Preston Grange Primary School

Science Curriculum

Nursery Overview

Autumn 1	Build with blocks of different shapes and sizes and loose parts, making good choices based on their understanding of properties. Actively collect and enjoy transporting materials. Follow adult prompts to explore sensory properties of everyday materials and demonstrate engagement through facial expression/body language. Sustain interest in action and reaction toys. Engage in joint attention with adults for short periods of time in respectful observations of living things. Recognise themselves and name family. Recognise that they can do things now that they couldn't do as a baby.
Autumn 2	Actively explore the properties of everyday materials through spontaneous experimentation. Respond appropriately to adult guidance to treat living things with care. Continue to develop positive attitudes and the differences between people.
Spring 1	Use some very simple adjectives to describe the sensory properties of everyday materials. Work alongside adults imitating their actions as they care for living things. Explain how things work e.g windup toys pulleys. Show interest in different occupations. Use materials for a purpose.
Spring 2	Choose the tools and materials they need to achieve their goal. Talk about the differences between materials and changes they notice. Respond appropriately to adult guidance to treat living things with care. Describe and enact some of the roles of community figures. Join materials for a purpose.
Summer 1	Collect particular materials for a purpose. Demonstrate a range of actions through with remote control toys. Work alongside adults imitating their actions as they care for living things. Narrate life cycles e.g. caterpillar. Know that there are different countries in the world and talk about the differences they have experienced or seen in photos. Join materials in a range of ways to make things for a purpose.
Summer 2	Actively explore the properties of everyday materials through spontaneous experimentation, narrating findings. Answer closed and anticipatory questions in simple and adult led experiments about the properties of materials. Work alongside adults imitating their actions as they care for living things.

Reception Overview

Autumn 1	Describe changes of state with 'cement' and clay and with ingredients when cooking. Describe and represent the home in 2D and 3D, naming rooms and parts of the building. Know that children were babies in the past. Know that adults were children in the past.
Autumn 2	Describe textures experienced through pumpkin exploration. Find and know some uses of the seeds. Describe changes to trees and woodland plants in Autumn. Know and demonstrate how to plant Spring flowering bulbs and predict what will happen. Notice the change in day length and discuss day / night daily activities. Identify healthy ingredients in healthy snacks. Distinguish between healthy food choices and special treats. Articulate and demonstrate teeth cleaning.
Spring 1	Describe changes to trees and woodland plants in Winter. Describe and explain changes in state with water. Describe and explain how penguins adapt to survive in Antarctica. Describe and explain changes in weather in different seasons. Observe, notice and discuss and record weather patterns across days and weeks. Compare different weathers they have experienced. Twist, wrap and weave with pressure and precision, narrating choices about colour and texture.
Spring 2	Choose ingredients suited to a healthy snack or recipe. Identify similarities and difference between babies and 4 year olds and describe how people change in the first 4 years of life. Identify similarities and difference between 4 year olds and adults. Describe how people grow up and change. Name farm animals and their young. Describe and demonstrate an understanding of how to grow and take care of seeds. Predict what will happen to seeds and how they will change as we begin to plant our allotment garden. Describe some difference between farming now and in the past.
Summer 1	Describe changes to trees and woodland plants in Spring. Know and demonstrate how to grow seeds and care for seedlings. Name the stages and describe the transitions in the life cycle of a sunflower, butterfly and frog. Name and identify the features of a range of minibeasts found in our gardens. Describe some of the benefits of minibeasts in our gardens. Make increasingly detailed observational drawings and paintings of natural found objects and living things.
Summer 2	Describe changes to trees and woodland plants in summer. Know and demonstrate how to nurture edible plants. Describe difference and similarities between animals and plants in our school forest and in Kenya. Compare physical features using aerial views and photographs. Name some physical features of a beach environment using secondary sources and first hand experiences. Describe natural and man-made beach detritus and know the dangers to wildlife from man-made rubbish.

KS1 and KS2 Overview

Year	Units				
1	Animals inc. Humans	Seasonal Change	Everyday Materials	Plants	Senses
2	Animals inc. Humans	Everyday Materials	Living Things and Habitats	Plants	
3	Animals inc. Human	Light	Rocks	Plants	Forces and Magnets
4	States of Matter	Electricity	Sound	Animals inc. Human	Living Things and Habitats
5	Forces and Magnets	Earth and Space	Animals inc. Humans	Living Things and Habitats	Materials and Changes
6	Light	Electricity	Evolution and Inheritance	Animals inc. Human	Living Things and Habitats

Knowledge Organisers

Year 1

Year 1 Animals, including humans

Key Words	
mammal	Breathes air, warm blooded, has hair or fur, live babies
amphibian	Lives part of its life in water, lays eggs, cold blooded.
reptile	Covered in scales, cold blooded, usually lay eggs, breathe air.
bird	Warm blooded, wings and beak, lay eggs, body covered in feathers
insects	Very small animals with six legs.
carnivore	An animal that gets food from killing and eating other animals
omnivore	An animal that eats both plants (including nuts and seeds) and other animals
herbivore	An animal that eats plants

Key Knowledge

Living things can be organised into different groups depending on how they look and how they live. There are six main groups mammals, amphibians, reptiles, birds, fish, insects.
What animals eat puts them into three different groups; carnivore, omnivore and herbivore.
Given animals children should be able to place them into a group and explain why. E.g. a dog is a mammal because it is furry.

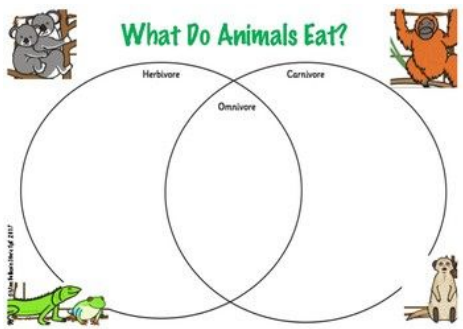
Practical Science

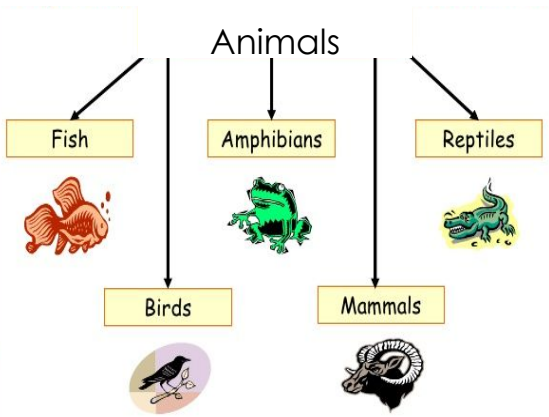
Sorting animals by observable features

Bird watching in forest.

