



Welton St Mary's Church of England Primary Academy



## Science Curriculum

*Together We Care, Learn and Thrive*



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



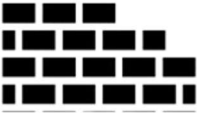


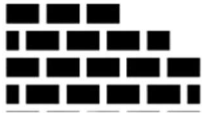






















### Science Intent

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.

- **Inclusive** 
- **Value each person** 
- **All to flourish** 
- **Strive for excellence** 
- **Rooted in God's love** 
- **Agents of positive change** 



# Science Overview

Year 1	Plants 	Seasonal Changes 	Materials 		Animals including Humans 
Year 2	Living things and their habitats 		Materials and their properties 	Animals including Humans 	Plants 
Year 3	Animals including Humans 	Forces and Magnets 	Light 	Rocks 	Plants 
Year 4	Sound 	States of Matter 	Living Things and their Habitats 	Electricity 	Animals including Humans 
Year 5	Living Things and their Habitats 	Animals including Humans 	Forces 	Earth and Space 	Properties and Changes of Materials 
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



Asking Questions



Evaluating



Interpreting and Communicating Results



Making Predictions



Observing and Measuring



Recording Data



Setting Up Tests

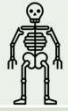





Knowledge Organisers

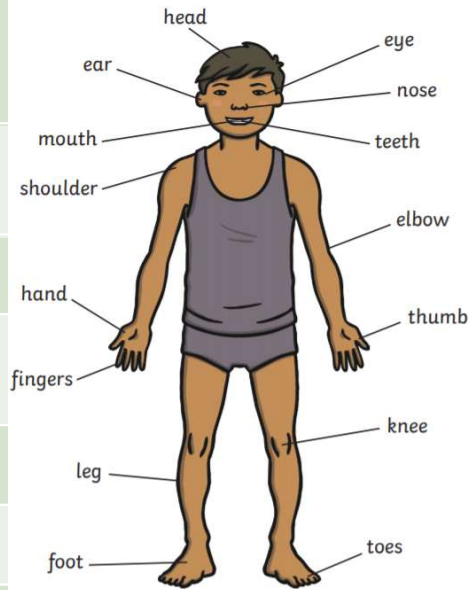
# Science: Year 1

## Animals Including Humans

### Key Vocabulary





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

Parts of the Body







### Types of Animals





**Fish**

 goldfish  tuna  shark  eel





**Amphibians**

 frog  toad  newt  salamander





**Reptiles**

 snake  tortoise  lizard  alligator

**Birds**

 penguin  chicken  seagull  robin

**Mammals**

 human  mouse  dog  cow

### Features of Animals

scales  
fins  
gills  
backbone

webbed Feet  
smooth Skin  
4 legs  
cold-Blooded  
backbone

dry/scaly Skin  
cold-blooded  
tail  
backbone

feathers  
beak  
claws  
wings  
backbone

fur/Hair  
hooves  
paws  
feet  
backbone

### The 5 Senses



Sight



Smell



Touch



Hear



Taste

# Science: Year 1

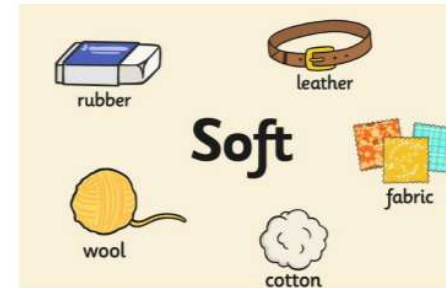
## Materials

### 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

<b>glass</b>	
<b>wood</b>	
<b>plastic</b>	
<b>metal</b>	
<b>water</b>	
<b>rock</b>	



## Science: Year 2

### Animals Including Humans







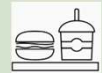
#### Key Vocabulary

<b>life cycle</b>	A series of changes that a living thing goes through during its life.
<b>offspring</b>	The child of an animal.
<b>reproduction</b>	The making of offspring.
<b>growth</b>	To get bigger and stronger.
<b>survive</b>	Continue to live.
<b>live young</b>	Offspring that has not hatched from an egg.
<b>young</b>	In early stage of life or growth
<b>child</b>	A young human being.
<b>adult</b>	A fully grown animal.




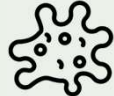
#### Overview

All living things pass through a life cycle which is a series of stages from when it is conceived until it produces the offspring of its own. All animals including humans need air, water and food to survive. To grow into healthy adults, they also need the right amounts and types of food as well as exercise. Good hygiene is important in preventing disease and illness.

#### Features of Living Things

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</b>	

#### Healthy Living

balanced diet 	exercise 	food types 
bones 	muscles 	heartbeat 
shelter 	breathing 	sleep 
hygiene 	germs 	disease 

#### Key People – Joe Wicks



Joe Wicks is best known as the Body Coach. He is a chef and fitness coach who teaches about the importance of exercise and healthy eating.

#### All animals including humans need









air 	water 	food 
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## Science: Year 2

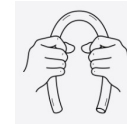
### Materials and Their Properties

#### Key Vocabulary

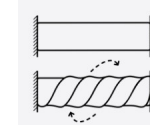
<b>materials</b>	What objects are made of.
<b>properties</b>	Describes what a material is like and how it behaves (stretchy, bendy, waterproof).
<b>suitable</b>	Right or appropriate for what it is being used for.
<b>opaque</b>	A material you <b>cannot</b> see through.
<b>transparent</b>	A material you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







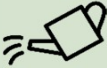




squashing

# Science: Year 2

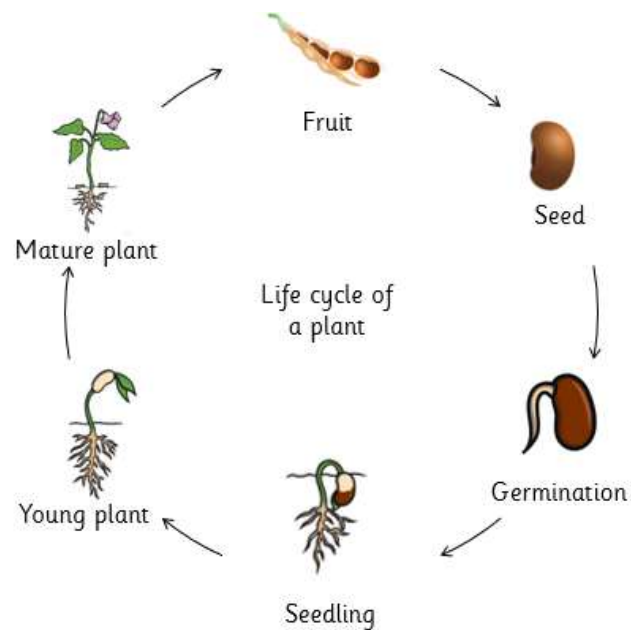
## Plants

### Key Vocabulary








plants		Living things that are rooted in the soil or grow in water.
seeds		Small, hard parts of a plant from which a new plant grows.
bulbs		Parts of some plants, mostly under the dirt, that store food while the plants are resting from growing.
germination		The process of a seed or a bulb starting to grow to create a new plant.
planting		Putting a seed or a bulb in the ground so that it can grow.
sunlight		All plants need sunlight to grow well. Some plants need lots of light while others prefer partial or full shade.
water		All plants need water to grow. Without water, seeds and bulb will not germinate.
temperature		Some plants like warm temperatures and some like cool temperatures.
food		Plants make their own food in their leaves using sunlight. They also get nutrients through the roots.

### Overview

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.






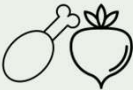
### Plants as Living Things

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

# Science: Year 2

## Living Things and Their Habitats

### Key Vocabulary

<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>		An animal that eats plants.
<b>carnivore</b>		An animal that eats other animals.
<b>omnivore</b>		An animal that eats both plants and animals.

