

Woodside Junior School

Primary Science Curriculum



Aims

The national curriculum for science aims to ensure that all pupils:

- 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 scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. 'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read, spell and pronounce scientific vocabulary correctly.

Year 3	Animals including humans – Moving & nutrition	Rocks	Light – protections from light & shadows	Forces & Magnets – friction	Living things & their habitats – function of parts of a flower
Year 4	State of Matter	Animals including humans – digestion systems & teeth	Living things & their habitats – grouping & classifying	Sound	Electricity – simple circuits, conductors & insulators
Year 5	Properties & changing of materials	Earth & Space	Forces – air & water resistance	Living things & their habitats – Life cycles& reproduction	Animals including humans – growth & development
Year 6	Evolution & inheritance	Living things & their habitats – micro-organism	Electricity – series circuits & diagrams with symbols	Light – behaviour of light	Animals including humans – human circulation system

	Year 3	Year 4	Year 5	Year 6
Progression in Working Scientifically skills (taken from ASE PLAN DOC)				
Asking questions and recognising that they can be answered in different ways	Asking relevant questions and using different types of scientific enquiries to answer them • The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions. • The children answer questions posed by the teacher. • Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. • Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.		
Making observations and taking measurements	Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • The children make systematic and careful observations. • They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. • During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).		
Engaging in practical enquiry to answer questions	Setting up simple practical enquiries, comparative and fair tests • The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher. • They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.		

Recording and presenting evidence	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams. • Children are supported to present the same data in different ways in order to help with answering the question.	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. • Children present the same data in different ways in order to help with answering the question.
Answering questions and concluding	Using straightforward scientific evidence to answer questions or to support their findings • Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence. Identifying differences, similarities or changes related to simple scientific ideas and processes • Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • They draw conclusions based on their evidence and current subject knowledge.	Identifying scientific evidence that has been used to support or refute ideas or arguments • Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer. • They talk about how their scientific ideas change due to new evidence that they have gathered. • They talk about how new discoveries change scientific understanding Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge
Evaluating and raising further questions and predictions	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.	Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface. • Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.	• They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. • They identify any limitations that reduce the trust they have in their data Using test results to make predictions to set up further comparative and fair tests • Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests
Communicating their findings	Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.	Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • They communicate their findings to an audience using relevant scientific language and illustrations

	Science NC objectives			
	Year 3	Year 4	Year 5	Year 6
Physics •Light •Earth and Space •Forces and Magnets •Sound •Electricity	<u>Light - Protections from light & shadows</u> Recognise that they need light in order to see things and that dark is the absence of light Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Recognise that shadows are formed when the light from a light source is blocked by a solid object Find patterns in the way that the sizes of shadows change.			<u>Light – behaviour of light</u> Recognise that light appears to travel in straight lines Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Vocabulary	<i>light, light source, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous, dark reflect reflective surface natural star Sun Moon translucent transparent Light protection, opaque,</i>			<i>light, travel, straight, light, rays source, object, shadows, filters, reflection, reflect, mirrors, periscope</i>
			<u>Earth & Space</u> Describe the movement of the Earth, and other planets, relative to the Sun in the solar system	

			Describe the movement of the Moon relative to the Earth Describe the Sun, Earth and Moon as approximately spherical bodies Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. Scientist study – Ancient Greek philosopher / scientists – Ptolemy and Copernicus Astronauts – Peggy Winson & Mae Jemison	
Vocabulary			<i>Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit celestial body Pluto 'dwarf' planet revolve geocentric model heliocentric model shadow clocks</i>	
	<u>Forces & Magnets – friction</u> Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance Observe how magnets attract or repel each other and attract some materials and not others		<u>Forces – air resistance</u> Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Recognise that some mechanisms, including levers,	

	Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing.		pulleys and gears, allow a smaller force to have a greater effect. Scientist study – Isaac Newton	
Vocabulary	<i>force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole</i>		<i>force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears magnet attract friction moving surfaces</i>	
		<u>Sound</u> Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sounds travel through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it Find patterns between the volume of a sound and the strength of the vibrations that produced it		

		Recognise that sounds get fainter as the distance from the sound source increases. Scientist study – Alexander Graham Bell		
Vocabulary		<i>sound source noise vibrate travel solid liquid gas pitch tune high low volume loud quiet fainter muffle vibrations insulation instrument percussion strings brass woodwind tuned instrument</i>		
		<u>Electricity – simple circuits, conductors & insulators</u> Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers 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 Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors.		<u>Electricity – series circuits & diagrams with symbols</u> Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit 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 Use recognised symbols when representing a simple circuit in a diagram. Scientist study – Micheal Faraday

Vocabulary		<i>electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol</i>		<i>voltage, insulators, resistance, appliance, wood, rubber, plastic, glass, conductors, metal, water, electrical circuit, cell, battery, wire, bulb, buzzer, switch, open, close, brightness, dim, dull, volume, series circuit, circuit diagram, symbols, motor</i>
Chemistry • States of Matter • Properties and Changes Materials • Rocks		<u>State of Matter</u> Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	<u>Properties & changing of materials</u> Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and changes of state are reversible changes	

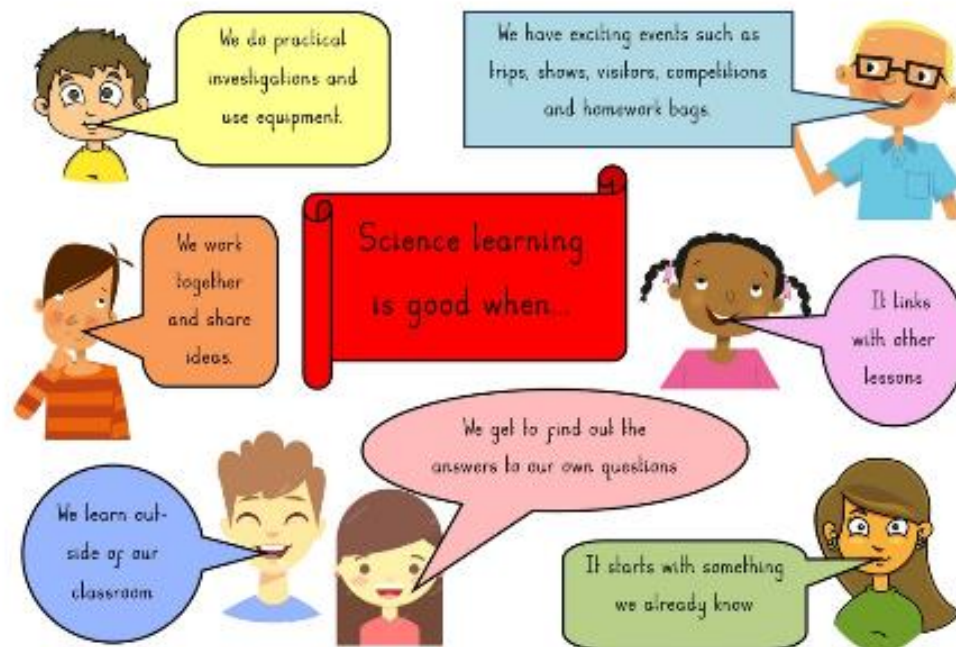
			Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
		<i>solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, degrees Celsius temperature, water cycle, vapour, electrical conductor, electrical insulator, metal, non-metal, thermometer</i>	<i>thermal insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/irreversible change, burning, rusting, new material, evaporation, condensation, temperature, water cycle, electrical conductor, electrical insulator, metal, non-metal solid, liquid, gas</i>	
	<u>Rocks</u> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter. Scientist study Mary Anning			
Vocabulary	<i>rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorbs water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate,</i>			

	<i>types of soil (e.g. peaty, sandy, chalky, clay)</i>			
Biology •Animals including humans •Living things and their Habitats •Evolution and Inheritance	<u>Animals including humans – moving & nutrition</u> Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	<u>Animals including humans – digestion systems & teeth</u> Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions Construct and interpret a variety of food chains, identifying producers, predators and prey.	<u>Animals including humans – growth & development</u> Describe the changes as humans develop to old age.	<u>Animals including humans – human circulation system</u> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans
Vocabulary	<i>nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine, relax,</i>	<i>digestive system, digestion mouth tongue-mixes, moistens, saliva teeth: oesophagus, stomach, small intestine, large intestine, rectum, anus incisors-cutting, slicing canines- ripping, tearing molars-chewing, grinding oesophagus transports stomach acid enzymes small intestine large intestine carnivore herbivore omnivore brush floss food chain Sun producers prey predators herbivore, carnivore, omnivore</i>	<i>puberty, the vocabulary to describe sexual characteristics in line with the school's RSE policy</i> <i>life cycle, foetus, baby, child, adolescent, adult, reproduce, sexual, sperm, fertilises, egg, live young (Y5 - Living things and their habitats)</i>	<i>circulatory system heart blood vessels pumps oxygen carbon dioxide lungs nutrients water diet exercise drugs lifestyle transported</i>
	<u>Living things & their habitats - function of parts of a flower</u> Identify and describe the functions of different parts of	<u>Living things & their habitats – grouping & classifying</u> Recognise that living things can be grouped in a variety of ways	<u>Living things & their habitats – Life cycles & reproduction</u> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird	<u>Living things & their habitats micro-organism</u> Describe how living things are classified into broad groups according to common

	flowering plants: roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Scientist study - George Washington Carver	Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Recognise that environments can change and that this can sometimes pose dangers to living things. Scientist study - Jane Goodall	Describe the life process of reproduction in some plants and animals. Scientist study - David Attenborough	observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics. Scientist study - Carl Linnaeus
Vocabulary	<i>photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water, environment, dispersal), air, nutrients, flowering and non flowering plants, minerals, soil, absorb, transport</i>	<i>classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate, vertebrates, fish, amphibians, reptiles, birds, mammals, warm-blooded, cold-blooded, invertebrates, insects, spiders, snails, worms, flowering plants, nonflowering plants population development litter environment</i>	<i>life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, cuttings, foetus, baby, child, adolescent, adult, reproduce, sexual, egg, live young, sperm, fertilises, metamorphosis, asexual, plantlets, runners, cuttings germination pollination stamen stigma</i>	<i>flowering, non-flowering, mosses, ferns, conifers, vertebrates, fish, amphibians, reptiles, birds, mammals, warm-blooded, cold-blooded, invertebrates, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers organism micro-organism fungus mushrooms classification keys</i>
				<u>Evolution & inheritance</u> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago

				Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Scientist study – Charles Darwin
Vocabulary				<i>offspring, sexual reproduction, vary, characteristics, adapted, inherited, species, evolve, evolution suited/ suitable adapted/adaptation fossils</i>

Woodside Junior Science knowledge organisers



Year 3

**Science knowledge
organisers**



YEAR 3 - MOVING & NUTRITION - BIOLOGY

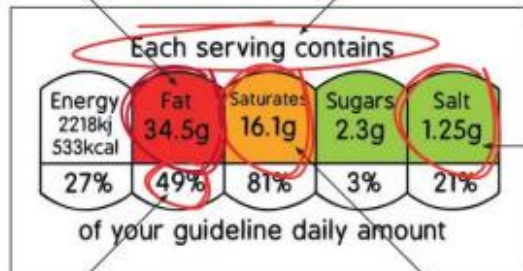
Vocabulary	Definition
nutrition	the study of food and how it works in your body. It includes carbohydrates, fats, protein, vitamins and minerals
nutrients	important substances you get from food that help your body survive and grow
fibre	This lets food pass quickly through your body. It helps keep your digestive system in good working order (brown bread, cereals)
water	All living things need water to survive. Without water, life as we know it would not exist. Water moves nutrients around your body and helps to get rid of waste
healthy diet	a healthy balanced diet containing foods from each food group so we get a wide range of nutrients to help them stay healthy.

Name of the Nutrient	Sources	Function	
Carbohydrates (energy giving food)	Rice, potato, wheat, sugar	Provides energy	
Fats (energy giving food)	Butter, ghee, milk, cheese	Gives more energy compared to carbohydrates	
Vitamins and minerals (protective food)	Fruits and vegetables	Required for normal growth and development	
Proteins (body building food)	Milk, eggs, meat, fish, soybean	Helps in building and repair of body	

Food Labels Traffic Light System

A red section means high. We shouldn't eat foods with red lights too often, just occasionally.

The traffic lights are worked out for the recommended serving, not necessarily for the whole amount of food.



A green section means low. The more green lights a food has, the healthier it is.

An amber section means medium. Foods with amber lights are okay to eat fairly often.

These percentages show how much of our ideal daily intake of fat, saturates, sugar and salt the product gives us.

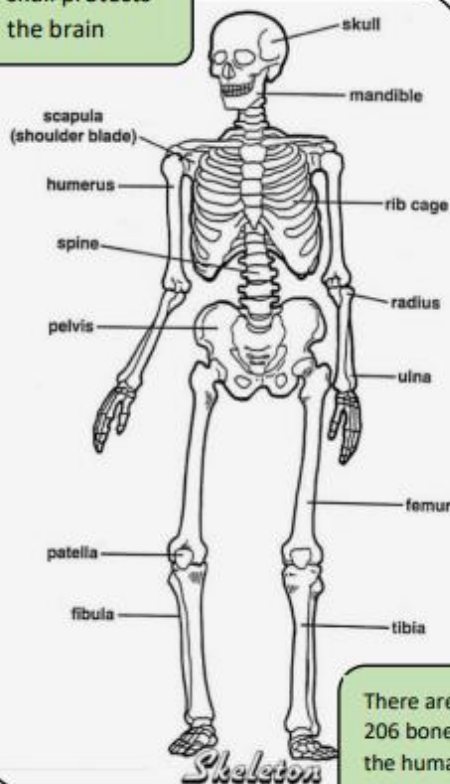


Healthy Food Pyramid



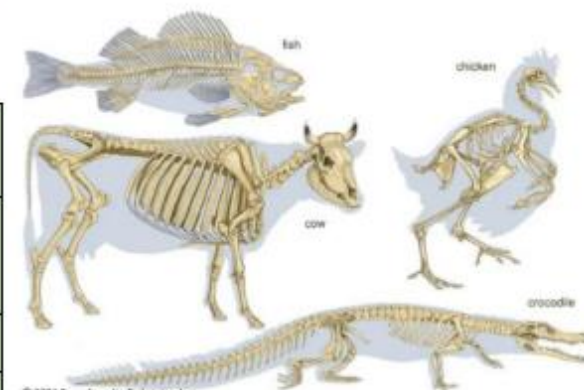
YEAR 3 - MOVING & NUTRITION - BIOLOGY

The skull protects the brain

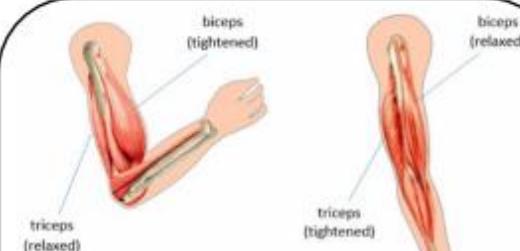


There are 206 bones in the human body

Related vocabulary	Definition
skeleton	strong structure made of bone which supports us so we can stand, protects internal organs from damage and allows movement
vertebrate	an animal with an internal backbone.
invertebrate	an animal without an internal backbone.
endoskeleton	an internal support made of bone that gives the body shape and allows it to move.
exoskeleton	a hard covering that supports and protects the bodies of some types of animals. The word exoskeleton means - outside skeleton.
muscles	an organ of the body which allows for the body to move as they are attached to the skeleton. Muscles can contract and relax.
joints	where 2 bones join together
bones	the hard parts inside your body that make up your skeleton
tendons	cords that join muscles to bones



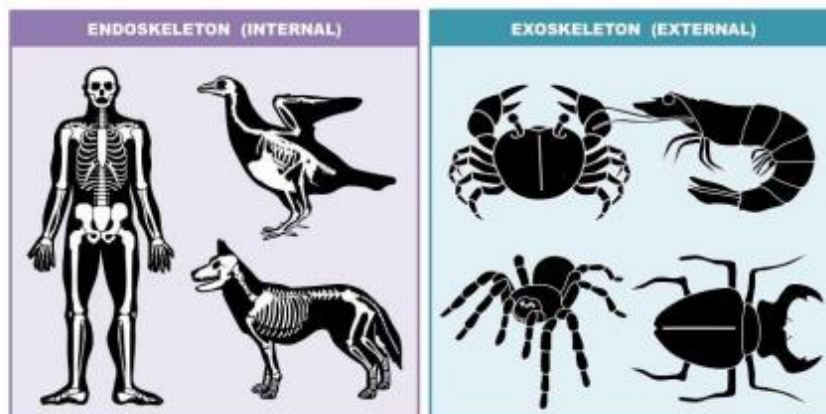
Vertebrates are animals that have a backbone inside their body. The major groups include fish, amphibians, reptiles, birds and mammals.



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

The skeleton has 3 functions:

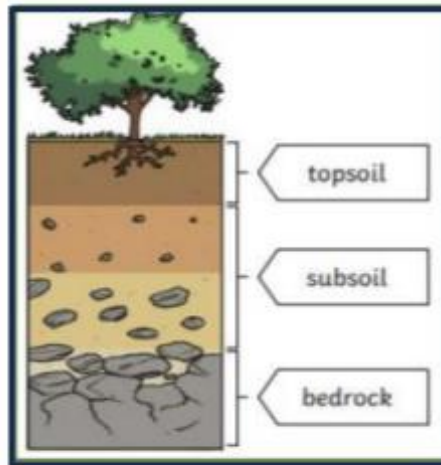
1. To protect vital organs
2. To allow for movement
3. To support the body from falling to the floor





YEAR 3 - ROCKS - CHEMISTRY

Igneous	Sedimentary	Metamorphic
Obsidian 	Chalk 	Marble 
Granite 	Sandstone 	Quartzite 
Basalt 	Limestone 	Slate 



Mary Anning

Mary Anning (1799-1847) was a famous British fossil hunter who found the fossils of many prehistoric animals. Although not trained as a scientist her discoveries changed Science.

