make a simple observation of e.g. colour, shape, size, texture.			Sort objects and living things into two simple groups (given criteria), e.g. all the blue things, all the heavy things.	Indicate which group includes more objects than the other	Be able to talk about why they think some things have happened	
Research	Ask questions about what they have observed.						Communicate what they have learnt through drawing.	Communicate orally, in simple descriptions and explanations, e.g. talk about their own environment.		
Comparative test	Suggest an idea for investigation. With support from teacher, frame as a	Select a piece of equipment they might use for a particular purpose, e.g.		Comment on what they see as they investigate.	Make comparisons through observation of e.g. size, weight,	Participate in class data collection.	Present information orally and in labelled drawings.	Answer questions in relation to, e.g. heavy /		

	simple question.	a slotted spoon to separate beads from sand.			distance travelled, capacity or position, measuring these using non-standard units, where appropriate.			light, fast / slow.		
<b>Observation over time</b>	Ask "why" questions based on their own interests.			Be able to comment on how things change over time e.g. how a plant has changed/ a tree over the seasons/ how they have changed from when they were a baby.		Take photographs of their findings	Produce labelled drawings to communicate their ideas			
<b>Pattern seeking</b>	Suggest an idea for investigation. With support from teacher, frame as a simple question.			Can comment on how 2 objects are different from one another. E.g. colour/ texture/		Participate in class data collection.	Talk about what they have found out.			

# Assessment Milestones in Science

Working Scientifically						
	By the end of Year 2		By the end of Year 4		By the end of Year 6	
	Y1	Y2	Y3	Y4	Y5	Y6
Approaches to enquiry	<p><b><i>Children should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including (1) observing changes over a period of time, (2) noticing patterns, (3) grouping and classifying things, (4) carrying out simple comparative tests and (5) finding things out using secondary sources of information.</i></b></p>	<p><b><i>Children should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including (1) observing changes over time, (2) noticing patterns, (3) grouping and classifying things, (4) carrying out simple comparative and fair tests and (5) finding things out using secondary sources of information.</i></b></p>	<p><b><i>Children should select the most appropriate ways to answer science questions using different types of scientific enquiry, including (1) observing changes over different periods of time, (2) noticing patterns, (3) grouping and classifying things, (4) carrying out comparative and fair tests and (5) finding things out using a wide range of secondary sources of information.</i></b></p>			
Planning	<ul style="list-style-type: none"> <li>• asking simple questions and recognising that they can be answered in different ways</li> </ul>	<ul style="list-style-type: none"> <li>• asking relevant questions and using different types of scientific enquiries to answer them</li> <li>• setting up simple practical enquiries, comparative and fair tests</li> </ul>		<ul style="list-style-type: none"> <li>• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> </ul>		
Observing	<ul style="list-style-type: none"> <li>• observing closely, using simple equipment</li> <li>• performing simple tests</li> <li>• identifying and classifying</li> </ul>	<ul style="list-style-type: none"> <li>• making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> </ul>		<ul style="list-style-type: none"> <li>• taking measurements, using a range of scientific equipment with increasing accuracy and precision, taking repeat readings when appropriate</li> </ul>		
Recording	<ul style="list-style-type: none"> <li>• gathering and recording data to help in answering questions</li> </ul>	<ul style="list-style-type: none"> <li>• gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> </ul>		<ul style="list-style-type: none"> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</li> </ul>		
Concluding	<ul style="list-style-type: none"> <li>• using their observations and ideas to suggest answers to questions</li> </ul>	<ul style="list-style-type: none"> <li>• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• identifying differences, similarities or changes related to simple scientific ideas and processes</li> </ul>		<ul style="list-style-type: none"> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results. in oral and written forms such as displays and other presentations</li> </ul>		

		<ul style="list-style-type: none"> <li>• using straightforward scientific evidence to answer questions or to support their findings</li> </ul>	
Evaluating		<ul style="list-style-type: none"> <li>• using results to draw simple conclusions, make predictions for new values, suggest improvements, and raise further questions.</li> </ul>	<ul style="list-style-type: none"> <li>• using test results to make predictions to set up further comparative and fair tests.</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>



By the end of Year 2		By the end of Year 4		By the end of Year 6	
Y1	Y2	Y3	Y4	Y5	