### Types of Micro-Habitats



log



path



bush

### Types of Habitats



mountains



woodland



sea shore



savannah/grassland



ocean



rainforest







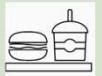


polar

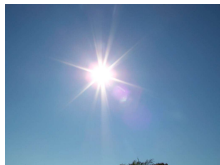


desert

### Features of Living Things

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

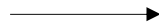
### Food Chain Example



sun- energy



grass - producer



rabbit - consumer (prey)



fox - consumer (predator)



alive



never alive



dead

# Science: Year 3

## Rocks

### Key Vocabulary

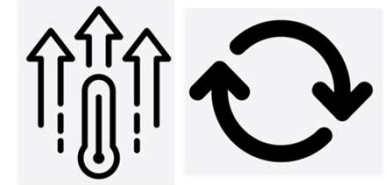
<b>igneous rock</b>	Rock that has been formed from magma or lava
<b>sedimentary rock</b>	Rock that has been formed by layers of sediment being pressed down hard and sticking together.
<b>metamorphic rock</b>	Rock that started out as igneous or sedimentary but changed due to being exposed to extreme heat.
<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.









igneous rock








sedimentary rock



metamorphic rock







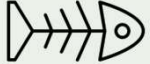


<b>IGNEOUS</b>	<b>SEDIMENTARY</b>	<b>METAMORPHIC</b>
 Granite   Pumice	 Sandstone  Limestone	 Marble  Slate

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

# Science: Year 3

## Animals Including Humans

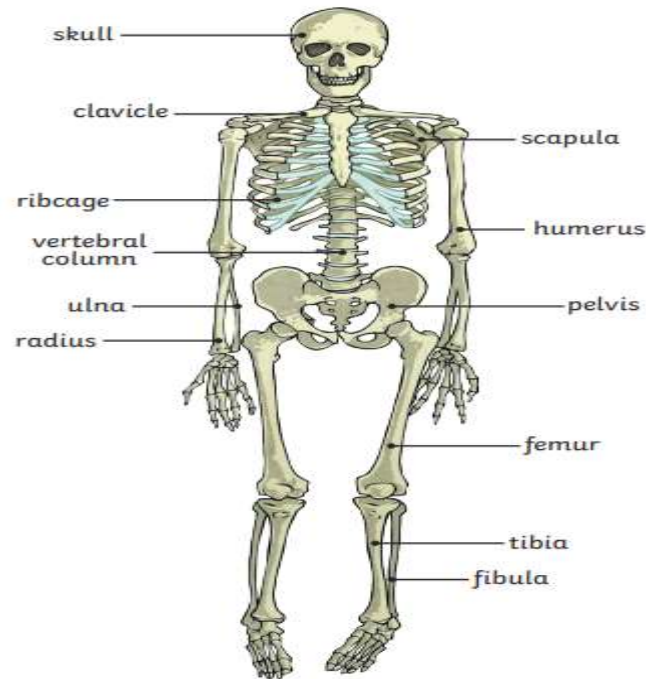
### Key Vocabulary

<b>healthy</b>		In a good physical and mental condition.
<b>nutrients</b>		Substances that animals need to stay alive and healthy.
<b>vertebrate</b>		Animals <u>with</u> backbones.
<b>invertebrate</b>		Animals <u>without</u> backbones
<b>muscles</b>		Soft tissues in the body that contract and relax to cause movement.
<b>joints</b>		Areas where two or more bones are fitted together.
<b>skeleton</b>		An internal or external framework supporting or containing the body of an animal or plant.
<b>endoskeleton</b>		Skeletons that are inside the body of an animal.
<b>exoskeleton</b>		Skeletons that are outside the body of an animal.
<b>hydrostatic skeleton</b>		A flexible skeleton supported by fluid pressure.

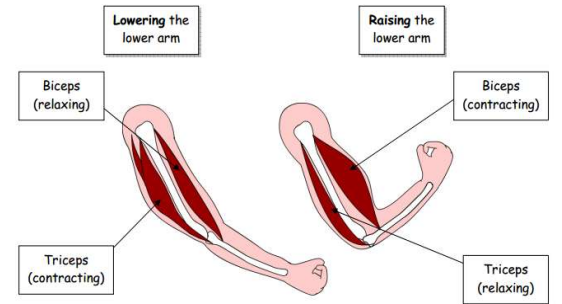
### The Skeleton

**Skeletons do three important jobs:**








- Protect organs inside the body;
- Allow movement;
- Support the body and stop it from falling on the floor.



### Muscles









### Food Groups

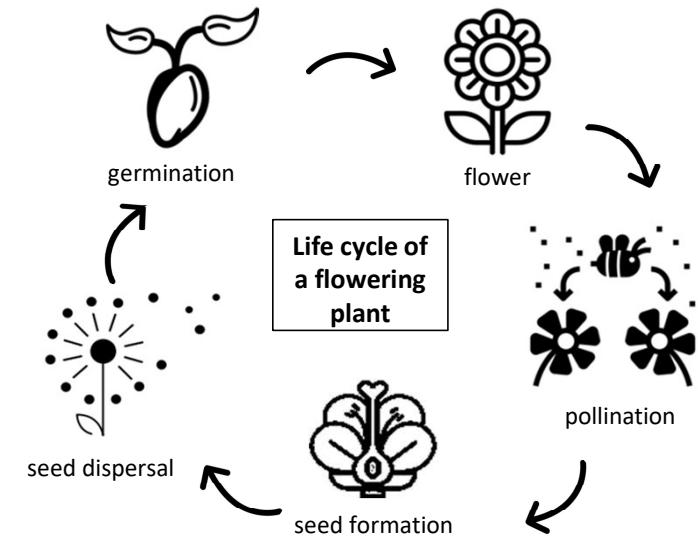
Nutrient	Found in... (examples)	What it does/they do
carbohydrates		provide <b>energy</b>
protein		helps growth and repair
fibre		helps you to digest the food that you have eaten
fats		provide <b>energy</b>
vitamins		keep you <b>healthy</b>
minerals		keep you <b>healthy</b>
water		moves <b>nutrients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

# Science: Year 3

## Plants

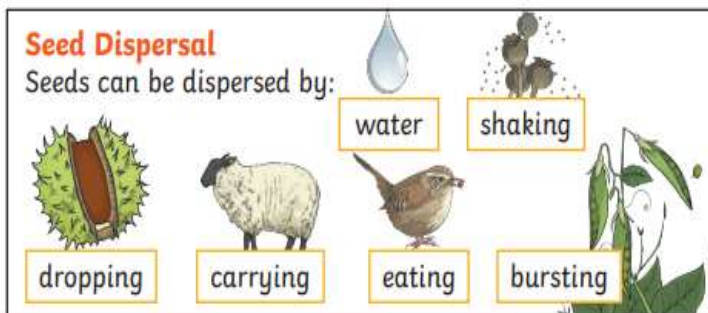
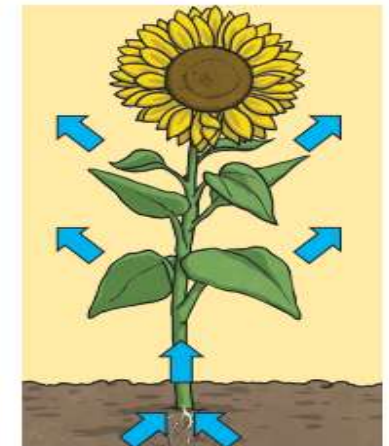
### Key Vocabulary

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



### 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**.



# Science: Year 3

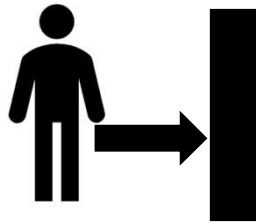
## Forces and Magnets

### 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>	A force that pushes objects away.
<b>attract</b>	A force that pulls objects together.

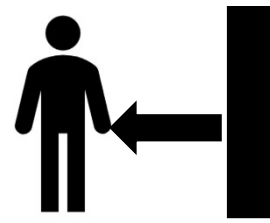
### Forces

Forces can change an object's speed, its direction, and even its shape.



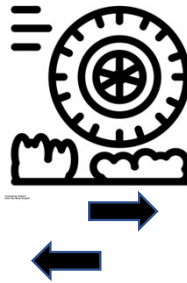
#### push

To move an object further away



#### pull

To move an object closer



#### friction

Slows things down

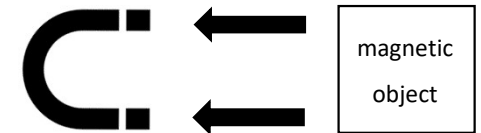
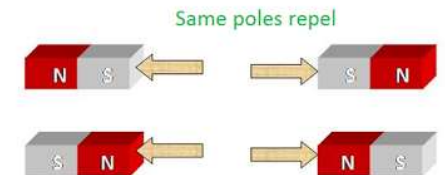


#### gravity

Pulls things down to Earth

### Magnets

Magnetic forces can act without direct contact, unlike most forces.