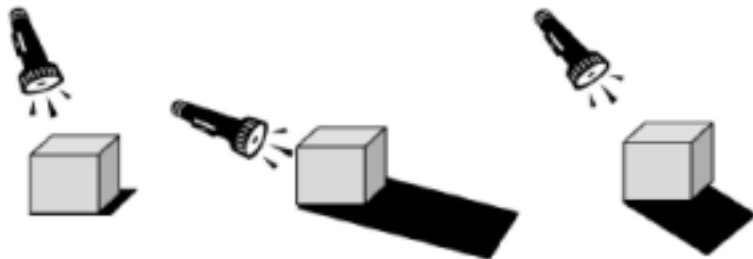
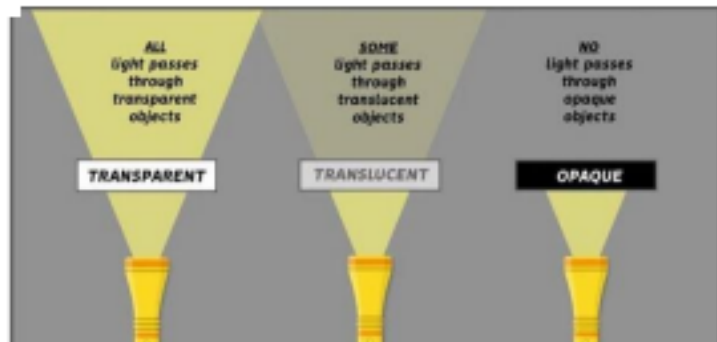


Fossils give us evidence of what lived on Earth millions of years ago. By studying fossils, scientists can put together how a plant or animal looked. They can identify what the animal ate, where it lived and how it died.

Related vocabulary	Definition
fossils	The remains or the minerals left by a prehistoric plant or animal embedded in the rock
rocks	A rock is a solid made up of a bunch of different minerals
minerals	Minerals come from broken down rock
erosion	Water, wind and other natural forces cause rocks and earth to wear away
soil	Soil is the loose upper layer of the Earth's surface where plants grow. Soil consists of a mix of organic matter, air, water and minerals
organic matter	Living and dead plants and animals
permeable	Permeable rocks allow water to pass through
impermeable	Impermeable rocks do not let water pass through
igneous rock	Rock that has been formed from magma or lava
sedimentary rocks	Rock that has been formed by layers of sediment being pressed down hard and sticking together
metamorphic rocks	Rock that started out as igneous or sedimentary rock but changed due to being exposed to extreme heat or pressure

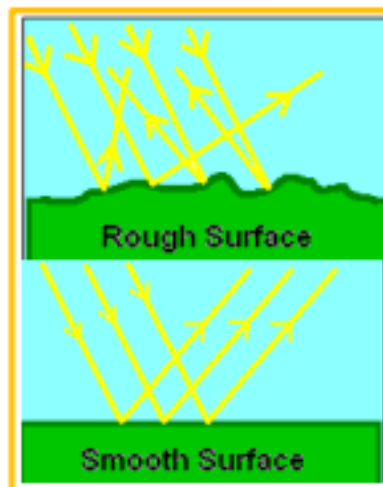


YEAR 3 - LIGHT - PROTECTIONS FROM LIGHT & SHADOWS- PHYSICS



We can change the size of the shadow by changing the position of the light source, object or the surface where the shadow is being made.

Light travels in a straight line from the light source. When it hits an object, it is reflected (bounces off). When the reflected light hits our eyes, we can see the object.



Related vocabulary	Definition
light	We can see objects because our eyes can sense light
dark	Darkness is the absence of light
light source	Some objects emit their own light and are sources of light; sun light, bulbs, candles
transparent	A material that is completely see through so all the light can pass through
translucent	A material that lets some light through but not all of it
opaque	A material that light cannot pass through. You cannot see through it
shadow	These are formed when an object blocks light
reflect	When light bounces off a surface
mirror	A sheet of glass or metal that reflects light
sun	The sun is a star which is located at the centre of our solar system
moon	The large round object that circles the Earth and that shines at night by reflecting light from the sun
reflective surface	When light from an object is reflected by a surface, it changes direction. It bounces off the surface at the same angle as it hits it.



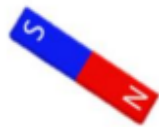
YEAR 3 - FORCES & MAGNETS - PHYSICS

What is a force?

A force is the push or pull of an object in a particular direction.



U-shaped magnet



Bar magnet



Ring magnet



Horseshoe magnet



Friction

The grip on our shoes stops us slipping. Therefore, friction is great. Ice-skates on an ice-rink will move for a long time because there is very little friction. **The rougher the surfaces, the greater the friction.** This rubbing of two surfaces can release energy, causing heat.



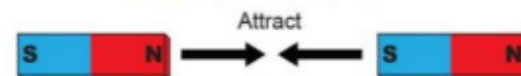
Related vocabulary	Definition
forces	the pushes and pulls which act on our bodies and the things around us to make things move and stop moving.
materials	the matter or substance that objects are made from. Different materials have different features, or properties, which make them suitable for different uses.
push / pushing	any action moving an object away from you.
pull / pulling	any action moving an object towards you
friction	a 'sticking' force – the resistance that a surface or object encounters when moving over another surface or object. E.g. Air resistance, water resistance and surface resistance.
magnet	an object that has a magnetic field (an invisible pattern of magnetism). A magnet attracts or repels other items.
magnetic force	an invisible force created by electrons. Magnetic force controls magnetism and electricity.
poles	the north pole is the end of the magnet attracted to the Earth's North magnetic pole; a magnet's south pole is the end attracted to the Earth's South magnetic pole.
attract	to pull together with physical force
repel	to move or force back or away.
contact force	a force that must directly touch another object to affect it.
non-contact force	a force that affects something at a distance e.g. gravity or magnetism.



Objects that contain iron, nickel or cobalt are magnetic. **Not all metals are magnetic!**

Magnets have **2 poles**, a north pole and a south pole.

Opposite poles attract.
Same poles repel.



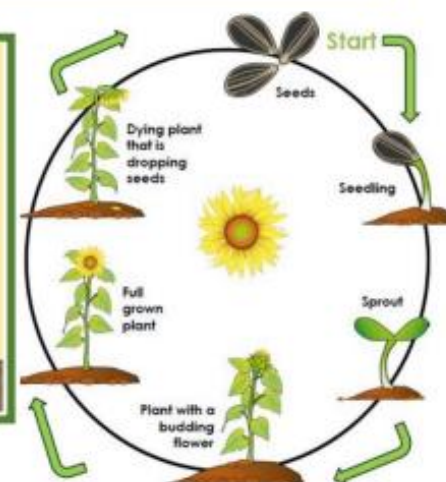


YEAR 3- PLANTS - BIOLOGY

Word	Definition
leaves	the parts of a tree or plant that are flat, thin, and usually green
stems / trunk	the thin, upright part of a plant on which the flowers and leaves grow.
roots	the parts of a plant that grow under the ground
petals	thin coloured or white parts which form part of the flower
soil	the loose upper layer of the Earth's surface where plants grow
seed	the small, hard part from which a new plant grows
dispersal	the scattering, separating, or spreading of something over a large area – like seeds
pollination	to pollinate a plant or tree means to fertilise it with pollen. This is often done by insects
absorb	to soak up or take in
photosynthesis	the way in which plants make food in their leaves
transportation	taking something from one place to another.
life-cycle	the different stages of life for a living thing.



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 (like a straw.)



Did you know

that strawberries are all mixed up. They are the only fruit that has seeds on the outside and boy do they have seeds. The average strawberry contains 200 seeds.



5 Things Plants Need



Year 4

**Science knowledge
organisers**



YEAR 4 - STATE OF MATTER - CHEMISTRY

SOLID



- Rigid
- Fixed Shape
- Fixed Volume
- Cannot be squashed

LIQUID

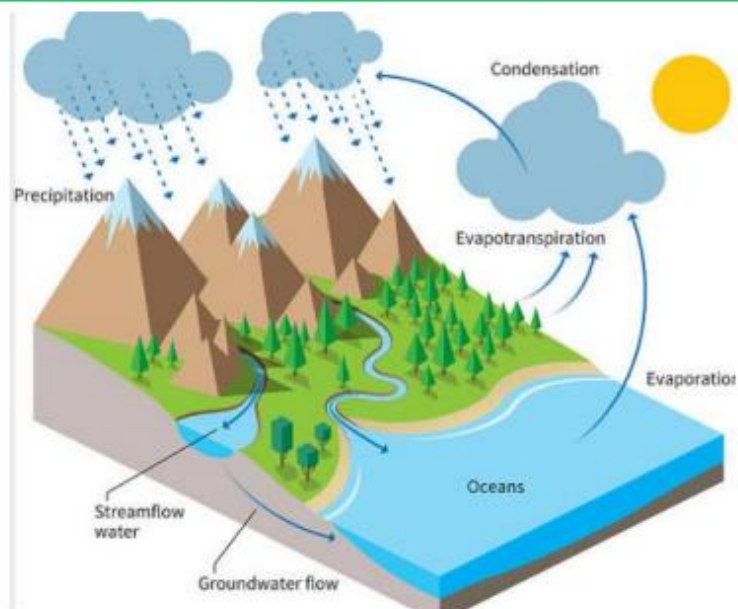
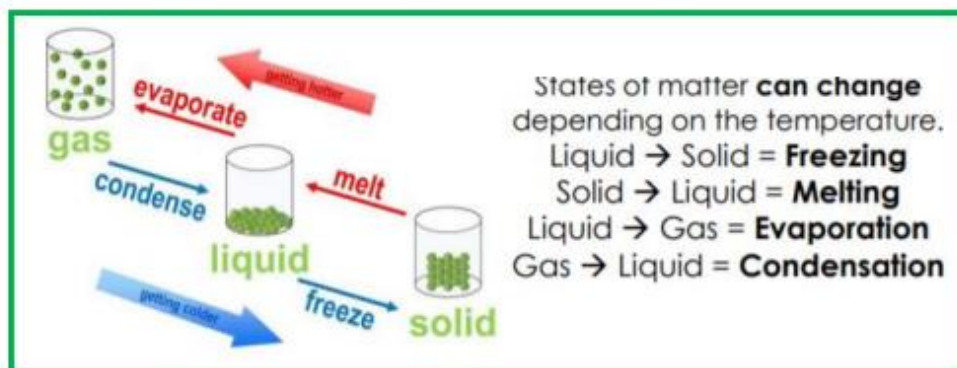