<p>Can <b>identify and name</b> different familiar materials, including wood, plastic, glass, metal, water and rock</p> <p>Can <b>sort</b> objects according to the materials from which they are made</p> <p>Can <b>describe</b> the simple properties of a variety of materials, e.g. hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent</p> <p>Can <b>identify</b> at least two properties in a material using simple vocabulary correctly e.g. hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent</p> <p>Can recognise that an object like a spoon, a coat or a toy can be made from different materials and suggest why.</p>	<p>Can name a wide variety of materials (extending range from Y1), e.g. wood, metal (iron, steel, copper, aluminium), plastic, leather, glass, brick, rock (contrasting examples like chalk and granite), cotton, wool, paper and cardboard</p> <p>Can describe how materials have been used to make different objects, including objects made of more than one material</p> <p>Can describe how their actions, e.g. push, pull, twist, squash, cause the shape of solid objects to change</p> <p>Can explain how varying their actions (applying a larger force) affects how an object changes shape, e.g. 'if I pull my sock hard it stretches and gets longer'</p> <p>Can identify that not all plastics are the same and link the specific properties of different types of plastic to their use for different purposes, e.g. cling film wrapping, carrier bags, water bottles, scissors, tables and chairs</p> <p>Can identify why certain materials are used for specific purposes. Focus on properties that make a material useful, e.g.</p> <ul style="list-style-type: none"> <li>• Can identify and compare materials that might be used for certain purposes, deciding which would be</li> </ul>	<p>Can <b>compare and group</b> different kinds of rocks (used in familiar buildings / contexts) on the basis of their appearance and simple properties, e.g. whether they have visible crystals or not, whether they have fossils in them or not, whether they are permeable or impermeable, their durability and evidence of erosion.</p> <p>Can describe (in simple terms) how fossils are formed when things that have lived are trapped within certain rocks.</p> <p>Can explain (in simple terms) that soils are made up from rocks that have been broken down into tiny particles by weather and erosion and that this is combined with organic matter, such as dead vegetation and animal bones.</p> <p>Can describe similarities and differences between soils of different type (some from the locality).</p>	<p>Can <b>compare and group</b> a variety of materials according to whether they are solids, liquids and gases.</p> <p>Can <b>describe</b> properties of typical solids, liquids and gases</p> <p>Can <b>identify a range</b> of materials as solid based on their properties; including those that flow like a liquid e.g. sand, flour and those that are not rigid, e.g. sponge, fabrics, flexible plastics.</p> <p>Can explain how we know a gas is present, even though it cannot be seen, e.g. gas in fizzy drinks, gas inside a balloon, gas contained in soils and rocks.</p> <p>Can describe what happens as water is heated to boiling point.</p> <p>Can use terms associated with the water cycle, e.g. water vapour, evaporation, condensation</p> <p>Can give examples of changes of state where changes are reversible, within the water cycle</p> <p>Can explain that water evaporates at a faster rate if temperatures are higher, washing drying on line / e.g. puddles on playground over radiator.</p>	<p>Understand and can use science vocabulary to describe properties, e.g. relative hardness, permeability, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>Can carry out comparative tests of specific properties of materials and order results, e.g. relative transparency of different materials – variety of transparent, translucent and opaque materials...</p> <p>Know that some materials dissolve, while others do not dissolve and give examples.</p> <p>Recognise degrees of solubility and how this might change, e.g. as temperature increases. Identify when a solution is saturated and explain why this happens (in terms of particles). <i>Consider including dissolving in Y4 too (but ensure that learning does not directly repeat in Y5)</i></p> <p>Can describe how to retrieve dissolved solids from a solution (reversible change). Understand ways that the rate of evaporation to retrieve a dissolved solid can be slowed or increased.</p> <p>Can describe ways of separating materials from a liquid that have not dissolved, e.g. by filtering or sieving as appropriate.</p> <p>Can separate a mixture containing a dissolved solid and two undissolved solids.</p> <p>Knows that some changes are irreversible, e.g. burning and rusting.</p> <p>Can select appropriate materials and structures to use as packaging for products, e.g. chocolates, for different purposes (more complex requirements), e.g. to protect chocolates from heat/water damage, breakage, changes in temperature (thermal insulation)</p> <p>Dissolved gases as well as solids – how many burps in a bottle of lemonade?</p> <p>Can describe examples of reversible and irreversible changes, identifying permanent changes that have taken place, e.g. light and burn a candle, bake cakes, look for rusting metals around school or reversible e.g. freezing flavoured water to make lollies, making ice cream, melting and cooling chocolate to make crispy cakes</p>	

	best, e.g. which material would make the best...coat for a rainy day?			