#### magnetic field

## Science: Year 3

### 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>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.

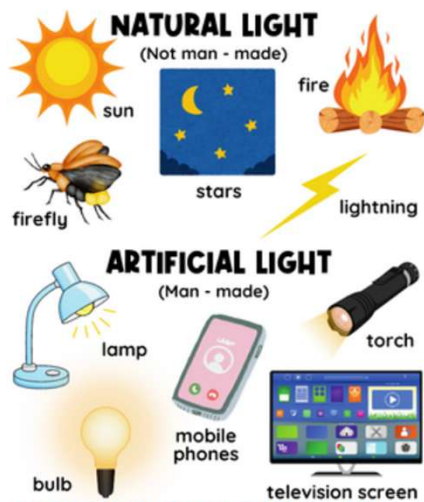
#### Key Information

Light travels in a straight line.

The pupil controls how much light enters the eye.



#### Sources Of Light

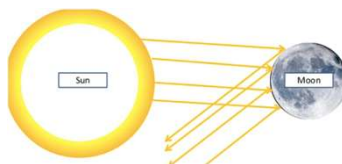


The Moon is not a source of light because it does not emit its own light. It reflects sunlight that reaches its surface.

#### Reflections

A reflection is formed when light hits a surface and 'bounces' back off it. Reflections allow the eye to see images such as in a mirror.

The moon is a natural reflector as it reflects the light of the sun.



#### Shadows

A shadow is formed when an opaque object blocks light. It causes a dark shape to form near the object, called a shadow.

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



#### Sun Damage

The sun gives off rays called UV rays that can hurt our eyes.

We can protect our eyes by:

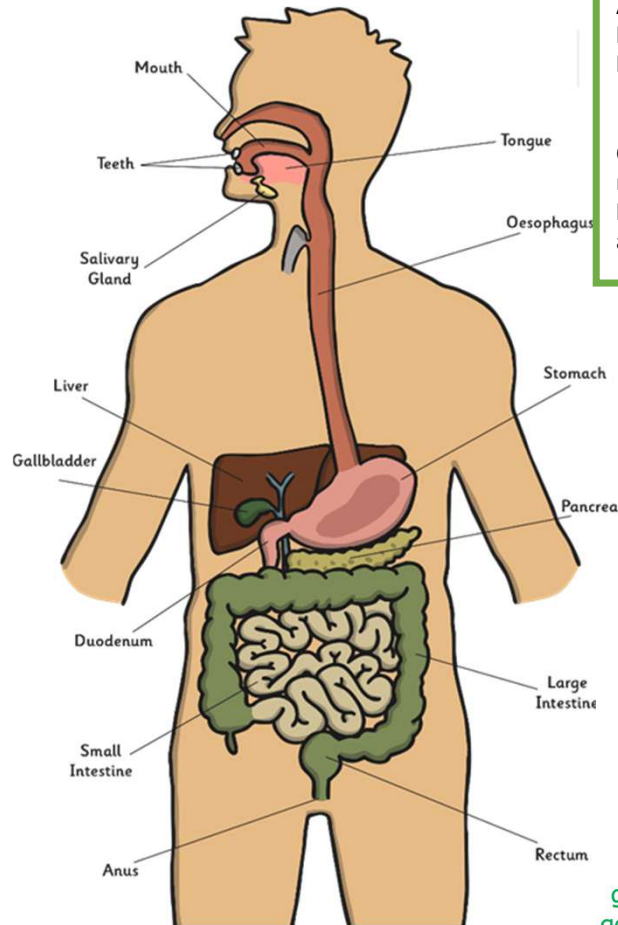
1. Wearing Sunglasses
2. Wearing a hat
3. Seeking shade, especially at the hottest time of the day.
4. Never look straight at the sun, even during sunrise or sunset, because it can damage your eyes very quickly.

# Science: Year 4

## Animals Including Humans

### Key Vocabulary

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

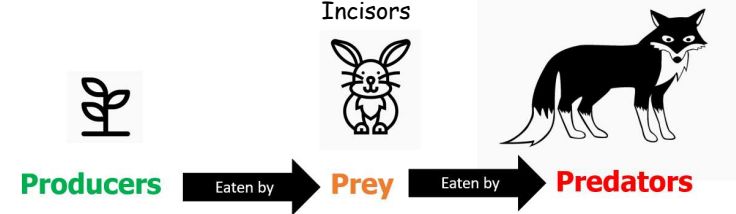
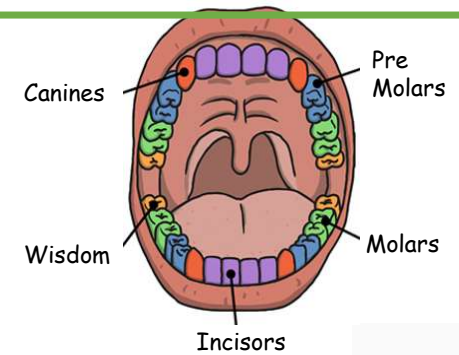


### Ecosystems

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

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

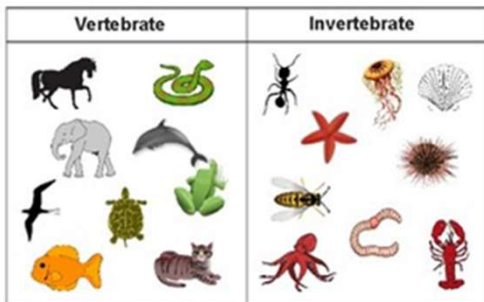
**Consumers** can also be **Carnivores** and **Omnivores** get energy by eating other animals.

# Science: Year 4

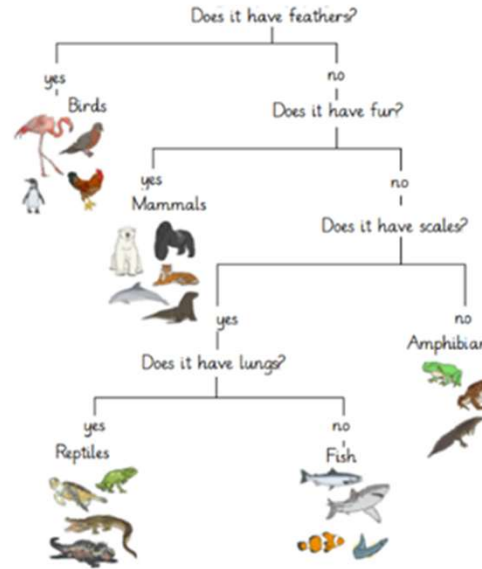
## Living Things and Their Habitats

### 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.



Classification branching diagram



### Features of Living Things

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</b> 

### What causes an environment to change?

Natural	Negative Human-Made	Positive Human-Made
earthquakes	plastic pollution	nature reserves
volcanos	deforestation	creating ponds
storms	urbanisation	tree planting
wildfires	littering	park areas
floods	increase in population	wildflower meadows
droughts	fires	rewilding
seasons	intensive farming	animal protection

# Science: Year 4

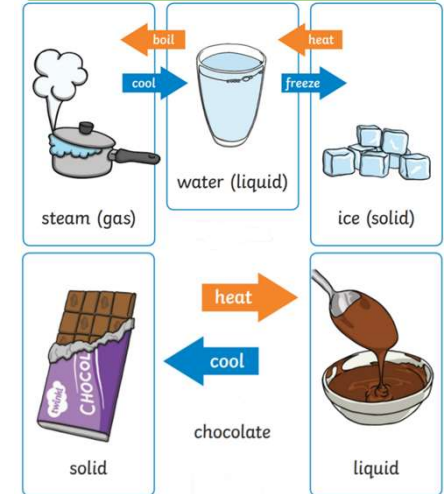
## States of Matter

### Key Vocabulary

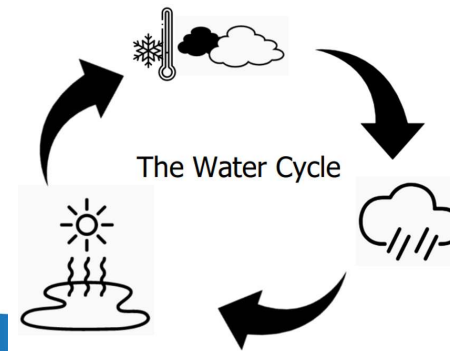
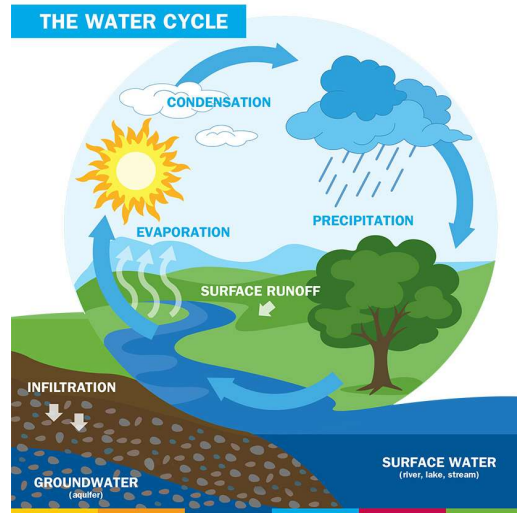
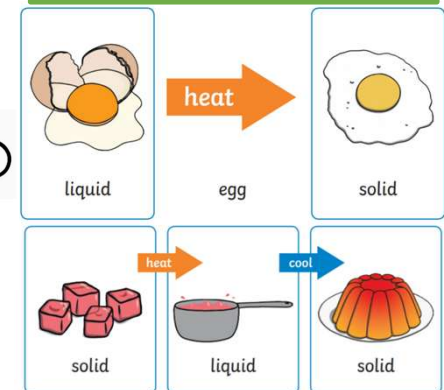
<b>solid</b>	Materials that keep their shape unless a force is applied to them.
<b>liquid</b>	Materials that take the shape of the container that they are in and can flow and be poured.
<b>gas</b>	Materials that spread to completely fill the area that they are in. They do not keep their shape.
<b>reversible 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.
<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
<b>Solids</b> 	✓	✓	✓	✓	✗
<b>Liquids</b> 	✓	✓	✗	✓	✗
<b>Gases</b> 	✓	✓	✗	✗	✓