Wildlife hunt in forest and counting/ sorting what they see. E.g. How many birds, how many mammals, how many insects?

Key Diagrams





Year 1 - Seasonal changes

Key Words	
season	There are 4 seasons. A season is a group of months where the weather is mostly the same
spring	A season when things begin to grow, the ground gets warmer, blossom appears
summer	The warmest season, daylight lasts longer, nights shorter
autumn	The days start to get colder,nights get longer, leaves fall from trees, fruits on trees, deciduous leaves fall.
winter	Coldest season, long nights, chance of snow, some animals hibernate, fewer things grow
weather	Each season has typical weather.
daylight	The time when the sun is visible from where you are on the Earth.

Key Knowledge

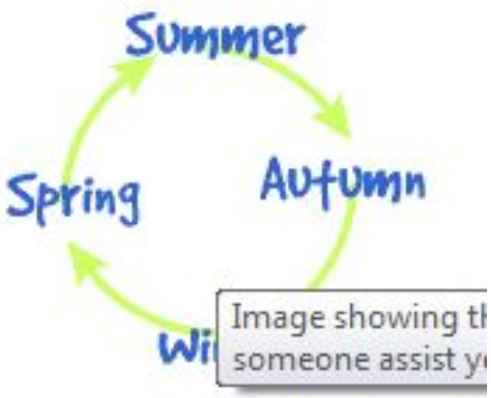
Days are longer in the summer and shorter in winter
Weather changes through the year, getting hotter in the summer and colder in the winter
The winter is likely to bring ice on the ground when water freezes due to the cold
The Earth goes around the Sun in one year and this causes the seasons.

Practical Science

Scavenger hunt
Leaf sort (observe and classify)

Compare trees throughout the seasons (apple tree, oak tree, ivy) using careful observations

Key Diagrams



Year 1- Plants

Key Words	
blossom	The bloom of a flowering plant.
petal	The colourful leaves of a flower or plant.
root	Roots anchor the plant to the ground and take in water
stems	This takes the water from the root to the rest of the plant.In a tree we would call it a trunk.
leaf	The green parts of trees which soak up sunlight.
flower	A flower attracts insects with its colour and perfume. It it where the fruit grows
Deciduous trees	Trees which lose their leaves in the colder months
Evergreen trees	Trees which keep their leaves all year round

Key Knowledge

Identify plants; daisy, dandelion, daffodil, bluebell, tulip, rose, sunflower.

Label and explain the parts of a plant; petal, root, stem, leaf.

Identify trees in the school grounds; oak, birch, horse chestnut including deciduous trees and evergreen trees.

Practical Science

Observe the growth of a bean seed looking at the plant parts as they appear.

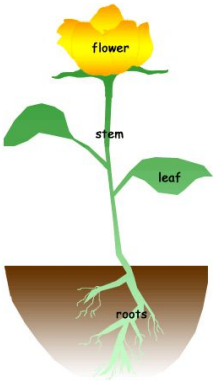
Repot plants as the roots get bigger and need more space

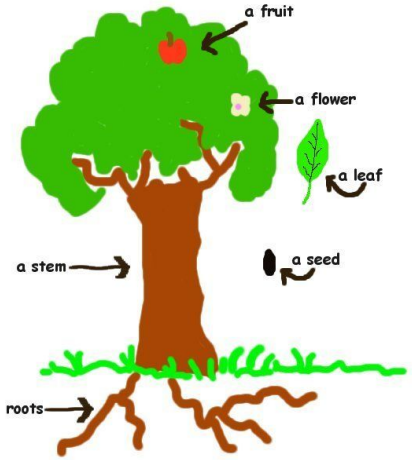
Colouring carnations to show the function of the stem

Make model of a flowering plant

Observational walk

Key Diagrams





Year 1 - Everyday materials

Key Words	
object	An object is a thing that can be seen and touched
material	What something is made of. There are lots of different materials:- rock, plastic, wood, glass, metal, water
properties	Materials have different properties, eg hard, soft, transparent, opaque, rigid, flexible, elastic, rough, smooth, fragile, shiny, waterproof, absorbent
waterproof	A material or object able to keep water out fully no matter how long they spend in water.
absorbent	A material or object that soaks up liquid.

Key Knowledge

Distinguish between materials made of wood, plastic, glass, metal, water, rock.

An object is made from/of a material.

Materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material.

Matter (stuff) is made from tiny building blocks.

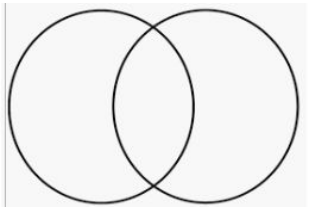
Practical Science

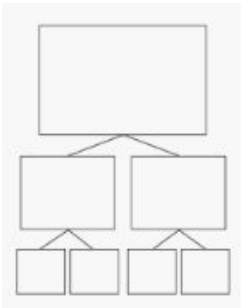
Sorting objects according to their properties

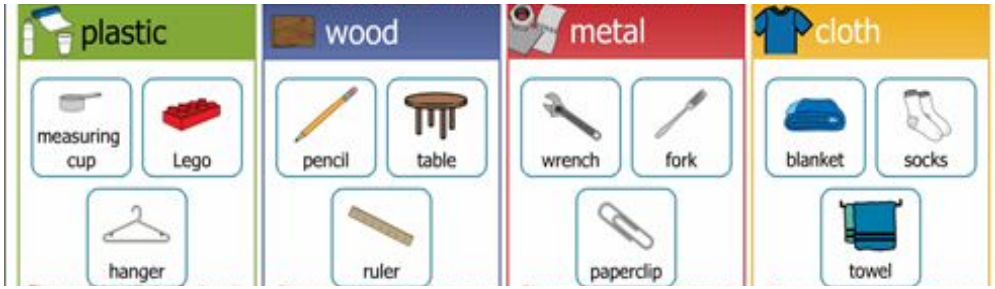
Using their senses to describe, identify and classify materials

Perform simple absorbency test in response to a question

Key Diagrams







Knowledge Organisers

Year 2

Year 2 - Animals including Humans

Key Words

humans	A person.
offspring	Person's child or children. (human) An animal's young. (animal)
survival	A state of continuing to live or exist, typically in spite of an accident, ordeal, or difficult circumstances.
diet	The food and drink usually eaten and drunk by a person or animal.
hygiene	The practice of keeping clean to stay healthy and prevent disease.
exercise	Activity requiring physical effort, carried out to sustain or improve health and fitness.
growth	An increase in size.
protein	Protein builds, maintains, and replaces the tissues in your body.
carbohydrates	The two main forms of carbohydrates are sugars and starches, which are found in foods such as starchy vegetables, grains, rice, breads, and cereals.