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By the end of Year 2		By the end of Year 4		By the end of Year 6	
Y1	Y2	Y3	Y4	Y5	Y6
<p>Can <b>identify and name</b> a number of common wild and garden plants found in the school grounds – 5 or more of each, including some familiar trees. <i>Choose local named examples – about 20, e.g. dandelion, daisy, nettle, pansy, rose, sunflower, trees – willow, cherry</i></p> <p>Can <b>name</b> the basic parts of flowering plants, e.g. flower, stem, trunk, leaf and root – <i>picked up again in Y3</i></p> <p>Understands that plants can be very different, e.g. that trees, grass, garden plants and indoor plants are all different types of plant</p> <p>Can use the word deciduous to describe plants that lose their leaves in autumn and evergreen to describe plants that keep their leaves (and indicate some familiar examples) – <i>relevant to seasonal change</i></p>	<p>Can describe how seeds and bulbs change as they germinate and grow into mature plants</p> <p>Can recognise that different seeds and bulbs grow into different types of plant</p> <p>Can use key vocabulary to describe observations of changes that take place, e.g. shoot, seedling, grow, growing, (germination), names of parts of plant</p> <p>Can explain in simple terms what happens if a plant has too little / too much water or light – use plants (already growing) such as pansies, runner beans, sweet peas and carry out simple comparative tests.</p> <p>Can describe what plants need to keep them healthy.</p> <p>Knows (and can describe) how to care for plants that they grow in a pot, container or planted garden</p> <p>Notices that plants (in a raised bed or garden) grow better when they are watered regularly and kept weed free</p> <p>Knows that plants that grow in different places in the school grounds are suited to the conditions there, e.g. meadow flowers in uncut areas, daisies and dandelions on school field,</p>	<p>Can <b>name the basic parts</b> of flowering plants, e.g. flower, stem, trunk, leaf and root (<i>building on Y1</i>), recognising examples in contrasting plants, e.g. on the class tree, buddleia bush, daisy/dandelion plant.</p> <p>Can <b>identify and describe</b> the jobs done by different parts of flowering plants, e.g. flower, stem, trunk, leaf, root and fruit (including nuts and seeds).</p> <p>Recognise that different plants require different conditions and react in different ways when they don't have enough light, water, nutrients or room to grow.</p> <p>Can explain, using accurate vocabulary, what happens when plants don't have enough light, water, nutrients or room to grow.</p> <p>Can describe how water is transported through a plant, entering through the roots and leaving through the leaves.</p> <p>Notice that flowers play an important part in the life cycle of flowering plants, including pollination, seed formation and seed dispersal – <i>links to reproduction and life cycles in Y5. Ensure that examples are different from those planned for Y5.</i></p> <p><b>Animals including humans</b></p> <p>Can explain that animals, including humans, have different requirements</p>	<p>Use appropriate vocabulary as they <b>identify and name</b> familiar animals and plants.</p> <p>Can suggest different ways of grouping living things, e.g. as flowering / non-flowering plants; vertebrate animals as fish, amphibians, reptiles, birds and mammals and invertebrate animals as snails and slugs, worms, spiders and insects.</p> <p>Can suggest ways that environments can change and that this can sometimes pose dangers to living things. Give positive and negative examples of human (their) impact, e.g. <i>planting a bumblebee friendly garden (appropriate planting – links to planting programme), dropping lots of litter on a local beach / in a park.</i></p> <p>Can use classification keys to help group, identify and name a variety of living things in their local and wider environment. <i>Links to Y6</i></p>	<p>Can compare the life cycles of plants and animals in their local environment with other plants and animals around the world</p> <p><b>In plants:</b></p> <p>Can describe the life cycle of a variety of plants, naming the stages i.e. germination, growth, flowering, fertilisation, pollination, seed dispersal.</p> <p>Can explain why each stage of the life cycle of a plant is important to the reproduction of plants.</p> <p>Can use scientific vocabulary to name and describe reproductive parts of a flower, their function and the process of reproduction, e.g. flower, petals, carpel, stamen, ovary, pollen, seed, fruit.</p> <p>Explain that different plants are pollinated in different ways, i.e. insects, wind, water, mechanical, and give real examples.</p> <p><b>In animals:</b></p> <p>Can describe the life cycle of a variety of animals, e.g. <i>several familiar and less familiar mammals – cow/sheep, dog/cat, hedgehog/squirrel, polar bear/killer whale, an amphibian other than a frog – newt, several familiar and less familiar insects – bumble bee, butterfly, woodlouse, spider, ladybird, several familiar and less familiar birds – blackbird, robin, duck, chickens, owl, peregrine falcon.</i></p>	<p>Can describe how/why living things are classified into broad groups, i.e. according to their observable characteristics – e.g. <i>there are several different varieties of prunus (cherry) trees around the school grounds. Their leaves are similar, but there are differences in flower structure (multi petals or single petal) and shape of tree.</i></p> <p>Can use the correct vocabulary to describe types of animals, e.g. amphibians, reptiles, birds, mammals, vertebrates, invertebrates, arachnid, mollusc, insect, crustacean – <i>building on Y5</i></p> <p>Can give reasons for classifying plants based on specific characteristics.</p> <p>Can give reasons for classifying animals based on specific characteristics</p>