### Reversible Changes



### Irreversible Changes



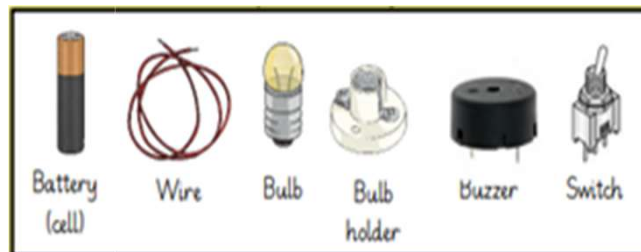
# Science: Year 4

## Electricity

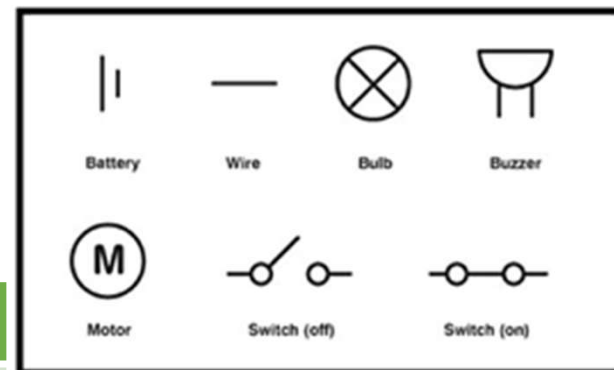
### Key Vocabulary

<b>circuit diagram</b>		Drawing showing the electrical components that make up a circuit.
<b>circuit</b>		A set of electrical components connected by wires. Can be either complete or incomplete.
<b>battery (cell)</b>		Portable devices that store and provide electricity.
<b>bulb</b>		Electrical component that produces light.
<b>switch</b>		Electrical component that is used to switch circuits on and off.
<b>buzzer</b>		Electrical component that produces sound.
<b>Wire</b>		Thin strips of metal which conduct electricity.
<b>electrical conductor</b>		Material that allows electricity to flow through it.
<b>electrical insulator</b>		Material that prevents electricity from flowing through it.
<b>electrical component</b>		A device that requires electricity to work and is used to build circuits.
<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.

### Electrical Components - Physical



### Electrical Components - Diagrams



### Electrical Appliances

Common appliances that use electricity:



Some appliances use batteries and some use mains electricity.

Batteries come in different sizes depending on how much and for how long the appliance is used.

Some appliances can also generate their own electricity using solar power, like garden lights.

### Examples of Conductors



### Examples of Insulators



# Science: Year 4

## Sound

### Key Vocabulary

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

### Overview

In this topic, we will learn how sounds are made, how sounds travel so that we can hear them and find patterns between volume, pitch and vibrations.

We can hear sounds because of the **vibrations** a **source** makes. Sound travels in **waves** to the ear drum, where a nerve passes the sound to the brain for us to recognize.

### Pitch

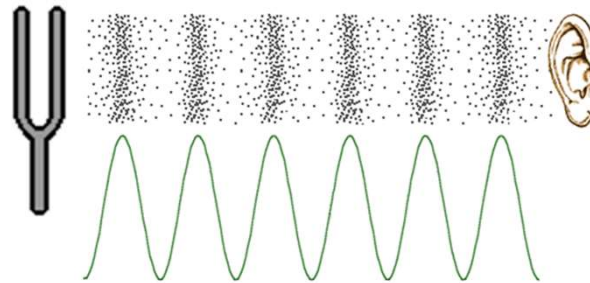


High Pitch = Short Soundwave



Low Pitch = Long Soundwave

### Particles in a Sound Wave



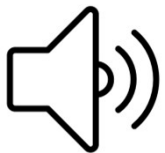
### Volume



Further Away = Quieter



Closer = Louder



Sound source



Travels in waves



Reaches the ear drum



Nerves pass this to the brain



Our brain alerts us to the noise

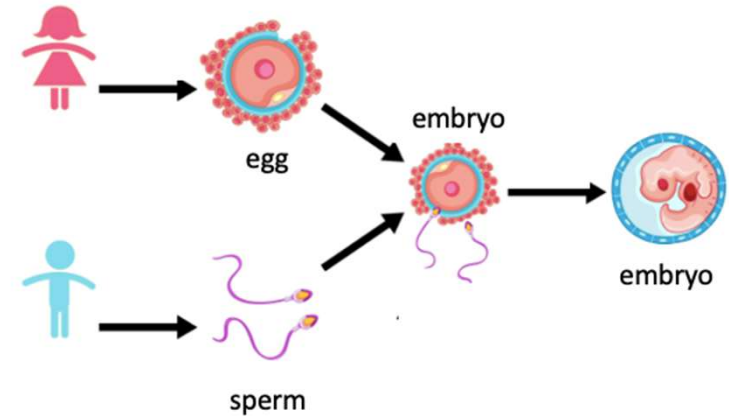
## Science: Year 5

### Animals Including Humans

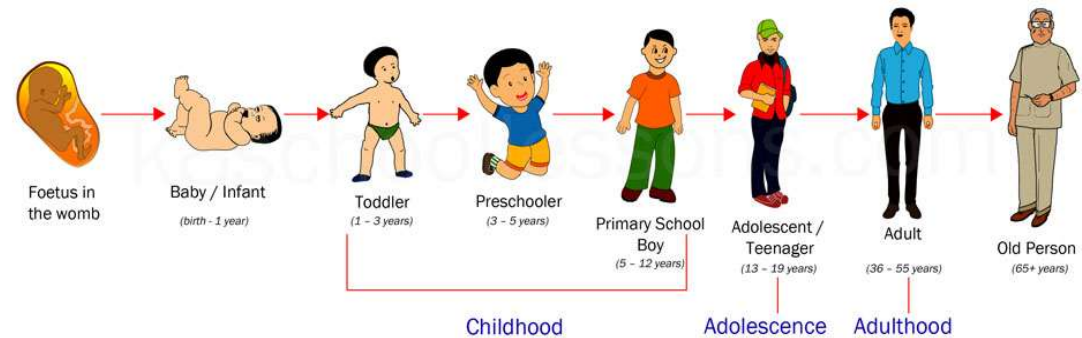
#### Key Vocabulary

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

#### Reproduction Process of Humans



#### Stages of Human Development



## Science: Year 5

### Living Things and Their Habitats

#### Key Vocabulary

<b>life cycle</b>	The series of changes in the life of an organism including reproduction.	<b>reproduction</b>	The process of new living things being made
<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>pollination</b>	The transfer of pollen to a stigma to allow fertilization.
<b>asexual reproduction</b>	Offspring get genes from one parent so are clones of their parents.	<b>sexual reproduction</b>	Offspring get genes from both mum and dad, inheriting a mix of features from both.
<b>metamorphosis</b>	The process of transformation from an immature form to an adult form in two or more distinct stages	<b>habitat</b>	The non-living environment surrounding a living thing. It provides space, shelter, food and water.