- Not Rigid
- No Fixed Shape
- Fixed Volume
- Cannot be squashed

GAS



- Not Rigid
- No Fixed Shape
- No Fixed Volume
- Can be squashed

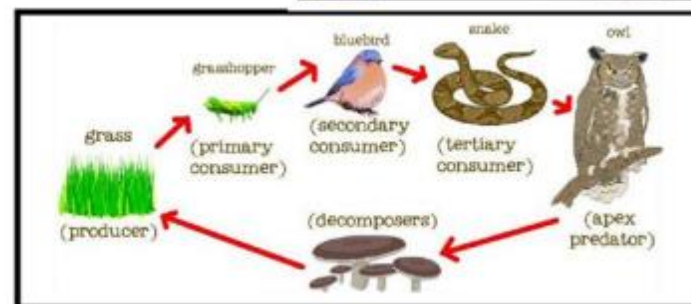
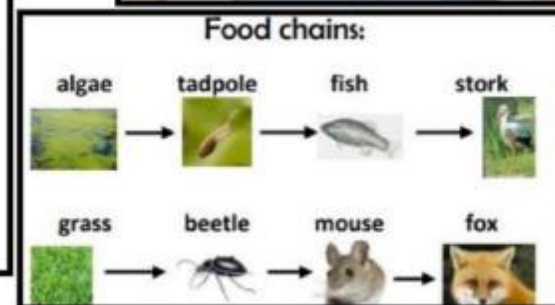
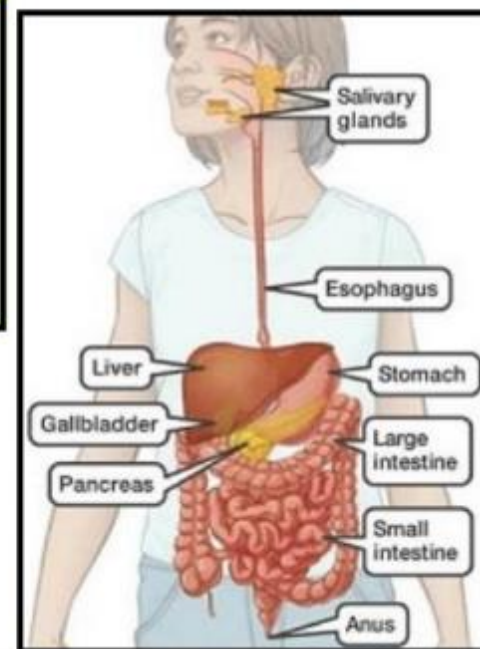
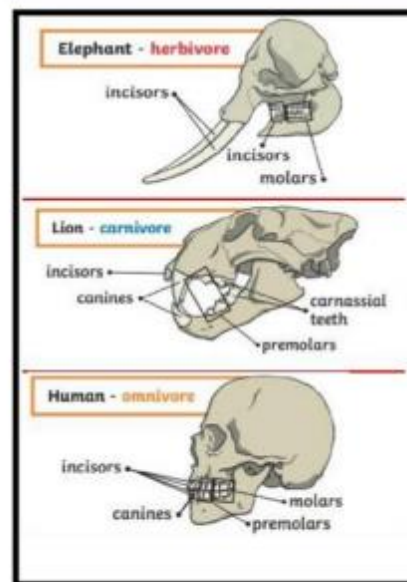
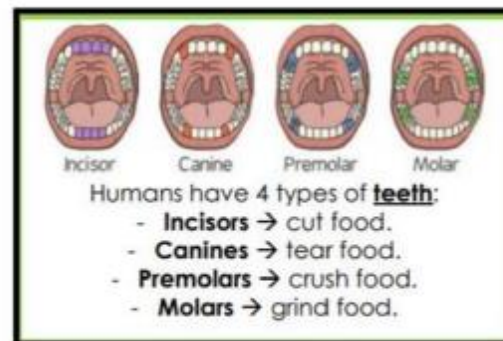


Related vocabulary	Definition
solid	firm or stable in shape—with particles very close together
liquid	A substance where the particles are still close together, but not as tightly as a solid. They take the shape of any container.
gas	a substance with no fixed shape that will expand to fill the whole of a container—particles far apart and moving around.
particles	a tiny amount or small piece of matter
heating	raising the temperature of something
cooling	lowering the temperature of something.
freezing	turning into ice or another solid as a result of cooling. Freezing point is the temperature at which a liquid turns into a solid when cooled.
melting	turning into a liquid as a result of heating. Melting point is the temperature at which a solid will melt.
temperature	a measure of how hot or cold something is in °C
condensation	the process of turning from vapour (a gas) into liquid.
evaporation	the process of turning from a liquid into vapour (a gas)
precipitation	rain, snow, sleet, dew, etc, formed by condensation of water vapour in the atmosphere.
Water cycle	the process by which water on the earth evaporates, then condenses in the atmosphere, and then returns to earth in the form of precipitation.
reversible change	a change that can be changed back again. Melting and heating are examples of reversible changes
irreversible change	a change that cannot be changed back again. Burning or mixing a liquid with bicarbonate of soda are examples of irreversible changes



YEAR 4 - DIGESTION & TEETH - BIOLOGY

Related vocabulary	Definitions
canines	Pointed teeth near the front of the mouth – used for tearing
molar incisors	Large, flat teeth towards the back of the mouth – used for chewing Teeth at the front of the mouth – used for biting
saliva	The watery liquid that forms in your mouth and helps you digest food
decay	Natural process of slowly losing health or strength – tooth decay
digestion	The food that we eat has to be broken down into other substances that our bodies can use, and any waste removed
excretion	Process of getting rid of faeces, urine or sweat through the body
oesophagus	The part of the body that carries the food from the throat to the stomach
stomach	The organ inside your body where food is digested before it moves into the intestine
intestines	The tubes in your body through which food passes when it has left your body
rectum	Part of the digestive system where stools are stored before leaving the body through the anus
carnivore	An animal that eats only a meat diet
omnivore	An animal that eats both plant and meat
herbivore	An animal that feeds on plants
insectivore	An animal that has a diet of only insects

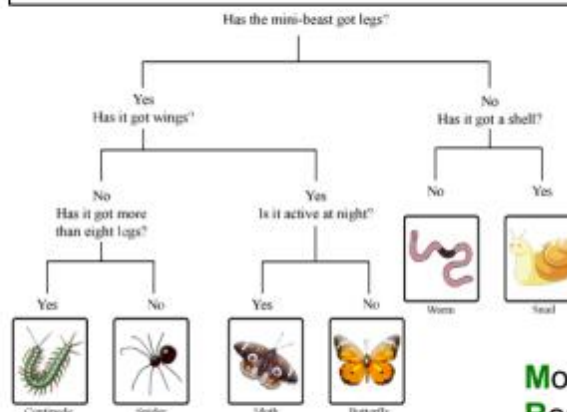




YEAR 4 - LIVING THINGS & THEIR HABITATS -BIOLOGY

RELATED VOCABULARY	DEFINITION
classification	Grouping things based on their characteristics so that they can be identified
classification key	A series of yes/no questions that help identify or classify things
environment	The conditions in which a living thing exists. Soil, climate and other living things all count as part of the environment.
habitat	The place where an animal or plant lives
hibernate	An animal or plant that spends the winter in a dormant state
vertebrates	Animals that have a backbone. Fish, amphibians, reptiles, birds and mammals
invertebrates	Animals that do not have a backbone. Examples are snails, worms, spiders and insects
Amphibians	Amphibians are vertebrates that are born in the water, are cold blooded and breath with gills
Reptiles	Reptiles are vertebrates that are cold blooded, have scales and lay eggs
Fish	Fish are aquatic vertebrates that breath with gills and are covered with scales
Mammals	Mammals are warm blooded vertebrates that feed their young with milk produced by their mothers. Most mammals are born live
birds	Birds are vertebrates that are warm blooded, lay eggs, are covered in feathers and have wings
environment	All physical surroundings on Earth including everything living and non-living

A classification key is a tool that uses yes/no questions



Characteristics of living things

Movement
Respiration
Sensitivity

Nutrition
Excretion
Reproduction
Growth

MRS NERG



Jane Goodall

Jane Goodall is an expert on wild chimpanzees. She is known for her ground breaking discoveries about their behaviour. She has shown us the urgent need to protect chimpanzees from extinction.



How can environments change?

Natural changes	This could be caused by flooding, fire, earthquakes etc
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Human have an impact on the environment:

Positive impact

This could be:

- setting up a nature reserve
- tree planting
- creating a garden pond.