<p><b>Animals including humans</b></p> <p>Can <b>identify and name</b> a number of common animals, including fish, amphibians, reptiles, birds and mammals - <i>5 or more of each (where possible), including familiar pets</i></p> <p>Can <b>identify and name</b> familiar animals that are carnivores, herbivores and omnivores, e.g. eagle, fox, cat, dog and lion as carnivores; sheep, cow, goldfish, giraffe as herbivores; human, hedgehog, pig, badger as omnivores.</p> <p>Can <b>name</b> the body parts of some familiar animals, e.g. of a goldfish, frog, lizard, blackbird and dog and suggest how they are the same and different</p> <p>Can compare the body parts of humans to those of other animals and suggest how they are similar and different</p> <p>Can use correct vocabulary to <b>name</b> the main body parts (head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth teeth) and identify where they are on the body</p>	<p>rushes and water lilies around pond.</p> <p><b>Animals including humans</b></p> <p>Can <b>name</b> the simple stages of different <b>animal life cycles</b>, as they describe how animals grow and change, e.g. caterpillar, pupae, butterfly or frog spawn, tadpole, frog or baby, toddler, child, teenager, adult – <i>ensure these life cycles are not re-taught explicitly in Y5</i></p> <p>Can show understanding that the offspring of a familiar animal will grow and change over time to become more like its parent – <i>links to Y6 Evolution and inheritance</i></p> <p>Can <b>describe</b> what animals, including humans, need to live and be healthy, e.g. understand that they need water, food and air</p> <p>Can <b>name a variety</b> of animals that have different diets, describing them (where appropriate) as carnivores, herbivores and omnivores and talking about what they eat – <i>builds on Y1, introduction of carnivores, herbivores and omnivores. Links to Y3 Animals including Humans.</i></p> <p>Can <b>describe</b> what humans need to keep them fit and healthy and give relevant examples from their own lives. <i>Links to Y3 Animals including Humans.</i></p>	<p>for nutrition (food) – referring back to Y1 animals that are carnivores, omnivores or herbivores</p> <p>Can identify different types of food and organise into basic food groups, e.g. dairy and eggs, meats, grains, fruit and vegetables – builds on Y1 and links to Y6 Animals including Humans</p> <p>Can recognise the need for a balanced diet for good health, e.g. that a little chocolate is good, but too much can lead to health problems, but fruit and vegetables can safely be eaten in greater quantity links to Y6 Animals including Humans</p> <p>Can explain that animals including humans have skeletons of different types – discussion might include exoskeleton of familiar insects</p> <p>Can identify and describe function of parts of skeleton, e.g. backbone and muscles – support, skull and ribcage – protection, long bones – movement</p>	<p><b>Animals including humans</b></p> <p>Identify and name the main body parts associated with the digestive system, and use the correct vocabulary, i.e. mouth, tongue, teeth, oesophagus, stomach and small and large intestine</p> <p>describe the simple functions of the basic parts of the digestive system in humans</p> <p>identify the different types of teeth in humans and their simple functions</p> <p>comparing the teeth of carnivores and herbivores, and suggesting reasons for differences</p> <p>Know what damages teeth.</p> <p>construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<p>Can compare the life cycles of different animals, recognising similarities and differences, e.g. <i>typical mammal compare with an insect (ladybird) and/or amphibian (newt).</i></p> <p>Recognise and use term metamorphosis for lifecycles of insects and amphibians.</p> <p>Know about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.</p> <p><b>In plants:</b></p> <p>Can describe the difference between sexual and asexual reproduction and give examples, e.g.</p> <p>Know that some plants have male and female flowers, e.g. holly, courgette, marrow, horse chestnut tree, holly tree, while others have flowers with male and female plants, e.g. pansy, sunflower, daffodil, rose, poppy, daisy.</p> <p>Can describe how plants reproduce asexually, e.g. by throwing out runners (e.g. strawberry, blackberry), and that gardeners can generate new plants by taking leaf, stem or root cuttings from a parent plant.