#### Animal 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.

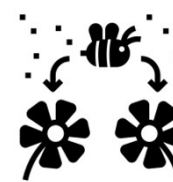
#### Flowering Plant Reproduction



Germination



Flower



Pollination

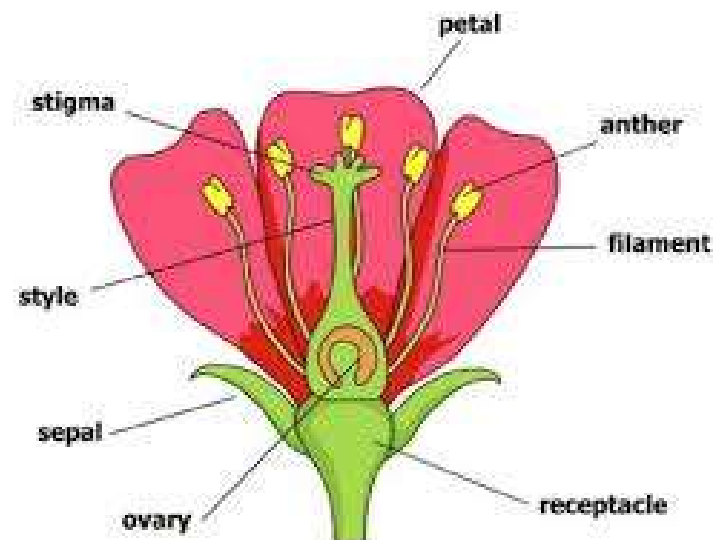


Fertilisation



Seed Dispersal

#### Parts of a Plant

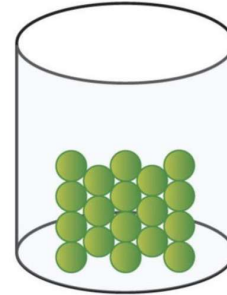


## Science: Year 5

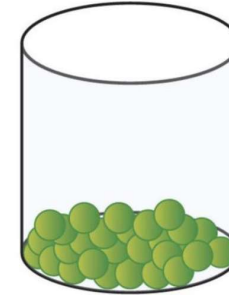
### Properties and Changes of Materials

#### Key Vocabulary

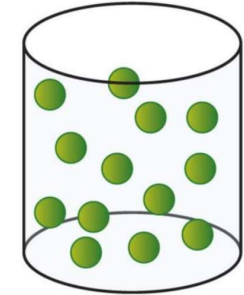
<b>conductor</b>	A material or device which allows heat or electricity to carry through.	<b>evaporation</b>	The process of turning from liquid to vapour.
<b>insulator</b>	A substance which does not readily allow the passage of heat or sound.	<b>dissolve</b>	When something solid mixes with a liquid and becomes part of the liquid.
<b>solid</b>	Firm and stable in shape, not a liquid or fluid.	<b>soluble</b>	Able to be dissolved, especially in water.
<b>liquid</b>	A substance that flows freely but can be measured by volume	<b>solute</b>	A solid that can dissolve in a liquid
<b>gas</b>	An air-like fluid substance which expands freely to fill any space available.	<b>solvent</b>	A liquid which will dissolve a solid
<b>reversible</b>	Able to be reversed back to its original state.	<b>solution</b>	Solvent + Solute
<b>irreversible</b>	Cannot be reversed back to its original state.	<b>states of matter</b>	Solid, Liquid and Gas



**Solid**

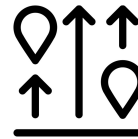


**Liquid**



**Gas**

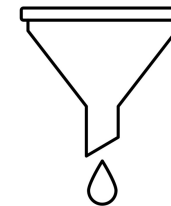
#### Reversible Changes



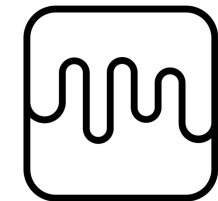
**evaporating**



**sieving**



**filtering**



**melting**



**dissolving**

## Science: Year 5

### Forces

#### Key Vocabulary

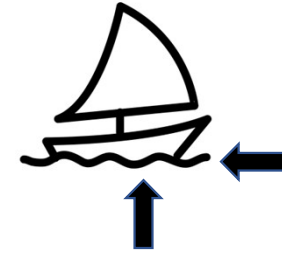
<b>force</b>	A push or pull upon an object resulting from its interaction with another object.		
<b>pull force</b>	To draw or haul towards oneself or itself, in a particular direction.	<b>push force</b>	To move something in a specific way by exerting force.
<b>attraction</b>	Pull force between two objects.	<b>repulsion</b>	The push force between two objects.
<b>mass</b>	A measure of the amount of matter in a body/object. Mass just has size. Measured in g, kg	<b>weight (gravity)</b>	The pull (gravitational force) that a body feels towards the centre of the Earth. It has size and direction. Measured in Newtons.
<b>resistance</b>	The ability to withstand a force.	<b>mechanism</b>	A system of parts working together in a machine.



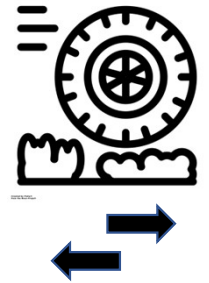
gravity



air resistance

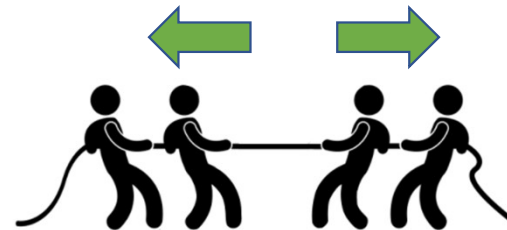


water resistance

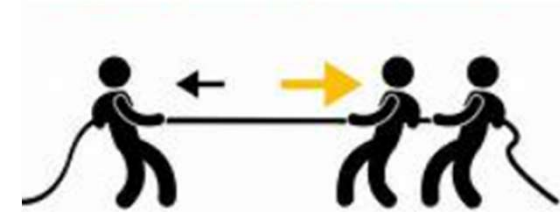


friction

#### balanced force



#### unbalanced force



### Mechanisms



pulley



lever



gears

Forces are measured in **newtons** using a **newton meter**.

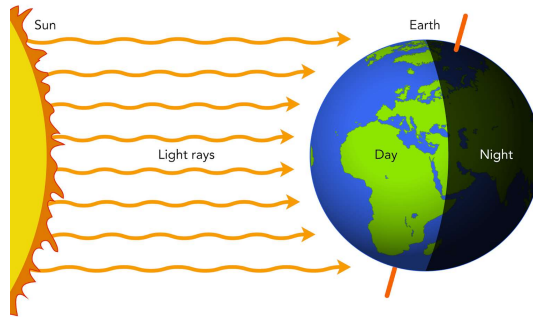


# Science: Year 5

## Earth and Space

### Key Vocabulary

<b>solar system</b>	A star with objects (such as planets) revolving around it.
<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>galaxy</b>	An extremely large group of stars and planets held together by gravity (E.g. Milky Way and Andromeda).
<b>universe</b>	All of space and everything in it (including stars, planets and galaxies).
<b>astronomy</b>	The branch of science that deals with space and the physical universe as a whole



### Movements

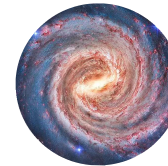
<b>orbit</b>		The Earth takes 365 days to orbit the sun. The moon takes 29.5 days to orbit the Earth.
<b>axis</b>		The Earth takes 24 hours to complete one rotation on its axis.
<b>rotate</b>		The Earth rotates (spins) on its axis whilst orbiting (circling) the sun.