Negative impact

This could be:

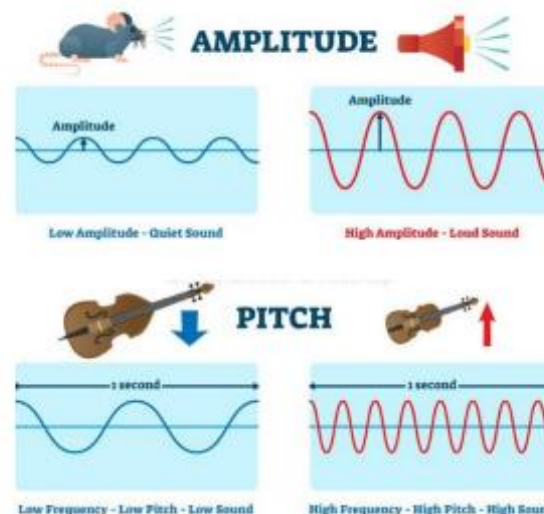
- littering
- deforestation
- air pollution
- plastics in the oceans



YEAR 4 - SOUND - PHYSICS

Words	Definition
sound	Sound is created when something vibrates and sends waves of energy (vibration) into our ears.
sound waves	invisible waves that travel through the air, water and solid objects as vibrations.
sound source	means any person, animal, device, equipment, operation, process or activity that creates a sound.
sound waves	invisible waves that travel through the air, water and solid objects as vibrations.
decibels	a measure of how loud a sound is – dB
pitch	how high or low a sound is.
amplitude	is a measure of the wave's height. The amplitude of a sound wave determines the sound's loudness.
volume	how loud or quiet a sound is
insulation	material that stops the travel of energy (including sound).
insulation	means quickly moving back and forth (or up and down)
medium	something that makes it possible to transfer energy from one location to another

We can wear ear defenders to protect our ears from very loud sounds.



How do we hear sounds?

Sounds are created when something vibrates (shakes back and forth).

This creates soundwaves which travel to the ears of the listener.

When a bell is struck, the metal of the bell vibrates. These vibrations create waves in the air (sound waves).

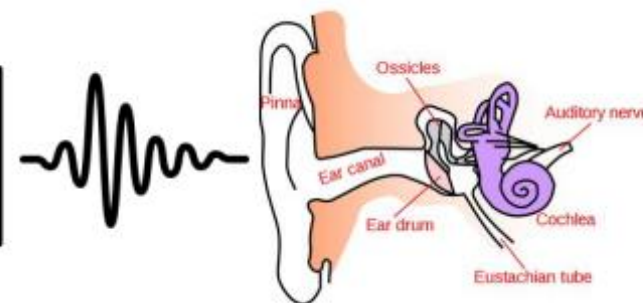
When they reach our ears, they make our eardrums vibrate, and we hear the sound of the bell ringing.



As distance increasing from the sound source, the fainter the sound becomes



Sound waves travel to the ear and make the ear drum vibrate.

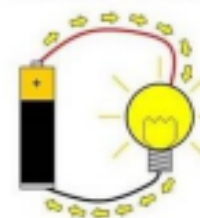




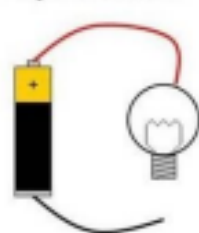
YEAR 4 - ELECTRICITY - PHYSICS

Related vocabulary	Definition
electricity	a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for devices.
insulators	a non-conductor of electricity or heat
conductors	a substance that heat or electricity can pass through or along
appliances	a device or machine in your home that you use to do a job such as cleaning or cooking. Appliances are often electrical.
battery	A device consisting of one or more cells
component	the parts that something is made of
current	a flow of electricity through a wire or circuit
energy	the power from sources such as electricity that makes machines work or provides heat
cell	a synonym for battery
mains	where the supply of water, electricity, or How does a gas enters a building
electric circuit	A complete path that an electric current can flow around. It flows from the battery, through wires and devices before returning to the battery. If the circuit is not complete the electric current cannot flow

Closed circuit



Open circuit



Some appliances use batteries and some use mains electricity. Batteries can vary greatly in size, shape and power.



Conductors and insulators

	Good Conductors allow energy to pass through	Insulators stop or slow down energy
Electrical	Metals e.g. copper, silver, gold, iron, steel, aluminum tap water 	rubber wood plastic glass paper cotton 
Thermal	Metals e.g. copper, silver, gold, iron, steel, aluminum 	plastic wood rubber fabric polystyrene 

ELECTRICITY SAFETY!



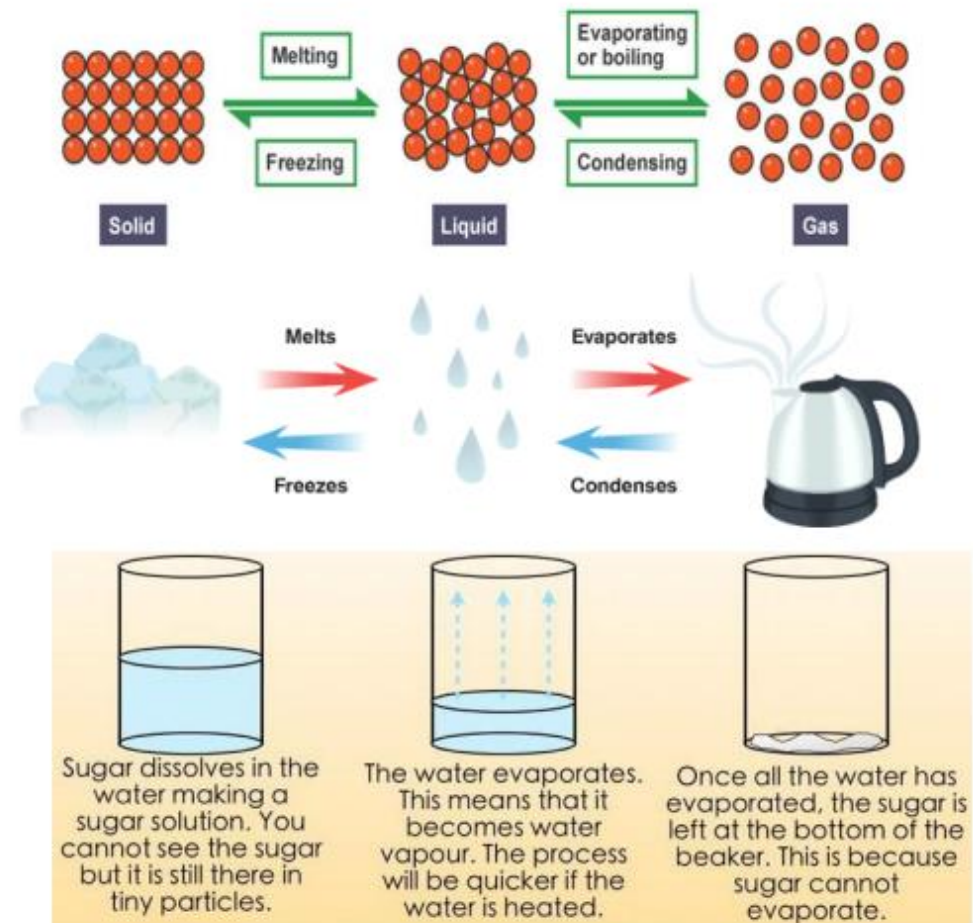
Year 5

**Science knowledge
organisers**



YEAR 5 - MATERIALS AND THEIR PROPERTIES - CHEMISRY

Conductor	A material or device which allows heat or electricity to carry through
Thermal	Relating to heat
Flexible	Capable of bending easily without breaking
Reversible change	Able to be reversed back to its original state - Melting and heating are examples of reversible changes.
Irreversible change	Cannot be reversed back to its original state Burning or mixing a liquid with bicarbonate of soda are examples of irreversible changes
Magnetic	Capable of being magnetised or attracted by a magnet
Dissolve	When something solid mixes with a liquid and becomes part of the liquid
Solution	A mixture that contains two or more substances combined evenly.
Soluble	Able to be dissolved, especially in water
Insoluble	impossible to dissolve, esp. in a given liquid
Filtering	a device used to remove dirt or other solids from liquids or gases. A filter can be made of paper, charcoal, or other material with tiny holes in it.
Sieving	Removal of unwanted items / objects
permeable	a substance that a gas or liquid can pass through
Evaporation	The process of turning from liquid to vapour
Condensation	small drops of water which form when water vapour or steam touches a cold surface, such as a window
Transparent	Allows light to pass through so that objects behind can be seen
Opaque	Not able to be seen through, not transparent



Sieving	Filtering	Evaporation



YEAR 5 - EARTH & SPACE - PHYSICS

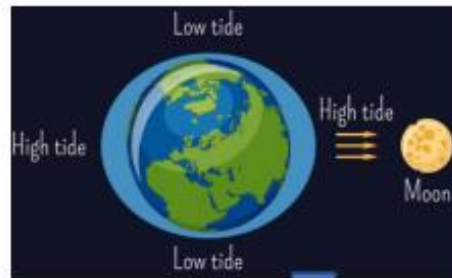
The Earth orbits the Sun.

It takes 365¼ days to complete its orbit around the Sun. This is a year.



The Sun is a star at the centre of our solar system.

There are 8 planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.



It is day for the half of the Earth facing the Sun



It is night for the half of the Earth facing away from the Sun

Tides are caused by a natural force called gravity. As the Moon pulls on Earth it makes the water move.