Key Knowledge

A balanced healthy diet is eating a variety of different foods from all five food groups.
The main food groups are; fruit and vegetables, carbohydrates, proteins, dairy and fats and oils.
The importance of exercise is to stay fit and healthy.

You need water, food and air to survive.

Animals including humans have offspring that will grow into adults.

Hygiene helps to keep clean and to prevent infections and diseases.

Practical Science

Exercise and measuring heart rate.
Hand washing.
Healthy cooking (homework)
Healthy food tasting.
Smoothie making.
Sorting foods into food groups.

Key Diagrams

Year 2 - Plants

Key Words

lifecycle	The stages a living thing goes through during its life.
seeds	Seeds are the small parts produced by plants from which new plants grow.
bulb	A resting stage of a plant that is usually formed underground.
temperature	A measure of hotness or coldness the can be measured using a thermometer.
germinate	The process of seeds developing into new plants.
shade	Covering that protects something from direct sunlight.
shoot	The part of a plant that comes up above the ground when it is just beginning to grow.
seedling	A young plant grown from seed.

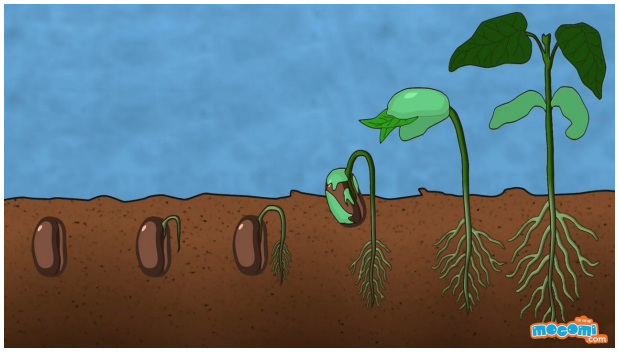
Key Knowledge

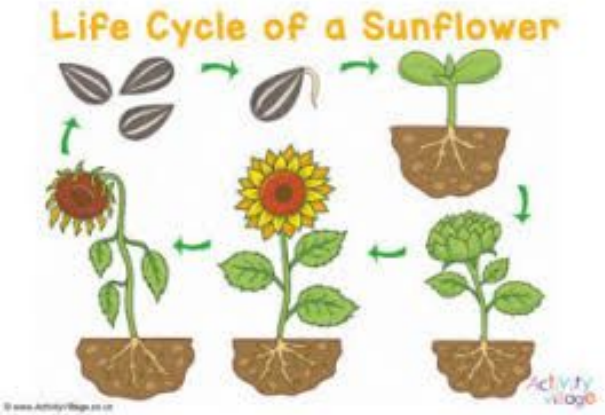
Describe how seeds and bulbs grow into mature plants.
Seeds and bulbs need to be planted under the soil and that they will grow into an adult plant under the right conditions.
Understand the life cycle of a plant.
Describe how plants need water, light and a suitable temperature to grow and stay healthy.
Know how to plant seeds and bulbs.
Carry out simple tests to investigate the best conditions for plant growth.
Observe changes closely and record what they find.
Revise the trees found in the school grounds.

Practical Science

Planting seeds.
Planting bulbs.
Investigating and observing trees and plants in the school ground.

Key Diagrams





Year 2 Living Things and Life Cycles

Key Words	
living	Something that is alive.
dead	Something that isn't alive.
habitats	A habitat is the home of an animal or a plant.
micro habitat	A small specialised habitat within a larger habitat. E.g. woodlice living under damp logs,
food chain	The order in which organisms, or living things, depend on each other for food.
producer	Producers make their own food.
consumer	Organisms that eat other living things are known as consumers.

Key Knowledge

Differences between things that are living, dead and things that have never been alive.
Most living things live in habitats to which they are suited.
Different habitats provide for the basic needs of different animals and plants.
Different plants and animals rely on each other for survival.
Animals obtain their food from plants and other animals using the idea of a simple food chain.
Identify and classify different plants and animals in their habitats.
Polar bears, sharks, cacti, pine trees, woodlice and frogs are adapted to their habitats.
Plants get energy from the sun.

Practical Science

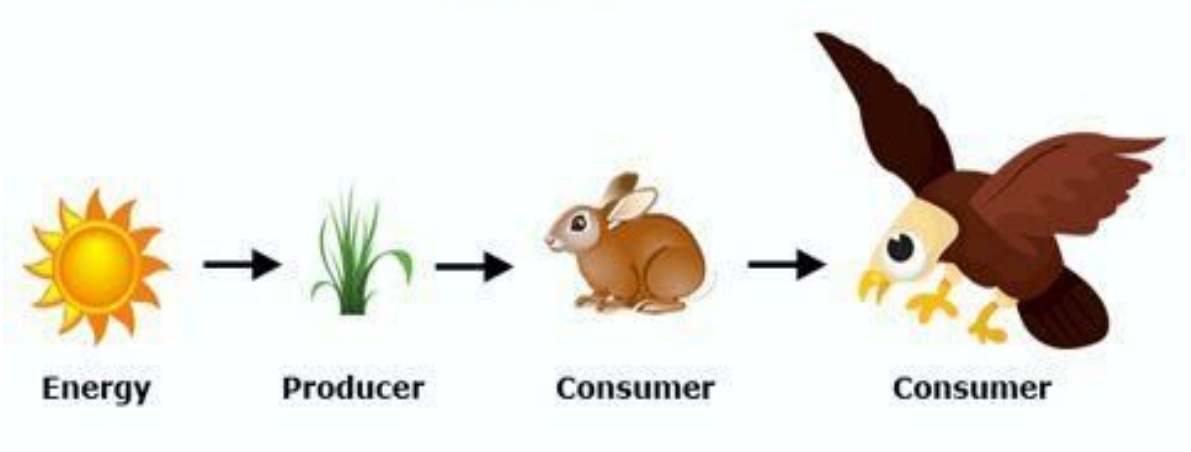
Making bug hotels.

Sorting non-living and living things.

Minibeast hunts.

Investigating minibeasts in the micro habits around school.