Earth



planet

Milky Way



galaxy



universe



Mercury



Venus



Earth



Mars



Jupiter



Saturn



Uranus



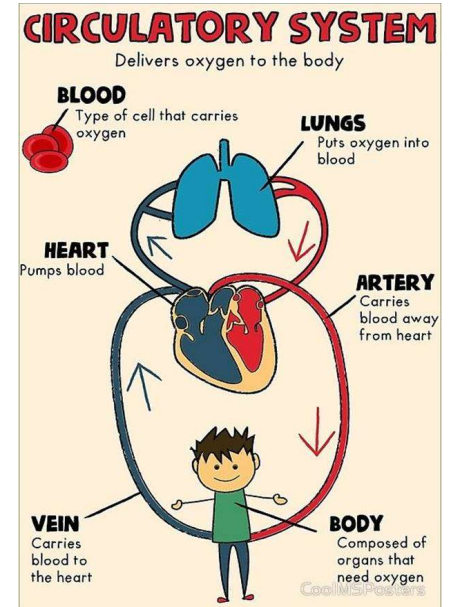
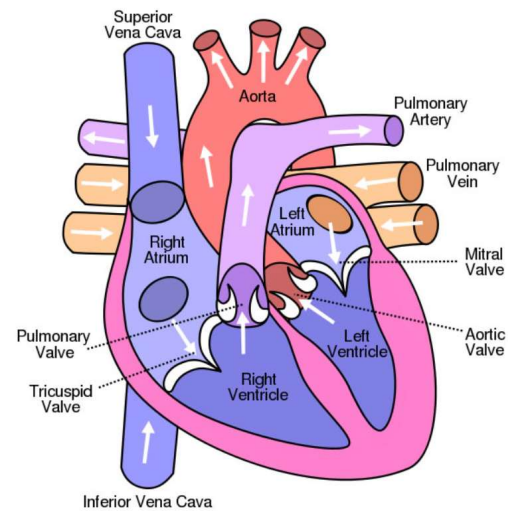
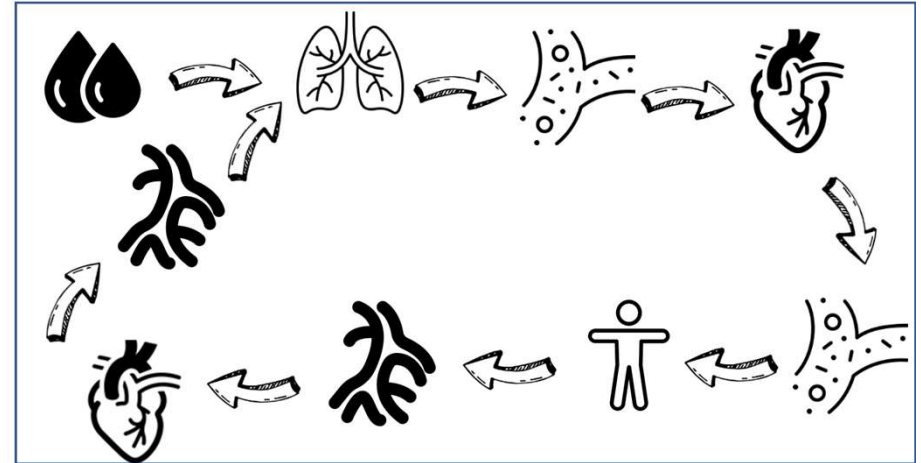
Neptune

## Science: Year 6

### Animals Including Humans

#### Key Vocabulary

<b>blood vessels</b>	Narrow tubes in which blood flows: arteries, veins and capillaries.	<b>capillaries</b>	Tiny blood vessels which exchange nutrients, oxygen and carbon dioxide
<b>arteries</b>	A tube that carries oxygenated blood from your heart to the body.	<b>deoxygenated</b>	Blood that does not contain oxygen.
<b>veins</b>	A tube that carries deoxygenated blood to the heart from the body.	<b>oxygenated</b>	Blood that contains oxygen.
<b>aorta</b>	The main artery blood leaves the heart to flow to the body.	<b>circulatory system</b>	The system responsible for circulating blood through the body.
<b>vena cava</b>	The main vein which transports deoxygenated blood back to the heart from the body.	<b>heart</b>	The organ in your chest that pumps blood around your body.
<b>atrium</b>	The right and left chambers found in the upper part of the heart.	<b>lungs</b>	Two organs inside the chest that oxygenate and remove carbon dioxide from the blood.
<b>ventricle</b>	The right and left chambers found in the lower part of the heart.	<b>organ</b>	A part of the body that has a particular purpose.
<b>carbon dioxide</b>	A gas produced by animals through exhaling.	<b>pulse</b>	The regular beating of blood through the body.
<b>oxygen</b>	A colourless gas that animals and plants need to survive.	<b>respiration</b>	The process of respiring; inhaling and exhaling air.



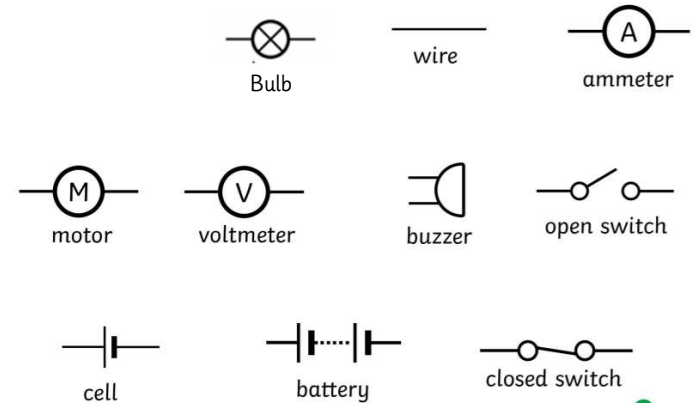
# Science: Year 6

## Electricity

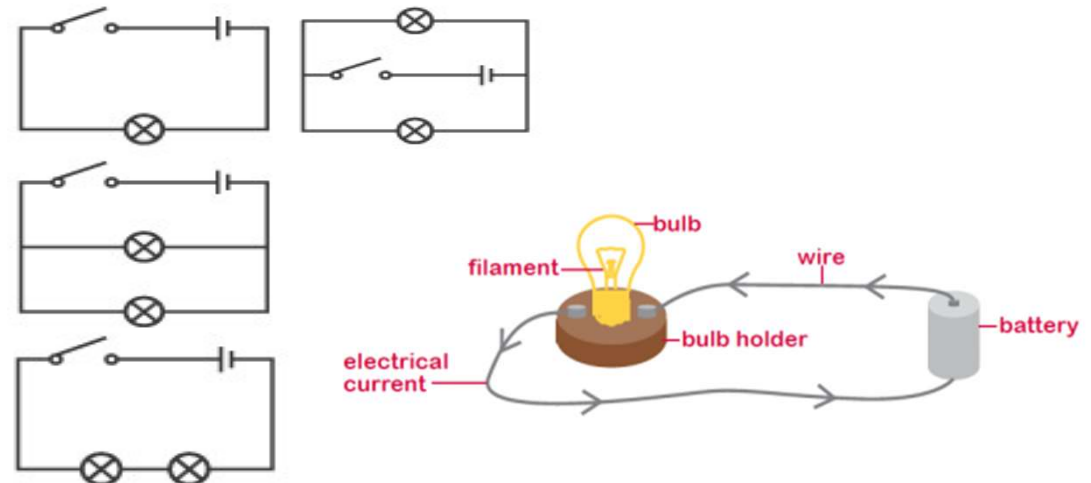
### Key Vocabulary

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

### Circuit Symbols



### Types of Circuits



# Science: Year 6

## Living Things and Their Habitats

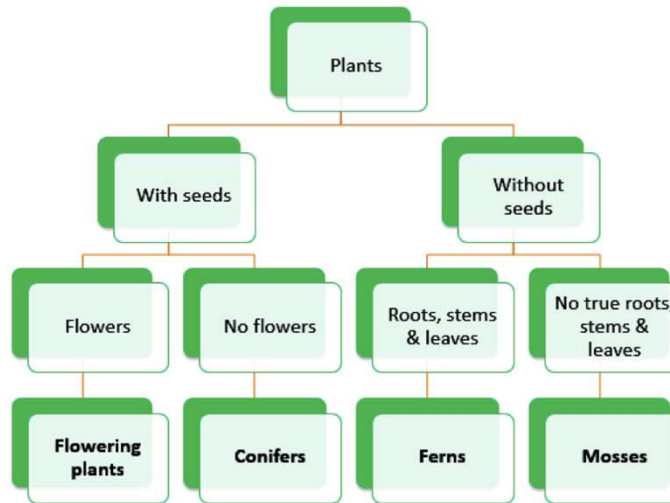
### Key Vocabulary

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

### Carl Linnaeus

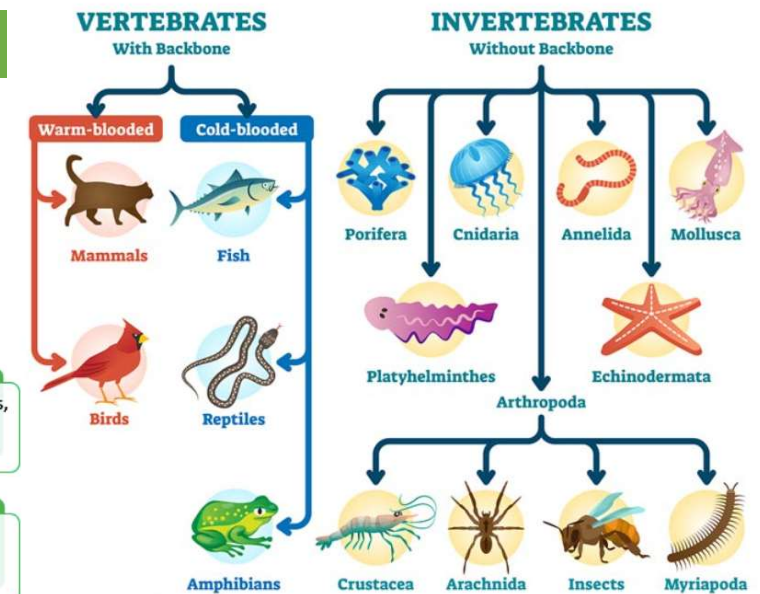
- A Swedish scientist (18<sup>th</sup> Century).
- Famous for his work in taxonomy –the science of identifying, naming and classifying species