Related vocabulary	Definition
spherical body	Astronomical objects shaped like spheres
Sun	It is a hot ball of gases that gives off great amounts of energy. Life on Earth depends on light and heat from the sun.
Earth	Earth is a terrestrial or inner planet consisting of a thin outer crust, an intermediate mantle, and a dense inner core.
moon	A natural object which orbits a planet and reflects the sun
planets	A celestial body which orbits a star
solar system	planets and their moons which orbit the Sun
universe	everything we can touch, sense and feel. It includes all planets, stars and moons
space	an unlimited area where everything can be found. Example: planets and stars
orbit	A repeating path which one object takes around another
rotate	To turn around on one point, also known as an axis
axis	an imaginary straight line around which an object spins.
satellite	is any object that is in orbit around a planet. There are two types of satellite: natural and artificial. e.g. natural – moon artificial - weather satellite
atmosphere	Earth's atmosphere is a jacket of gases that surrounds our planet. It keeps us warm, gives us oxygen to breathe, and it is where our weather happens.

Maggie Aderin-Pocock
(born 1968)



Maggie is a British space scientist and science educator. She is working on the observation instruments for the Aeolus satellite, which will measure wind speeds to help the investigation of climate change.



YEAR 5 - FORCES - AIR RESISTANCE - PHYSICS

RELATED VOCABULARY	DEFINITION
force	A force is an interaction which can change the motion of an object
gravity	The force which causes things to drop to the ground.
air resistance	Air resistance is a type of friction between air and another material
friction	The force that makes it difficult for things to move freely when they are touching each other.
water resistance	A force that slows things down that is moving through water.
up thrust	An upward push or thrust
mass	A measure of the amount of matter in an object (measured in grams and kilograms). It will be the same whether you are on Earth or in space
weight	Is the measure of the force of gravity on an object. The mass of an object will never change, but the weight of an item can change based on its location
gears	A toothed wheel that works with others to increase speed.
mechanisms	A part, often consisting of a set of smaller parts, which performs a particular function
pulleys	A machine with a wheel and a fixed axle (pin)
fulcrum	The point where a lever turns (also called a pivot)
lever	A rigid bar that rests on a fulcrum. It is used to lift/move heavy objects.
buoyancy	The ability that something has to float on a liquid or in the air.

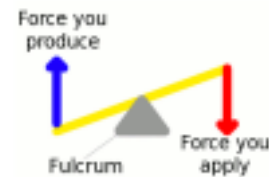
Pulleys

Pulleys are made by looping a rope over one or more wheels. They are often used to lift heavy objects: pulling down on one end of the rope creates an upward pull at the other end. Looping the rope over more wheels increases the upward force.



Levers

A lever is a long, sturdy body that rests on a support called a **fulcrum**. The fulcrum is the place where the lever pivots. It is one of the three parts or actions that work together in a lever. The load is the object that is being lifted or affected.

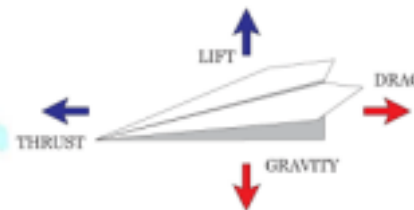


Gears

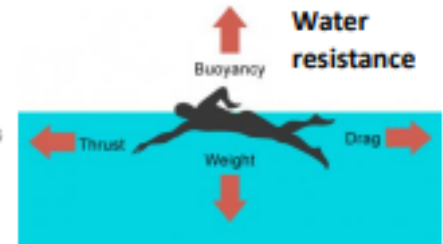
Gears are used to transmit power from one part of a machine to another. Connected gears can increase speed, increase force. When joined, the direction of rotation of the driven gear is the opposite of the drive



Air resistance



Water resistance

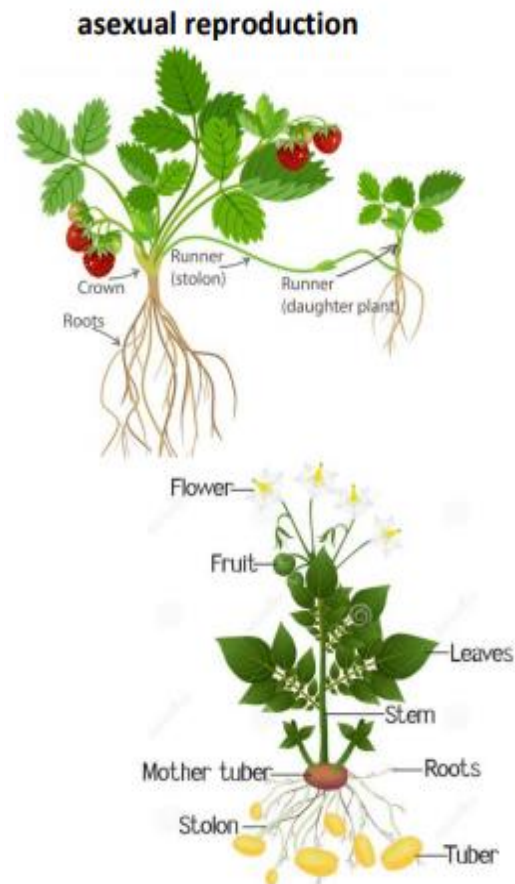
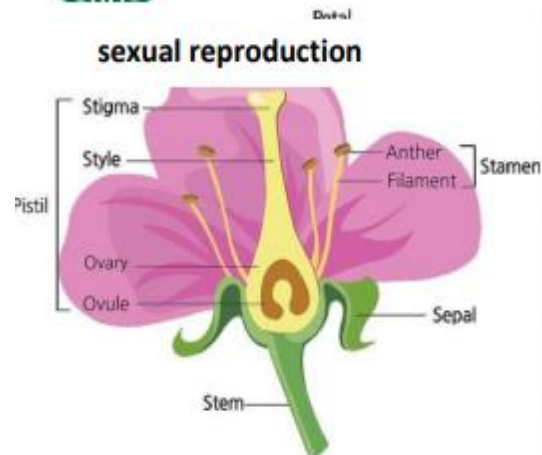


Isaac Newton

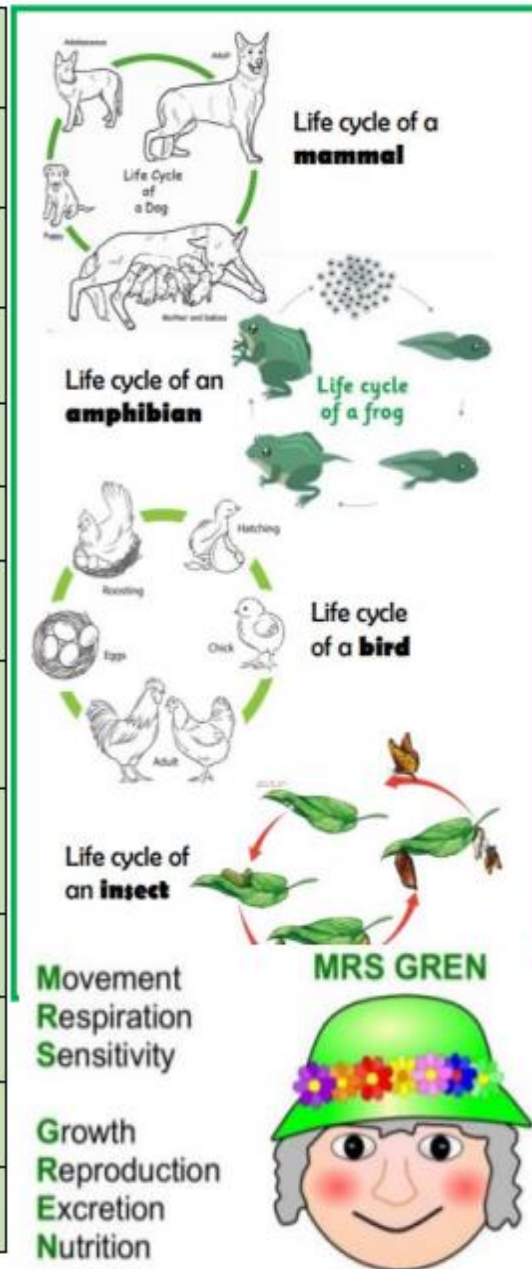
He discovered the idea of forces acting upon objects on Earth.
He discovered that gravity acts upon objects on Earth.
For every action there is an equal and opposite reaction.