Key Diagrams



Year 2 Materials

Key Words

suitability	The quality of being right or appropriate for a particular person, purpose, or situation.
rigid	Unable to bend or be forced out of shape; not flexible.
flexible	Capable of bending easily without breaking.
waterproof	A material that keeps water out.
opaque	Blocks the light and cast a shadow. You cannot see through.
transparent	Light can completely passes through and you can see clearly through it.
translucent	Light can pass through, but doesn't show clear and distinct images on the other side.
reflective	When light travels towards and surface and bounces off it.

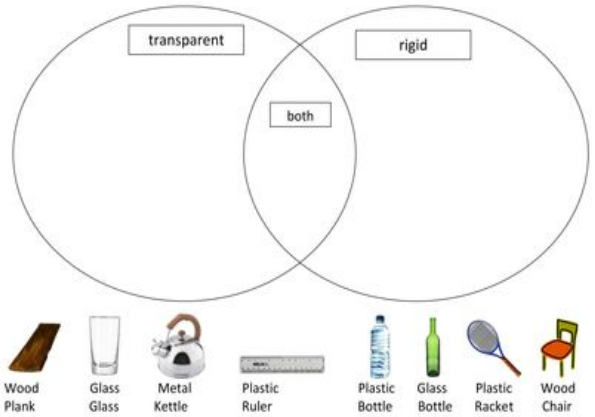
Key Knowledge

Materials can have useful properties for a given job (including being waterproof, strong, hard, soft, flexible, rigid, light or heavy.)
Many types of plastic are waterproof,
that steel (a type of metal) is strong,
that rock is hard and rigid
that cotton wool is soft,
that rubber is flexible,
that polystyrene (a type of plastic) is light
that iron (a type of metal) is heavy,
Materials can be change shape by squashing, bending, twisting and stretching (force).

Practical Science

Identifying different materials around school.
Sorting materials by their properties.
Investigating if materials can be changed by squashing, twisting, bending and stretching.
Observing if materials return to their original shape.
Use wool to create rope for additional strength.

Key Diagrams



Knowledge Organisers

Year 3

Year 3 Plants

Key Words	
transport	The way water travels from one part of a plant to another.
absorb	Soaking up liquid
germination	Where a seed starts to grow into a plant.
pollination	The process by which pollen is transferred to the female parts of the plants which means the plants can make seeds and reproduce.
Seed formation	When a seed is made and formed.
dispersal	The movement or transport of seeds away from the parent plant.

Key Knowledge

Plants need light, sun, water and oxygen to grow.
Plants keep our air fresh by taking in carbon dioxide and giving out oxygen.
Plants are living things. (MRS GREN)
Plants are made of different parts.
There are different stages of the plant life cycle.
When an insect visits another flower for more nectar, the grains of pollen transfer from the insect's body to the sticky stigma of the new flower.
Water evaporates from the leaves into the atmosphere.The plant then sucks up more water with its roots, to replace the water it has lost. As a result, water is constantly moving through plants.
Plants disperse their seeds in lots of different ways. Some seeds are transported by the wind and are shaped to float, glide or spin through the air.

Practical Science

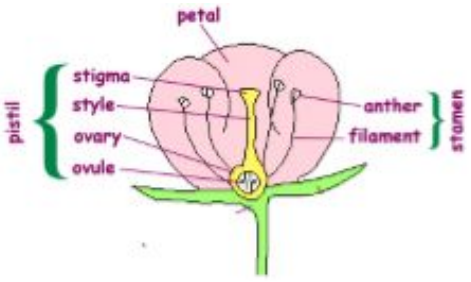
Seed germination.

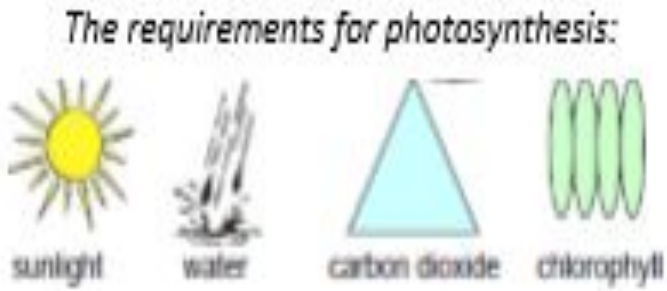
Compare the effect of different factors on plant growth. E.g. amount of light or fertiliser.

Observe plant growth over time and record the stages.

How is water transported in plants? Use food colouring and cut flowers to show how it travels.

Key Diagrams





Year 3 Rocks

Key Words

sedimentary	Type of rock formed when sand, mud and pebbles get laid down in layers.
igneous	Type of rock formed by the cooling of magma, either underground (intrusive) or overground (extrusive).
metamorphic	Type of rock formed by transforming existing rocks using heat or pressure.
fossil	The remains or impression of a prehistoric plant or animal, embedded in rock.
Organic matter	A matter that has come from a recently living organism.
soil	The upper layer of earth, consisting of a mixture of organic remains, clay and rock particles.

Key Knowledge

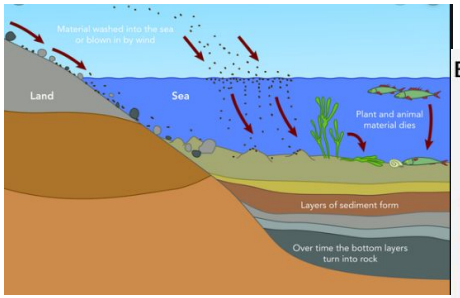
There are 3 different types of rock; sedimentary, igneous and metamorphic and how each differs and how they are formed.
The stages of fossilisation - After an animal dies, the soft parts of its body decompose leaving the hard parts, like the skeleton, behind. This becomes buried by small particles of rock called sediment. As more layers of sediment build up on top, the sediment around the skeleton begins to compact and turn to rock. The bones then start to be dissolved by water seeping through the rock. Minerals in the water replace the bone, leaving a rock replica of the original bone called a fossil.
Mary Anning was the first to discover the complete skeleton of a Plesiosaurus
Soils are made from rocks and organic matter.