### Classification of Plants



### Classification of Animals

## CLASSIFICATION OF ANIMALS



Species

Genus

Family

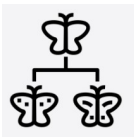
Order

Class

Phylum

Kingdom

Domain



## Science: Year 6

### Light

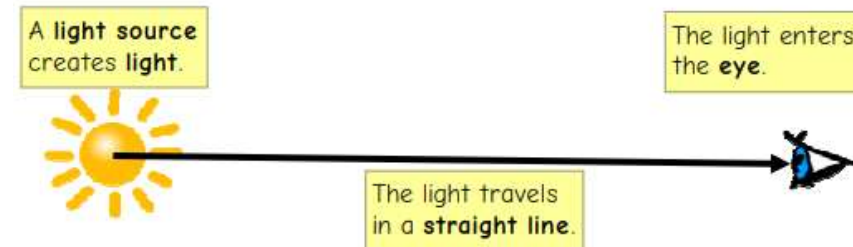
#### Key Vocabulary

<b>eyes</b>	Globular organs of sight in the head of humans and vertebrate animals.
<b>filter</b>	Pass through a device to remove unwanted material (liquid, gas, light or sound).
<b>light</b>	The natural agent that stimulates sight and makes things visible.
<b>light source</b>	Something that provides light, whether it be a natural or artificial source of light (e.g. the sun, a torch).
<b>periscope</b>	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.
<b>rainbow</b>	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.
<b>reflection</b>	The throwing back by a body or surface of light, heat or sound without absorbing it.
<b>refraction</b>	The bending of light as it passes from one substance to another with the bending caused by the difference in density between two substances.
<b>shadow</b>	A dark area or shape produced by a body coming between rays of light and a surface.
<b>spectrum</b>	A band of colours, as seen in rainbows, produced by separation of the components of light by their different degrees of refraction.

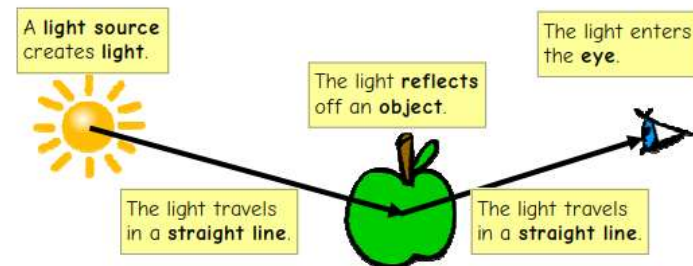
#### Overview

- Light appears to travel in straight lines.
- Due to light travelling 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.
- Due to light travelling in straight lines, shadows have the same shape as the objects that cast them.

#### Light Sources



#### Reflections



## Science: Year 6

### Evolution and Inheritance

#### Key Vocabulary

<b>adaption</b>	An adaptation is a trait (characteristic) changing to increase a living thing's chances of surviving and reproducing in a given environment.
<b>ancestor</b>	A person or animal from whom one is descended.
<b>breeding</b>	The process of producing plants or animals by reproduction.
<b>characteristic</b>	A feature or quality belonging typically to a person, place, or thing, making them recognisable.
<b>evolution</b>	Adaptations that take place in a species over a long period of time in response to the environment.
<b>extinct</b>	No longer has any living members, either in a particular place or in the world.
<b>fossil</b>	The remains of an imprint of a prehistoric plant or animal which is embedded in rock and preserved.
<b>genes</b>	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.
<b>inherit</b>	If you inherit a characteristic, you were born with it because your parents or ancestors also had it.
<b>natural selection</b>	The process whereby organisms that are better adapted to their environment tend to survive and produce more offspring.
<b>offspring</b>	A person's child by birth or animal's young.
<b>species</b>	A class of plants or animals whose members have the same main characteristics and can breed with each other.
<b>theory</b>	A formal idea that is intended to explain something.
<b>variation</b>	A change or slight difference.

#### Charles Darwin's Theory of Evolution

##### Theory of Evolution by Natural Selection

**Better Adapted to Environment = Survival + Reproduction**

Darwin discovered that living things which are better adapted to their environment are more likely to survive and reproduce offspring.

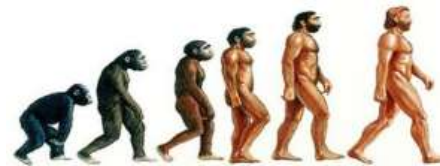
The changes that living thing make to adapt and survive are passed onto (**inherited** by) their offspring.



#### Adaptation

Changes to a living thing to ensure survival in an **environment**.

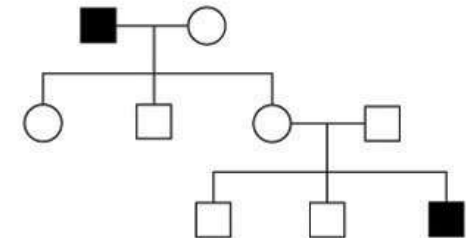
These changes have been discovered through **fossils**, which can provide information about living things that inhabited the Earth millions of years ago.



#### Reproduction

Living things produce offspring of the same kind.



Offspring vary and are not identical to their parents, although they can inherit adaptations.





Assessment in science

# Working Scientifically

	<u>FS</u>	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
 <p><b>Asking Questions</b></p>	<p><b>Show curiosity and ask questions</b> Ask questions to find out more and to check they understand what has been said to them. (Communication and language)</p> <p>While playing and exploring, ask 'I wonder...' questions.</p> <p>With support, develop ideas for answering questions.</p>	<p><b>Asking simple questions</b> Use everyday language/begin to use simple scientific words to ask or answer a scientific question.</p>	<p><b>Asking simple questions</b> Suggest ideas, ask simple questions and know that they can be answered/investigated in different ways including simple secondary sources, such as books and video clips.</p>	<p><b>Asking relevant questions</b> Use ideas to pose questions, independently, about the world around them.</p>	<p><b>Asking relevant questions</b> Suggest relevant questions and know that they could be answered in a variety of ways, including using secondary sources such as ICT. Answer questions using straight forward scientific evidence.</p>	<p><b>Planning different types of scientific enquiries to answer questions</b> Raise different types of scientific questions, and hypotheses.</p>	<p><b>Planning different types of scientific enquiries to answer questions</b> Pose/select the most appropriate line of enquiry to investigate scientific questions.</p>
 <p><b>Making Predictions</b></p>	<p>Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. (Communication and language)</p> <p>Show resilience and perseverance in the face of challenge. (Personal, social and emotional development)</p>	<p>Begin to say what might happen in an investigation.</p>	<p>Begin to make predictions.</p>	<p>Make predictions and begin to give a reason.</p>	<p>Make predictions and give a reason using simple scientific vocabulary.</p>	<p>Make predictions and give a reason using scientific vocabulary. scientific vocabulary.</p>	<p>Make predictions and give a reason using scientific vocabulary.</p> <p>Base predictions on findings from previous investigations.</p>





**Setting Up Tests**

<p>Explore the natural world around them. (Understanding the world) Describe what they see, hear and feel whilst outside. (Understanding the world)</p>	<p>Use simple, nonstandard equipment and measurements in a practical task.  Follow instructions to complete a simple test individually or in a group.</p>	<p>Use simple equipment, such as hand lenses or egg timers to take measurements, make observations and carry out simple tests.  Do things in the correct order when performing a simple test and begin to recognise when something is unfair.</p>	<p>Take accurate measurements using standard units.  Discuss enquiry methods and describe a fair test.</p>	<p>Take accurate measurements using standard units and a range of equipment, including thermometers and data loggers.  Make decisions about different enquiries, including recognising when a fair test is necessary and begin to identify variables</p>	<p>Take measurements using a range of scientific equipment with increasing accuracy and precision.  Plan a range of science enquiries, including comparative and fair tests.</p>	<p>Choose the most appropriate equipment in order to take measurements, explaining how to use it accurately.  Decide how long to take measurements for, checking Science Working Scientifically Skills Progression results with additional readings.  Select and plan the most suitable line of enquiry, explaining which variables need to be controlled and why, in a variety of comparative and fair tests.</p>
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## Observing and Measuring