</p> <p><b>In animals:</b></p> <p>Can describe sexual reproduction (as part of the life cycle) in a variety of animals.</p> <p>Include; mating rituals – birds, mammals; male and female roles in reproduction – raising young</p>	<p><b>Animals including humans</b></p> <p>Can describe how the heart works using the correct vocabulary.</p> <p>Can describe how the circulatory system works using the correct vocabulary.</p> <p>Can describe what happens to the heart when a person exercises.</p> <p>Can compare graphs of different heart rates and discuss how they are different or the same.</p> <p>Can describe what is needed for a balanced diet, identifying the types of foods needed. Building on Y3</p> <p>Can give examples of how a diet needs to be adjusted in certain circumstances e.g. an athlete, for a vegetarian, a marathon runner, a diabetic or a coeliac.</p> <p>Can describe what happened to a person when they don't have the appropriate lifestyle including the use of drugs.</p> <p><b>Evolution &amp; Inheritance</b></p> <p>Know about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution</p>
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	<p><b>Living things and their habitats</b></p> <p>Can <b>compare</b> a variety of objects and describe the differences between things that are living, dead, and things that have never been alive</p> <p>Can <b>identify</b> living things that live in familiar local habitats and say how they are suited to that habitat</p> <p>Can <b>describe</b> how different habitats provide for the basic needs of different kinds of animals and plants, i.e. food, water and shelter</p> <p>Can <b>identify and name a variety</b> of plants and animals in familiar, local habitats – <i>expect greater variety in naming, building on those plants and animals named in Y1</i></p> <p>Can <b>identify and name</b> different sources of food, e.g. for familiar animals such as hedgehog, fox, snail, wild birds</p> <p>Can <b>describe</b> how animals obtain their food from plants and other animals, using the idea of a simple food chain</p> <p>Construct a simple food chain that includes humans (e.g. grass, cow, human).</p> <p><b>Compare</b> animals in familiar habitats with animals found in less familiar habitats, for</p>			<p>(as part of the reproductive cycle); length of gestation...</p> <p>Know that some animals (can) reproduce asexually, e.g. stick insects, earthworms.</p>	<p>Can explain, in more detail, the formation of fossils of various types (including dinosaurs) – building on introduction in Y3 - rocks</p> <p>Can describe what fossils tell scientists about living things that lived millions of years ago, but are now extinct or have evolved.</p> <p>Know that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles</p> <p>Know that variation in offspring over time can make animals more or less able to survive in particular environments</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>
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	example, on the seashore, in woodland, in the ocean, in the rainforest.				
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By the end of Year 2		By the end of Year 4		By the end of Year 6	
Y1	Y2	Y3	Y4	Y5	Y6
<p><b>Seasonal Change</b></p> <p>Can name the four seasons of the year</p> <p>Can describe, in simple terms, differences between the seasons, e.g. by noticing differences in a series of images</p> <p>Can notice and describe changes they observe taking place in the natural environment around school, e.g. to a familiar deciduous tree</p> <p>Can name different types of weather, e.g. sunny, windy, rainy, cold, hot, foggy, icy</p> <p>Can describe how they feel in specific weather conditions</p> <p>Can make observations of weather over time and record these using a simple chart</p> <p>Can make observations and talk about changing light and day length.</p>		<p><b>Light</b></p> <p>Can explain that some light is needed if we are to see anything, i.e. that a 'dark' room usually has some light in it, so we can see objects dimly.</p> <p>Can explain that light reflects from surfaces and this enables us to see – include here objects that reflect light differently e.g. shiny/reflective surfaces and different colours Links to Y6</p> <p>Can describe how a shadow is formed, i.e. by an opaque object blocking the light Links to Y6</p> <p>Can describe what happens to shadows when a light source moves or the distance between the light source and the object changes.</p> <p>Links to Y6 Know that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p><b>Forces</b></p> <p>Can use correct vocabulary when describing how magnets work, e.g. 'North' and 'South' poles, attract / repel, attraction / repulsion.</p> <p>Can make predictions and / or describe what will happen when like and different poles of two magnets are placed next to one another.</p> <p>Can explain that not all metal objects are magnetic, i.e. that objects made of iron and steel are magnetic (age</p>	<p><b>Sound</b></p> <p>Can use appropriate vocabulary related to sound, e.g. vibrate, pitch, volume, comparatives – loud/soft, gentle/strong, louder/softer, higher/lower, as they describe and explain their ideas.