YEAR 5 - LIFE CYCLES & REPRODUCTION - BIOLOGY



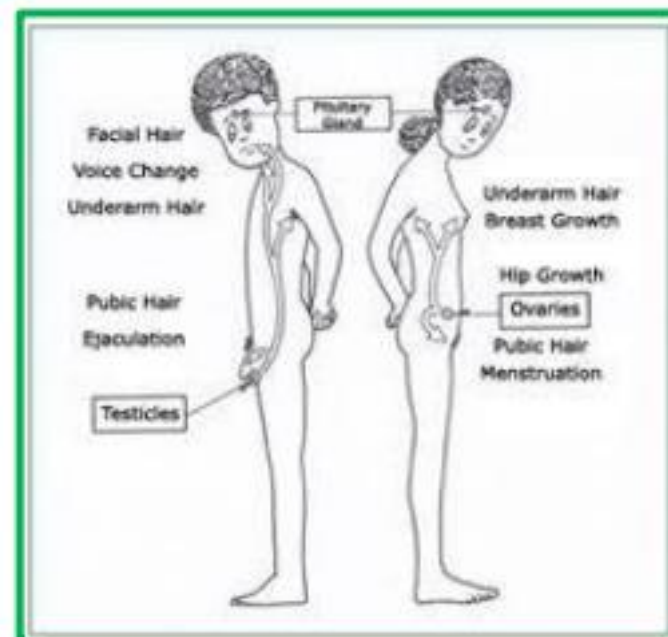
Related vocabulary	Definition
life cycles	the series of changes that an animal or plant goes through from the beginning to the end of its life.
reproduction	as part of their life cycle plants and animals need to reproduce to produce offspring
asexual reproduction	Only one parent is needed. This occurs mostly in plants and bacteria
metamorphosis	A major change from one form to another in the life cycle of some animals. Eg a caterpillar → butterfly
seed dispersal	it is the way seeds get from the parent plant to a new place
pollination	the transference of pollen to a flower, or plant to allow fertilisation. Happens in sexual reproduction
Pistil	are composed of three main parts: the sticky stigma , which catches pollen grains; the style , a long neck that connects the stigma and the ovary where ovules are produced.
stamen	the stamen is the part of the flower that produces pollen. There are two main parts of the stamen : the filament and anther .
respiration	involves taking in oxygen and releasing it as carbon dioxide into the atmosphere (air).
excretion	gets rid of carbon dioxide, water and harmful substances (the by-products of respiration) from your body
nutrition	is about the nutrients in food and how the body or plants uses them.
runner	A long stem of a plant that grows along the ground in order to put down roots in a new place



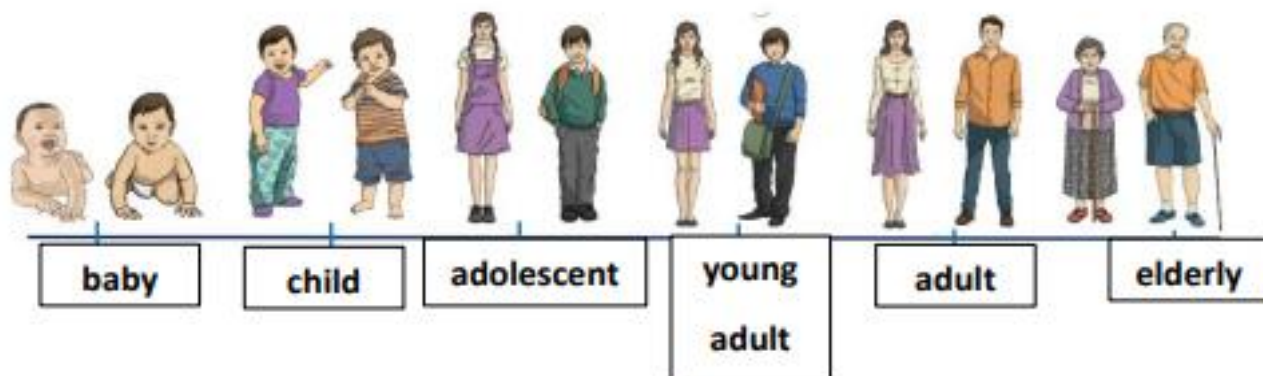


YEAR 5 - HUMANS DEVELOP TO OLD AGE- BIOLOGY

Related vocabulary	Definition
foetus	An unborn or unhatched offspring of a mammal
child	a young person especially between infancy and puberty (ages 3-11)
adolescent	The process of developing from a child into an adult (teenager)
adult	A person who is fully grown or developed
elderly	Person aged 65 or more years
gestation	The process of developing inside the womb between conception and birth
reproduction	Creating offspring by a sexual or asexual process
life expectancy	The average period that you may expect to live
puberty	is the name for the time when your body begins to develop and change as you move from kid to adult



Human time line



As humans grow, they undergo many physical and emotional changes. As a child, we learn new skills such as walking and talking and as we develop into old age, we may get wrinkles, greying hair and may not be able to do all the activities that they could when they were younger. These changes are all part of the human life cycle.

Year 6

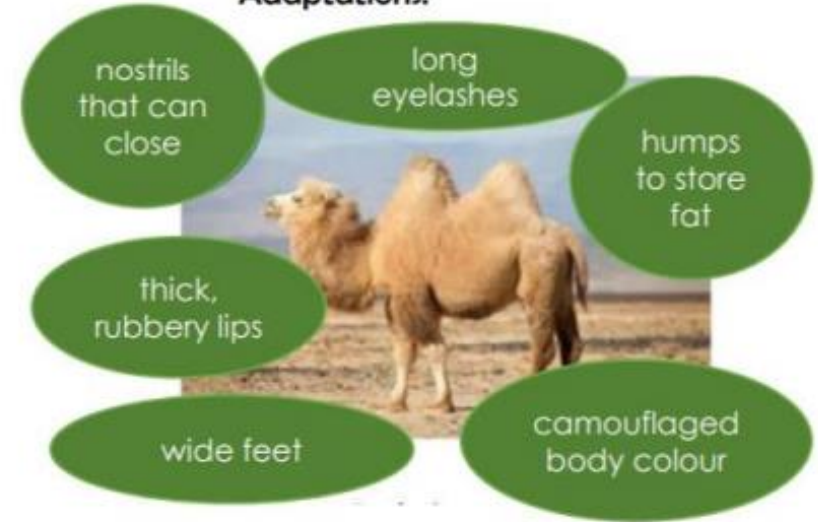
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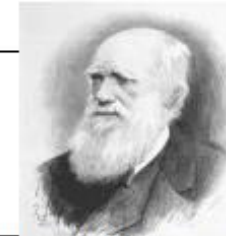
YEAR 6 - EVOLUTION & INHERITANCE - BIOLOGY

Related vocabulary	Definition
evolution	The process of gradual change that takes place over many generations
inheritance	The particular characteristics received from a parent through genes
genes	Part of a cell in a living which controls its physical characteristics
natural selection	The process by which species that are best adapted to their environment survive and reproduce, while less adapted species die out
species	Plants and animals which have the same characteristics and are able to produce offspring
mutation	Permanent changes in genes which pass on to future offspring
adaptation	The process of change by which an organism or species becomes better suited to its new environment
characteristics	Distinguishing qualities, traits, or features of a living thing
variation	Differences between cells, individual organisms, or groups of organisms of any species caused either by genetic differences or by the effect of environmental factors
palaeontology	The branch of science concerned with fossil animals and plants
pre-history	Relating to the period before written records
extinct	A species that is no longer existing
offspring	the product of the reproductive processes of a person, animal, or plant

Adaptations:



Charles Darwin



Charles Darwin (1809-1882) was an English scientist best known for his theory of evolution. He was a geologist who travelled across the world in 1831 on the HMS Beagle. He studied many animals and plants on his travels and came up with the idea of natural selection. His book 'On the Origin of Species' was very controversial at the time because it went against the creation story in the Bible. He studied finches and tortoises living across the Galapagos islands.

Fossils give us evidence of what lived on Earth millions of years ago. By studying fossils, scientists can put together how a plant or animal looked. They can identify what the animal ate, where it lived and how it died.





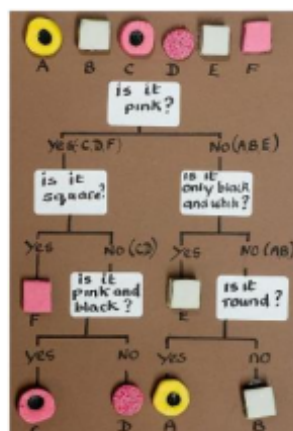
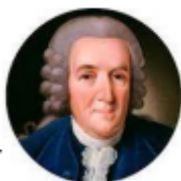
YEAR 6 - LIVING THINGS & HABITATS - BIOLOGY

What you should already know:

- Animals and plants can be classified into different groups based on their characteristics.
- Animals can be grouped into **vertebrates** (with a backbone) and **invertebrates** (without a backbone).
- They can then be subdivided into further groups, for example **mammals**, **fish**, **reptiles**, . (vertebrates) or **spiders**, **snails**, **worms** etc. (invertebrates).
- Plants are commonly grouped into **flowering plants** and **non-flowering plants**. They too can be sub-divided beyond these broad classifications.

Domain
↓
Kingdom
↓
Phylum
↓
Class
↓
Order
↓
Family
↓
Genus
↓
Species

Carl Linnaeus (1707-1778) was a botanist, zoologist and physician. He's most famous for simplifying the naming system scientists use to describe the millions of species on Earth.



A key is a set of questions about the characteristics of living things. You can use a key to identify a living thing or decide which group it belongs to by answering the questions.

Microorganisms are very tiny living things that can only be seen using a microscope. They can be found in and on our bodies, in the air, in water and on objects around us. **Microorganisms** are **viruses**, **bacteria**, **moulds** and **yeast**. Some animals (dust mites) and plants (phytoplankton) are also microorganisms.