<p>Develop small motor skills so that they can use a range of tools competently, safely and confidently. (Physical development)</p> <p>Count objects, actions and sounds. (Mathematics)</p> <p>Use magnifying glasses or tablets with magnifiers to make observations.</p> <p>Use smaller pieces of equipment such as syringes and pipettes.</p> <p>While playing and exploring, try out using resources to answer a question.</p> <p>Test things out to make comparisons e.g. Does the red car go further than the blue car?</p>	<p>Observe objects, materials and living things and describe what they see.</p> <p>Use simple, nonstandard equipment and measurements in a practical task.</p>	<p>Observe something closely and describe changes over time.</p> <p>Use simple equipment, such as hand lenses or egg timers to take measurements, make observations and carry out simple tests.</p>	<p>Make decisions about what to observe during an investigation.</p> <p>Take accurate measurements using standard units.</p>	<p>Make systematic and careful observations.</p> <p>Take accurate measurements using standard units and a range of equipment, including thermometers and data loggers.</p>	<p>Plan and carry out comparative and fair tests, making systematic and careful observations.</p> <p>Take measurements using a range of scientific equipment with increasing accuracy and precision</p>	<p>Make their own decisions about which observations to make, using test results and observations to make predictions or set up further comparative or fair tests.</p> <p>Choose the most appropriate equipment in order to take measurements, explaining how to use it accurately.</p> <p>Decide how long to take measurements for, checking Science Working Scientifically Skills Progression results with additional readings.</p>
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 <p style="text-align: center;"><b>Recording data</b></p>	<p>With support, sort and group objects.</p> <p>With support, make comparisons, using hands and feet and other non-standard measures e.g. building blocks and beakers.</p> <p>Identify and name objects by matching them with pictures. Sort and group objects, sometimes using their own criteria.</p> <p>Draw and write simple labels to record their observations.</p> <p>Record observations and comparisons e.g. using simple prepared tables, taking photographs, using sorting rings and boxes</p>	<p><b>Tables</b></p> <p>Telling the story of the Science</p> <p>Fill in tables</p> <p>Sorting Hoops</p>	<p><b>Graphs</b></p> <p>Telling the story</p> <p>Teacher model simple graphs to show story</p>	<p><b>Diagrams</b></p> <p>Communicate equipment names</p> <p>Copy teacher diagram</p>	<p><b>Tables</b></p> <p>Draw simple tables</p> <p>(starting with 2 columns 1 row and building this up)</p>	<p><b>Graphs</b></p> <p>Human Bar</p> <p>Charts</p> <p>Shared graphs to tell a story</p>	<p><b>Diagrams</b></p> <p>Communicate equipment names and uses</p> <p>Copy teacher diagram – annotate with labels and uses where necessary</p>	<p><b>Tables</b></p> <p>Draw tables independently with headings given</p>	<p><b>Graphs</b></p> <p>Labeling axis of shared graphs to tell a story</p>	<p><b>Diagrams</b></p> <p>Labelling diagrams – Accurate presentation with printed text on both sides.</p>	<p><b>Tables</b></p> <p>Draw tables independently with some heading givens</p>	<p><b>Graphs</b></p> <p>Plot/complete graphs</p>	<p><b>Diagrams</b></p> <p>Draw simple circuit diagrams with labels</p> <p>(Electricity)</p> <p>Independent</p>	<p><b>Tables</b></p> <p>Draw tables independently</p>	<p><b>Graphs</b></p> <p>Draw graphs independently (start with axis given and then build to independent choice)</p>	<p><b>Diagrams</b></p> <p>Draw diagrams with labels independently – Teacher model after</p>	<p><b>Tables</b></p> <p>Draw tables independently – Showing understanding of appropriateness to the task</p>	<p><b>Graphs</b></p> <p>Draw graphs independently – Choosing line/scatter or bar chart based on task</p>	<p><b>Diagrams</b></p> <p>Draw independent diagrams with labels accurately and annotations where necessary</p>
 <p style="text-align: center;"><b>Interpreting and Communicating Results</b></p>	<p>Connect one idea or action to another using a range of connectives.(Communication and language)</p> <p>Describe events in some detail. (Communication and language)</p>	<p>Explain, with help, what they think they have found out.</p>	<p>Use simple scientific language to explain what they have found out.</p>	<p>Draw, with help, a simple conclusion based on evidence from an enquiry or observation.</p>	<p>Use recorded data to make predictions, pose new questions and suggest improvements for further enquiries.</p>	<p>Use a simple mode of communication to justify their conclusions on a hypothesis.</p> <p>Begin to recognise how scientific ideas change over time.</p>	<p>Identify validity of conclusion and required improvement to methodology.</p> <p>Discuss how scientific ideas develop over time.</p>												



**Evaluating**

Use every day or simple scientific language to ask and/or answer a question on given data.

Identify simple patterns and/or relationships using simple comparative language.

Gather, record and use data in a variety of ways to answer a simple question.

Identify, with help, changes, patterns, similarities and differences in data to help form conclusions. Use scientific evidence to support their findings.

Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas.

Identify and explain causal relationships in data and identify evidence that supports or refutes their findings, selecting fact from opinion.

# TAPS Assessments

Terms	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
FS						
Year 1	Plant Structure <a href="#">Download</a> <i>Doing</i>	Seasonal Changes <a href="#">Download</a> <i>Doing</i>	Sorting Materials <a href="#">Download</a> <i>Reviewing</i>	Umbrella Planning <a href="#">Download</a> <i>Planning</i>	Sorting Living and Non-Living <a href="#">Download</a> <i>Reviewing</i>	<i>Knowledge</i>
Year 2	Sorting Living and Non-Living <a href="#">Download</a> <i>Planning</i>	<b>Woodlice Tally</b> <i>Doing</i>	Material Hunter <a href="#">Download</a> <i>Reviewing</i>	Exercise Ideas <a href="#">Download</a> <i>Reviewing</i>	Comparing Plant Growth <a href="#">Download</a> <i>Doing</i>	<i>Knowledge</i>
Year 3	Skeleton Explanation <a href="#">Download</a> <i>Review</i>	Magnet Results Table <a href="#">Download</a> <i>Doing</i>	Can everything make a shadow? <a href="#">Download</a> <i>Doing</i>	Reporting on Rocks <a href="#">Download</a> <i>Review</i>	Plant labelling and question raising <a href="#">Download</a> <i>Planning</i>	<i>Knowledge</i>
Year 4	Exploring Sound <a href="#">Download</a> <i>Planning</i>	Investigating Ice Cubes <a href="#">Download</a> <i>Planning</i>	Animal Keys <a href="#">Download</a> <i>Doing</i>	Burglar Alarms <a href="#">Download</a> <i>Doing</i>	Digestive System Info. Text (link to English) pop-up book. <a href="#">Download</a> <i>Reviewing</i>	<i>Knowledge</i>
Year 5	Different Life Cycles <a href="#">Download</a> <i>Reviewing</i>	Growth Survey <a href="#">Download</a> <i>Doing</i>	Parachute Explanation <a href="#">Download</a> <i>Reviewing</i>	Space Research <a href="#">Download</a> <i>Reviewing</i>	Question Raising / Dissolving <a href="#">Download</a> <i>Planning/Doing</i>	<i>Knowledge</i>
Year 6	Heart Rate Poses <a href="#">Download</a> <i>Planning</i>	Adaptation <a href="#">Download</a> <i>Reviewing</i>	Changing Circuits <a href="#">Download</a> <i>Doing</i>	Measuring Shadows <a href="#">Download</a> <i>Planning/Doing</i>	Creating Keys <a href="#">Download</a> <i>Doing</i>	<i>Knowledge</i>



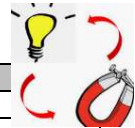
By the end of Year 2		By the end of Year 4		By the end of Year 6	
Y1	Y2	Y3	Y4	Y5	
<p>Can <b>identify and name</b> different familiar materials, including wood, plastic, glass, metal, water and rock</p> <p>Can <b>sort</b> objects according to the materials from which they are made</p> <p>Can <b>describe</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 best, e.g. which material would make the best...coat for a rainy day?</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>	



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, rushes and water lilies around pond.</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><u>Animals including humans</u></b> 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, <i>e.g. 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> 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> Can describe the life cycle of a variety of animals, <i>e.g. 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 – <i>e.g. 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><u>Animals including humans</u></b> Can <b>identify and name</b> a number of common animals, including fish, amphibians, reptiles, birds and mammals - 5 or more of each (where possible), including familiar pets</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><b><u>Animals including humans</u></b> 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><b><u>Living things and their habitats</u></b> Can <b>compare</b> a variety of objects and describe the differences between things that are living,</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><u>Animals including humans</u></b> 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> 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> 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><u>Animals including humans</u></b> 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 exercise</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><u>Evolution &amp; Inheritance</u></b> 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>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 example, on the seashore, in woodland, in the ocean, in the rainforest.</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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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 <b>name</b> 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 <b>name</b> 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> 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> 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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