</p> <p>Can describe how a sound is made when an object vibrates, e.g. when a guitar string is plucked..., or when a drum skin is hit.... It vibrates, making a sound.</p> <p>Can explain that we hear sounds because sound travels through a medium, i.e. a solid, a liquid or a gas, to our ears.</p> <p>Can describe in simple terms how our ears enable us to hear.</p> <p>Recognises that sound can be insulated by certain materials, e.g. if we close the door it reduces the noise from the corridor.</p> <p>Describe how the pitch of an instrument can be changed and identify a pattern, e.g. the longer the string the lower the note, the tighter the string the lower the note.</p> <p>Describe how the volume of sounds can change and recognise that e.g. strong</p>	<p><b>Earth in space</b></p> <p>Can describe how the view we have of the Moon changes over the course of a (lunar) month. Uses correct vocabulary to name Moon phases.</p> <p>Can name the planets and identify their order in the solar system. Uses a mnemonic of their own design to remind them of their order.</p> <p>Knows that planets orbit the Sun and that they take different amounts of time to do so.</p> <p>Can describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>Understands, through modelling, the relative sizes of different bodies in the solar system, e.g. compares Sun and Earth, Mercury and Saturn etc.</p> <p>Describe how the position of the Earth, relative to the Sun, affects the seasons on Earth.</p> <p>Explain that the Earth rotates and that this causes day and night and the apparent movement of the Sun across the sky</p> <p>Recognises that the existence of time zones around the Earth makes a difference to the time of day it is in other countries, e.g. compare UK to other known countries, like Sierra Leone. Links to light in Y6</p> <p><b>Forces</b></p>	<p><b>Light</b></p> <p>Explain that we see things because light travels from the object or is reflected from the object travels into our eyes.</p> <p>Can understand that light appears to travel in straight lines.</p> <p>Explain what happens when light is shone on an object.</p> <p>Explain how an object is seen i.e. Light travels from light sources to our eyes or from light sources to objects and then to our eyes.</p> <p>Describing how light behaves to explain why shadows have the same shape as the objects that cast them. E.g. I know that light travels in a straight line and when it is blocked, it casts a shadow in the shape of the object that has blocked it.</p> <p>Describing the size of shadows when the position of the light sources changes. E.g. Explaining why it is that the lower the light source is positioned, the longer the shadow of the object is. Builds on Y3</p>

		<p>appropriate – there are others) while most other metals, including copper, brass and aluminium, are not.</p> <p>Can compare how objects move over different surfaces, e.g. rolling a car, sliding a box loaded with weights, and describe what makes a difference.- links to Y5</p> <p>Notices that some forces need contact between two objects, e.g. kicking a ball, opening a door, pushing a swing, but magnetic force can act at a distance.- links to Y5</p>	<p>vibrations produce louder sounds.</p> <p><b>Electricity</b></p> <p>Identify common appliances that run on electricity by listing a number of common objects that need electricity to function.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers – <i>Link to Y6</i></p> <p>Associate metals with being good conductors whilst recognising some common conductors and insulators. Show understanding through explaining the differences – <i>Link to Y6</i></p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery – <i>Link to Y6</i></p> <p>Observe patterns e.g. bulbs get brighter if more cells are added or that some materials can/can't be used to connect across a gap in a circuit. They may explain what happens when extra components are added to a circuit with the same battery – <i>Link to Y6</i></p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit – <i>Link to Y6</i></p>	<p>Can explain the force of gravity in simple terms, as the 'pull' that acts on objects which fall towards the Earth.</p> <p>Can identify and describe the effects of other forces that act between moving surfaces, i.e. friction, air resistance and water resistance.</p> <p>Can describe how simple mechanisms 'make work easier' and give examples, e.g. gears on a bike, a lever to open a tin, nut crackers...</p>	<p><b>Electricity</b></p> <p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. May use some scientific vocabulary: electrical current, amp, volts – builds on Y4</p> <p>Draw simple, circuit and parallel diagrams using recognised symbols including lights, wires, switches and cells – builds on Y4</p> <p>Understand and explain different types of electricity: static electricity electric shocks, force fields</p> <p>Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches using some scientific vocabulary that could include: current, voltage, amps, bulb ratings</p> <p>Construct simple series and parallel circuits to help them answer questions about what happens – builds on Y4</p>
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