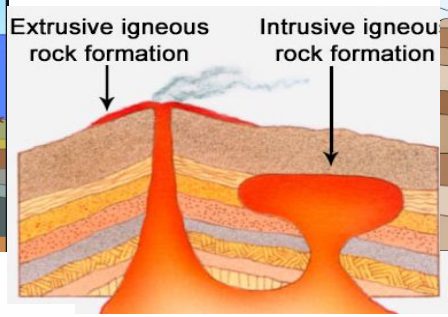
Practical Science

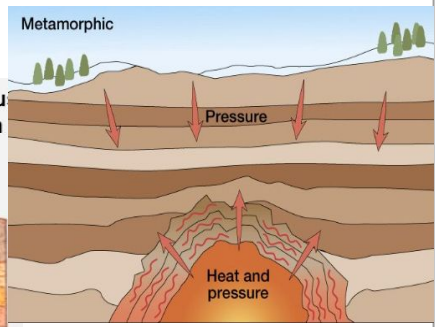
Grouping rocks by appearance and physical properties

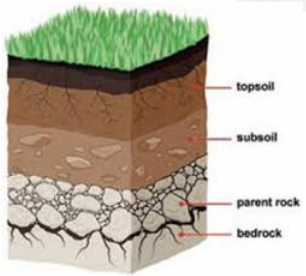
Handling different types of soils.

Key Diagrams









Year 3 Animals, including humans

Key Words	
nutrients	Substances that support our immune systems, maintain healthy bones and teeth and support growth.
vitamins	A group of nutrients that are needed for the body but are essential for our system.
minerals	Present in food that are required by our body to develop and function properly.
muscle	A bundle of fibres that can contract and relax to allow the body to move.
exoskeleton	Protective structure covering the outer body of many animals.
vertebrate	A creature which has a spine.
invertebrate	A creature which does not have a spine.
joints	Joints allow different parts of the skeleton to move.

Key Knowledge

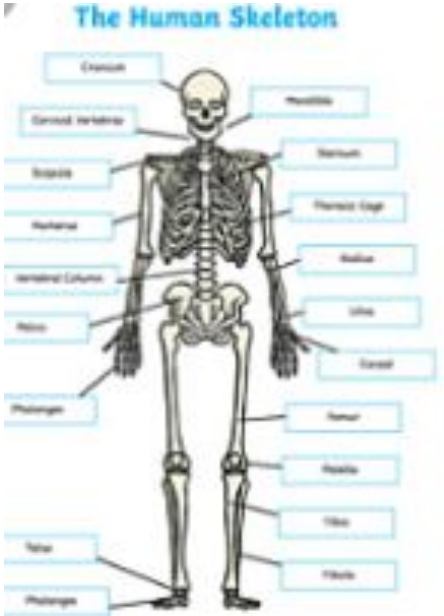
Animals, including humans, need the right types and amounts of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Humans and some other animals have skeletons and muscles for support, protection and movement. Know the common and scientific names for bones. Different animals have different skeletons; vertebrate, invertebrate, exoskeleton.

Practical Science

Children moving their own bones- can they do this without their muscles?

Classifying and grouping animals with and without skeletons.

Key Diagrams



Year 3 Light

Key Words

light source	An object that produces its own light.
dark	The absence of light.
Absence of light	No light - we cannot see.
reflection	When a light hits off a surface and bounces off.
shadow	A dark area created by the blockage of light.
opaque	An object that does not allow light to pass through it.
translucent	An object which allows some light to pass through it.
transparent	An object which allows light to pass through it

Key Knowledge

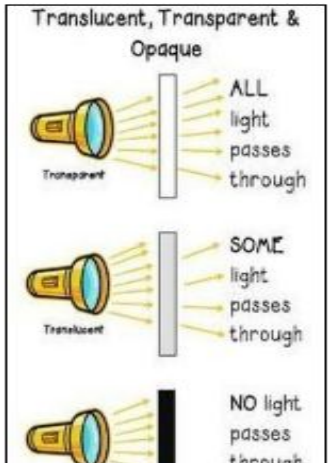
Darkness is the absence of light.
The moon is not a light source, but it reflects the sun.
A shadow is created when the light from a light source is blocked by a solid object.
Light from the sun can be dangerous and ways to protect our eyes against damage from the sun.
Light travels faster than sound.
Light is reflected from surfaces.

Practical Science

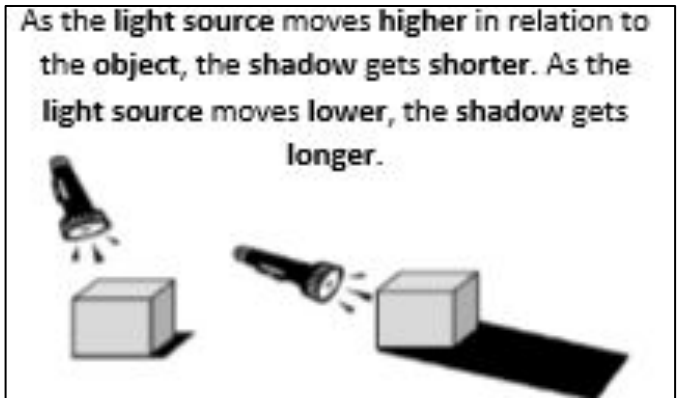
Creating their own silhouettes.

Changing the length of shadows.

Testing different materials to see if they are opaque, translucent or transparent.



Key Diagrams



Year 3 Forces and magnets

Key Words	
attract	To pull towards.
repel	To push away.
north pole	One end of a magnet is the north pole, it is usually represented by the colour red.
south pole	One end of a magnet is the southpole, it is usually represented by the colour blue.
Magnetic force	A force that pulls on other metals such as iron, cobalt and nickel.
strength	How strong a magnet is. Magnets will create bigger pushing or pulling forces than weak

Key Knowledge

Compare how things move on different surfaces.
Some forces need contact between 2 objects, but magnetic forces can act at a distance.
Magnets attract and repel each other and attract some materials and not others.
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.
Magnets as have 2 poles, and describe them as so.
Magnets will attract or repel each other, depending on which poles are facing.

Practical Science

Using magnets to attract and repel.

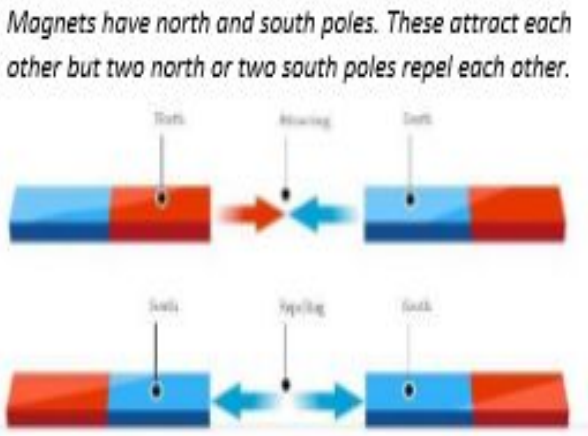
Magnets to move objects.