Related vocabulary	Definition
classification	living things can be classified into broad groups according to observable characteristics that are similar or different.
taxonomy	an area in science that focuses on the classification of different organisms.
microorganism	these are tiny living creatures. Most can only be seen through a microscope. They can be sub-divided into smaller groups including bacteria, fungi and viruses.
species	this is the grouping together of similar types of plants, animals and other organisms that can reproduce with each other.
living	alive now or once was alive. Has all of the 7 characteristics from MRS GREN - m ovement, r espiration, s ensitivity, g rowth, r eproduction, e xcretion and n utrition
organism	a living thing made up of one or more cells and able to carry on the activities of life (e.g. using energy, growing, or reproducing).
environment	all of the conditions that affect a living thing.
virus	Viruses are a type of germ. They're very tiny, and when they get inside your body, they can make you sick. Viruses cause colds, chicken pox, measles, flu, and many other diseases.
bacteria	are small organisms, or living things, that can be found in all natural environments. They are made of a single cell
fungi	are a group of living organisms which are classified in their own kingdom. This means they are not animals, plants, or bacteria
algae	are organisms, or living things, that are found all over the world. Algae are very important because they make much of Earth's oxygen



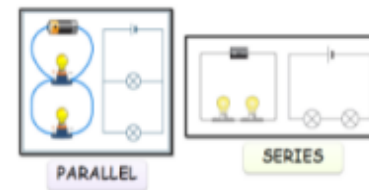
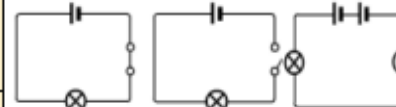
YEAR 6 - ELECTRICITY - PHYSICS

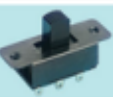
Conductors and Insulators

Related vocabulary	Definition
electricity	a form of energy that can be carried by wires and is used for heating and lighting, and to provide power for devices.
voltage	the force of an electric current as measured in volts the force of an electric current as measured in volts
insulators	a non-conductor of electricity or heat
conductors	a substance that heat or electricity can pass through or along
electrical circuit	A complete path that an electric current can flow around. It flows from the battery, through wires and devices before returning to the battery. If the circuit is not complete the electric current cannot flow
electricity symbols	A symbol used to represent various electronic components or functions in a diagram of a circuit.
appliances	a device or machine in your home that you use to do a job such as cleaning or cooking. Appliances are often electrical.
battery	A device consisting of one or more cells
component	the parts that something is made of
current	a flow of electricity through a wire or circuit
energy	the power from sources such as electricity that makes machines work or provides heat
resistance	a force which slows down a moving object or vehicle

	Good Conductors allow energy to pass through	Insulators stop or slow down energy
Electrical	Metals e.g. copper, silver, gold, iron, steel, aluminum tap water 	rubber wood plastic glass paper cotton distilled water polystyrene fabric 
Thermal	Metals e.g. copper, silver, gold, iron, steel, aluminum 	plastic wood rubber fabric polystyrene 

Examples of circuits



	BULB (LAMP) A component which lights up when electricity passes through it in a circuit	
	MOTOR A component which moves (spins) when electricity passes through it in a circuit	
	BUZZER A component which makes a sound when electricity passes through it in a circuit	
	WIRE Plastic-coated electrical wire which conducts electricity around a circuit	
	SWITCH Part of a circuit which can easily be opened or closed to control the flow of electric current	
	CELL - 1 battery A safe power source. A store of chemical potential energy that can power a circuit	
	CELL - 2 batteries Two cells used together to make a more powerful power source	



YEAR 6 - LIGHT - PHYSICS

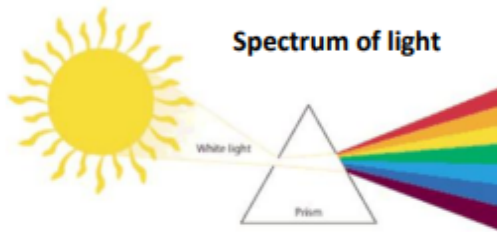
What you should already know (year 3):

Light is a form of energy that makes it possible to see.

Darkness is the absence of light. Light can reflect off surfaces (e.g. mirrors).

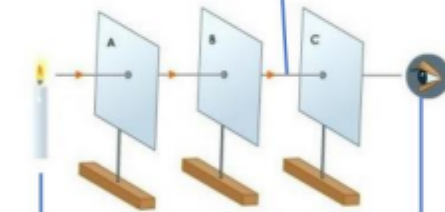
Objects can be labelled as **transparent**, **translucent**, or **opaque**, depending on the amount of light that they let through.

Shadows are formed when light is blocked by an opaque object.



Light travels in a straight line:

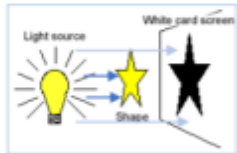
We can use an arrow to represent the path of the light.



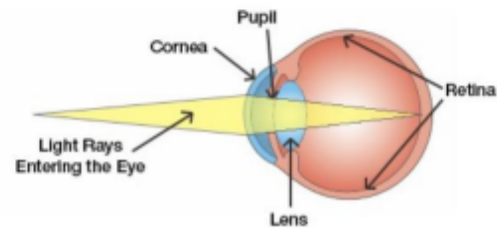
Light source

We see light from the light source when it enters our eyes.

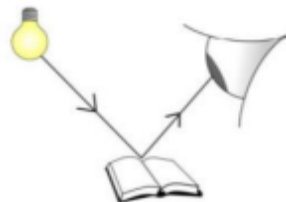
Shadows have the same shape as the objects that cast them:



Because when an opaque object is in the path of light travelling from a light source, it will block the light rays, while the rest of the light continues travelling in a straight line.



For objects that are not a light source, light must be reflected from the object into our eye for us to see the object:

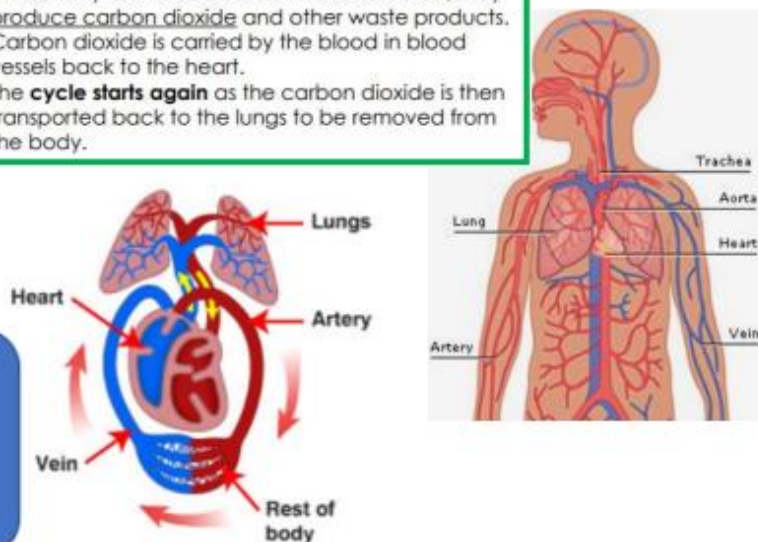


Related vocabulary	Definition
eyes	globular organs of sight in the head of humans and vertebrate animals.
filter	a device to remove unwanted material (liquid, gas, light or sound).
light	the natural agent that stimulates sight and makes things visible.
light source	something that provides light, whether it be a natural or artificial source of light (e.g. the sun, a torch).
opaque	an object which does not allow light to pass through (e.g. wood).
translucent	an object which allows some light to pass through it. It may be possible to see some unclear images through the object (tissue paper).
transparent	an object which allows light to pass through it so that objects behind it can be easily seen (glass)
rainbow	an arch of colours visible in the sky, caused by the refraction and dispersion of the sun's light by rain or other water droplets in the atmosphere
prism	when light passes through a different object and its direction changes.
ray	a beam of light given off by a light source
reflection	the throwing back by a body or surface of light, heat or sound without absorbing it.
refraction	the bending of light as it passes from one substance to another with the bending caused by the difference in density between two substances.
shadow	a dark area or shape produced by a body coming between rays of light and a surface.
spectrum	a band of colours, as seen in rainbows, produced by separation of the components of light by their different degrees of refraction.



YEAR 6 - HUMAN CIRCULATORY SYSTEM - BIOLOGY

- The **heart** pumps **blood** in the **blood vessels** to the **lungs** where oxygen goes into the blood and carbon dioxide is removed.
- The blood goes back to the heart.
- It is then pumped around the body so that water, nutrients and oxygen are transported in the blood to the muscles and all the other parts of the body where they are needed. As all these are used, they produce carbon dioxide and other waste products.
- Carbon dioxide is carried by the blood in blood vessels back to the heart.
- The **cycle starts again** as the carbon dioxide is then transported back to the lungs to be removed from the body.



Smoking

Can cause shortness of breath, heart and lung disease.

Alcohol

Too much alcohol can damage the liver, heart and stomach.

Diet, exercise, drugs and other lifestyle choices have an impact on how our bodies function. This can affect how well our heart and lungs work and how fit and well we feel.

Exercise can increase fitness, make you feel physically and mentally healthier, strengthen your heart and improve your lung function

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



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



Related vocabulary	Definition
heart	the organ in your body that pumps blood around the body
lungs	two organs in your chest which fill with air when you breathe in. They oxygenate the blood and remove carbon dioxide from it
arteries	tubes in your body that carry oxygenated blood from your heart to the rest of your body
atrium	the part of the heart that receives blood from the veins
aorta	the main artery that carries blood away from your heart to the rest of your body.
blood vessels	narrow tubes that your blood flows through.
veins	a tube in your body that carries deoxygenated blood to your heart from the rest of your body.
ventricles	the part of the heart from which blood passes into the arteries
carbon dioxide	a gas produced by animals and people breathing out
circulatory system	the system responsible for circulating blood through the body, that supplies nutrients and oxygen to the body and removes waste products such as carbon dioxide
deoxygenate	blood that does not contain oxygen
oxygenate	blood that does not contain oxygen
pulse	the regular beating of blood through your body. How fast or slow your pulse rate is depends on how active you are
respiration	inhaling oxygen-rich air and exhaling air filled with carbon dioxide