Testing which metals are magnetic.

Creating a magnetic game .

Comparing the strength of magnets and identifying if the size relates to the strength.

Key Diagrams



Knowledge Organisers

Year 4

Year 4 Sound

Key Words	
sound	A vibration that is created and travels through a medium to the ear.
medium	A medium is what the sound travels through. This can be air, solids, liquids and gases.
pitch	A measure of how high or low a sound is.
volume	The intensity of sound, loud and quiet.
source	Where a sound is coming from.
vibrations	The rapid back-and-forth movement of physical particles, as a reaction to different forces.
faint	Has very little strength, sound or intensity.
insulation	Materials that are better at absorbing sound waves so sound doesn't pass through easily.

Key Knowledge

Sound is generated when an object vibrates; some of the energy from the vibrating object is transferred to the air, making the air particles move.
Sound is a form of energy that transfers in a wave - like that seen in a slinky.
Sound travels through a medium (e.g. particles in the air) and thus sounds does not travel through a vacuum which has no particles in it at al.l
Sound waves are detected in the ear by humans and that the brain interprets this as the sounds we hear.
Sound travels at different speeds through different objects; it travels at around 340 metres per second in air, much slower than light travels; this is why we often hear thunder after we see lightning as the light reaches our eye before the sound reaches our ears.
Pitch is how high or low a sound is and that this is determined by how many vibrations per second are being made by the vibrating object; the number of vibrations per second is called frequency.

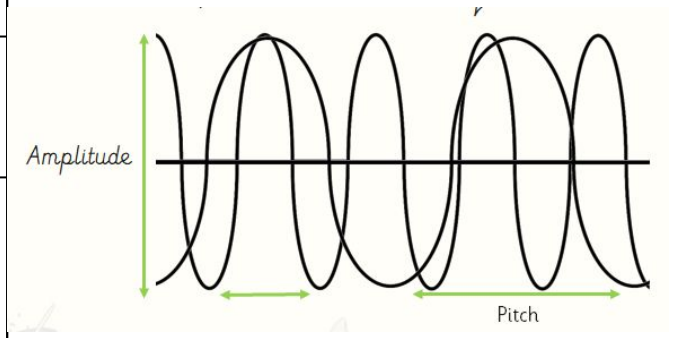
Practical Science

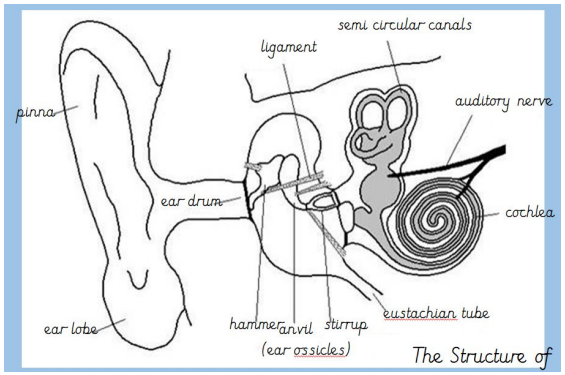
Exploring how to make a vibration using drums and rice, elastic bands and rulers.

Creating straw pan pipes to explore pitch.

String telephones.

Key Diagrams





Year 4 Electricity

Key Words	
electricity	The flow of tiny particles called electrons and protons.
cell	A battery with wires connecting it to a bulb.
insulator	Materials that let electricity pass through them easily.
conductor	Materials that do not let electricity pass through them.
circuit	A circuit is a path for the electricity to flow through.
mains	To use this type of electricity, you need to plug the appliance into a socket.
switch	Used to control circuits and the electricity flow.
battery	To use this type of electricity, you need to insert a battery into the appliance.

Key Knowledge

Electrical currents can only flow if there is a complete circuit.
Conductor materials; metals such as: copper, iron and steel.
Insulator materials; plastic, wood, glass and rubber.
A switch function completes or breaks the electricity flow in a circuit.
Static electricity is an imbalance of charged particles on a material.

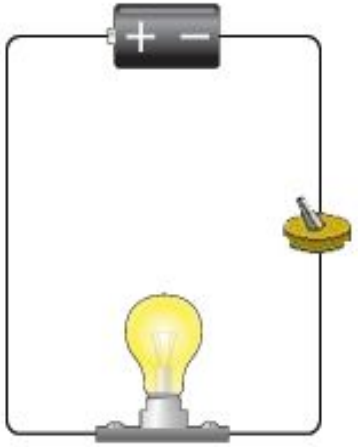
Practical Science

Electrical walk around school.

Create their own electrical circuit using resources. Exploring conductor materials and insulator materials.

Design and create their own switch the test out in a circuit.

Key Diagrams



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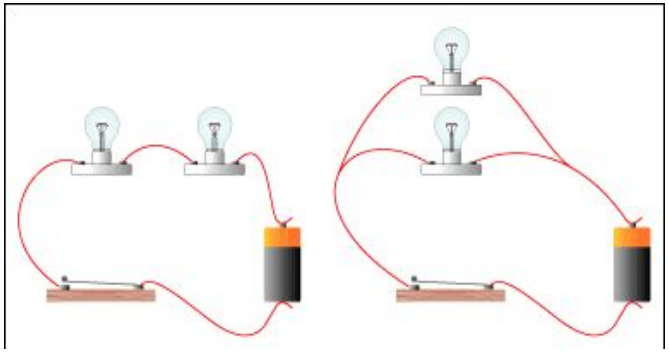


Year 4 States of matter

Key Words	
solid	A state of matter that stays in one place and can be held, keeping their shape.
liquid	A state of matter that can flow and are not easy to hold.
freeze	The process of changing a liquid into a solid.
melt	The process of changing a solid into a liquid.
evaporation	The process of changing a liquid into a gas.
condensation	The process of changing a gas into a liquid.
gas	A state of matter that is often invisible and spread out and change shape to fill up whatever container it is in.

Key Knowledge

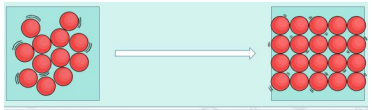
There are 3 states of matter; solids, liquids and gases.
Even though gases are not always visible they are there and they are a matter.
Materials can change state when temperature changes.
Things are made of particles (tiny building blocks) which are organised differently in different states.
Water flows around our world in a continuous process called the water cycle - revision from Year 3 Geography with addition of states of matter knowledge from Year 4 Science.
The melting point of water is 0°C and that the boiling point of water is 100°C.

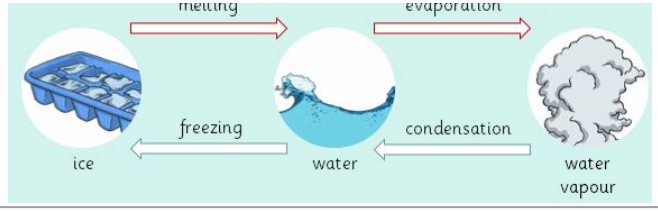
Practical Science

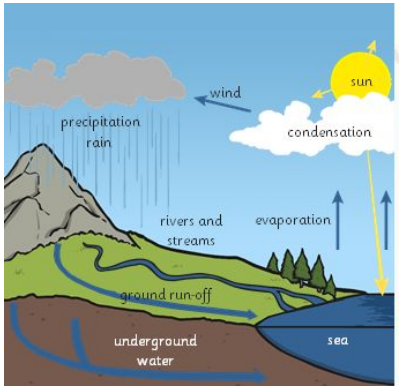
Role play - demonstrating the particles in the 3 states of matter.

Ice cube investigation.

Key Diagrams







Year 4 Animals, including humans

Key Words	
digestive system	It is part of the body that breaks down food into simple chemicals that can be absorbed into the bloodstream.
incisors	A narrow-edged tooth at the front of the mouth, adapted for cutting.
canines	A pointed tooth between the incisors and premolars of a mammal, often greatly enlarged in carnivores.
molars	A grinding tooth at the back of a mammal's mouth.
predator	An animal that naturally preys on another animal
prey	an animal that is hunted and killed by another for food
producers	Organism that creates food for itself and others.
consumers	Organisms that eat other living things.

Key Knowledge

Food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion.
The process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body.
A human has three types of teeth – incisors, canines and molars – and that these each perform different functions.
All energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers.
Consumers take in energy by eating.
Animals are either predator or prey.

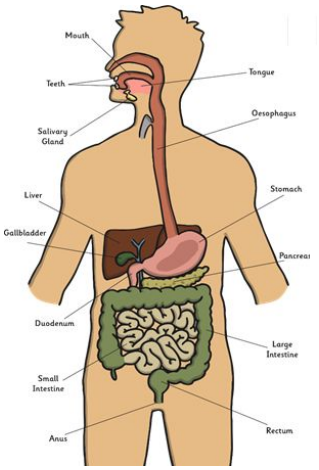
Practical Science

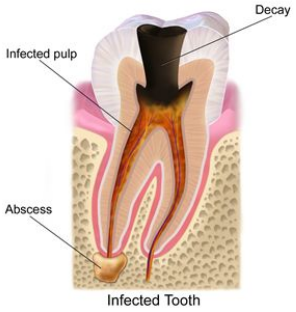
Egg experiment

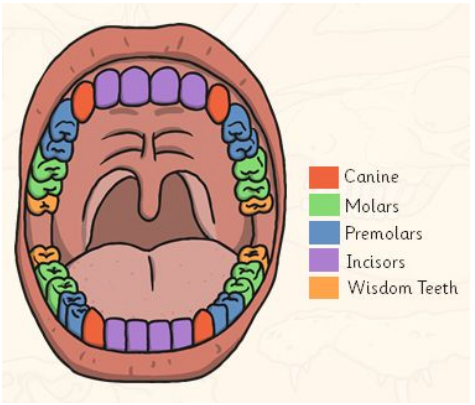
Create model of digestive system.

Enrichment - dentist visit

Key Diagrams







Year 4 Living things and habitats

Key Words	
organisms	A living thing made up of one or more cells and are able to carry on the activities of life.
environment	The surroundings or conditions in which a person, animal, or plant lives or operates.
bacteria	Single-celled tiny organisms.
migrate	When an animal, typically a bird or fis move from one region or habitat to another according to the seasons.
endangered	At risk of extinction.
species	A group of closely related organisms that are very similar to each other and can usually produce offspring.
classification key	a tool that can be used to identify organisms or objects in the natural world, such as plants, animals, or rocks.

Key Knowledge

Animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and based on their behavior (e.g. herbivores, carnivores and omnivores).
Living things are divided into kingdoms: the animal kingdom, plants, fungi, bacteria, and single-celled organisms.
Changes to the environment can make it more difficult for animals to survive and reproduce.
Human activity – such as climate change caused by pollution - can change the environment for many living things, endangering their existence.

Practical Science

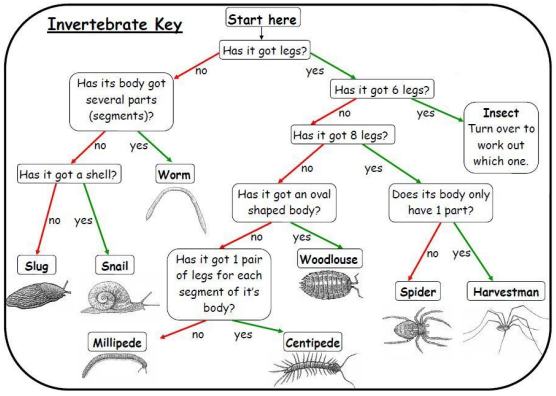
Collect specimens and sort them into categories - Pooters!

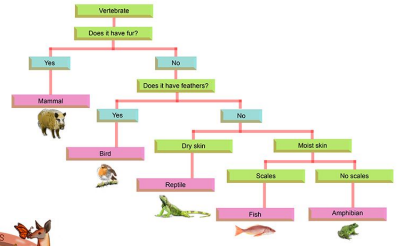
Tree shake with white sheet.

Trip to Cullercoats Bay and Dove Marine Laboratory

Habitat test for woodlice.

Key Diagrams





Knowledge Organisers

Year 5

Year 5 Properties and changes of materials

Key Words	
soluble	Something that can be dissolved in a liquid.
filtration	Separating a solid from a liquid.
dissolving	When a solid mixes with a liquid and becomes part of the liquid e.g. sugar in water.
evaporating	When a liquid becomes a gas. Used to separate solids dissolved in liquids.
reversible changes	A change where you can go back to the original materials.
Irreversible changes	A change where you cannot go back to the original materials.
insoluble	Something which cannot be dissolved.
conductor	A material which allows heat or electricity to carry through it.
solution	A liquid which has a solid dissolved in it e.g. sugar in water.

Key Knowledge

Everyday materials have different properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.

Because of these differences different materials (metal, wood, plastics) are chosen for different purposes.

Salt and sugar and other materials dissolve in liquid to form a solution.

Mixtures might be separated, including through filtering, sieving and evaporating.

Dissolving, mixing and changes of state are reversible changes

Some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, cooking and the action of acid on bicarbonate of soda.

Practical Science

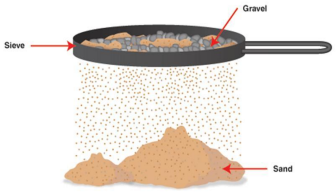
Crystallizing salt/sugar solution

Filtering

Planning enquiry materials in a circuit e.g. graphite, aluminum, iron nail ect.

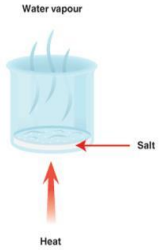
Testing properties of materials.

Key Diagrams

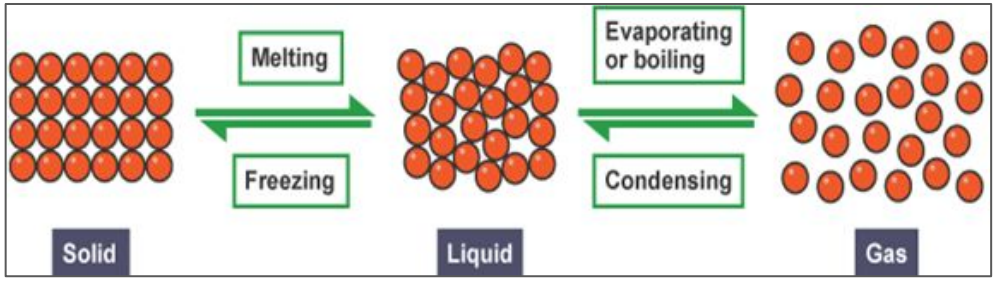


Sieving

Filtering



Evaporating



Year 5 Animals, including humans

Key Words	
development	The gradual change as a baby grows into an adult.
puberty	The stage in life when a child's body starts to mature.
gestation	The process of a baby growing and developing inside their mother.
fetus	An unborn baby who is still developing inside their mother's womb.
adolescence	The stage in life when a child develops into an adult.
offspring	A person's children or an animal's young.
life expectancy	The average number of year someone will live
womb	An organ found in females where a baby grows before birth.

Key Knowledge

Humans go through stages of development;
they begin as fertilized eggs and then develop into embryos before developing into babies;
once they are born, these newborn babies become infants (roughly 2 months to 2 years)
then into young children (roughly 2-12 years old);
children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of Reproduction; as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently.

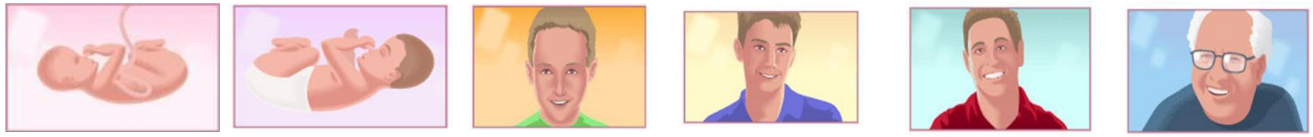
NB. Puberty and changes from childhood to adolescence to adulthood is covered as part of SRE so is only referred to

Practical Science

Statistics- Use of real data to create line graphs.

Key Diagrams

Fetus (before birth) → Baby (Birth- 1 year) → Child (1 - 12 years) → Adolescent (13-19 years) → Adult (20-65 years) → Old age (65+ years)



Year 5 Earth and space

Key Words

planet	A large body which orbits a star.
Solar System	The planets which orbit our nearest star the sun.
rotate	Move in a circle around an axis.
orbit	One complete circuit around an object in space.
axis	An imaginary line which runs through an object.
spherical	Shaped like a ball.
heliocentric	The true idea that the sun and planets in the solar system revolve around the sun.
universe	Everything that exists.

Key Knowledge

The universe comprises all matter and space in existence.
The sun is a star and a star is an exceptionally hot ball of gas.
planet (e.g A Earth) is defined as a spherical celestial body that orbits a star.
It was once thought that everything orbited the Earth, but that scientists like Copernicus and Galileo showed that the Earth orbited the Sun.
Tthere are eight major planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.
The universe is utterly vast and that our solar system makes up a tiny fraction of the universe.
A satellite orbits a planet and that moons are natural satellites.
The Moon orbits the Earth roughly every 28 days.
All the planets in the solar system orbit the Sun and that the further away they are from the Sun, the longer their orbit.
The Earth spins around an imaginary line through its centre called an axis.
Night and day are the result of the Earth rotating on its axis.
The tilt of the Earth towards and away from the Sun's light as the Earth orbits the Sun leads to the seasons as during winter
the light is spread over a wider area.

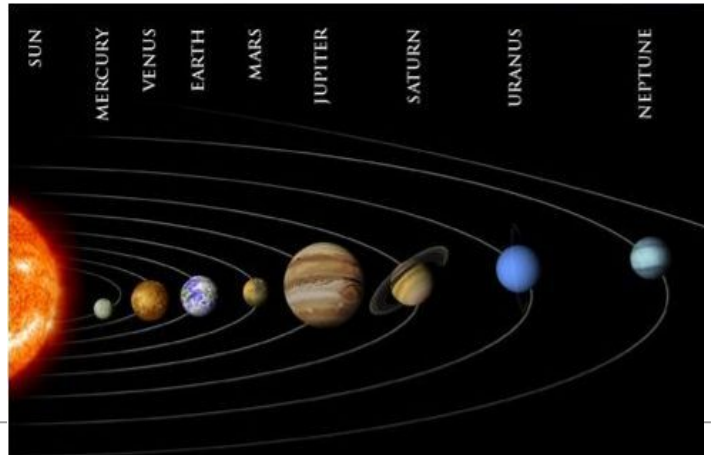
Practical Science

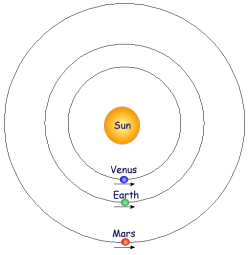
Spheros

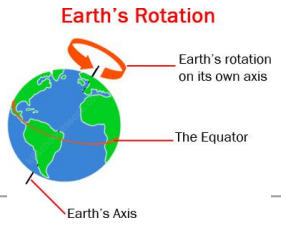
Scale of solar system

Identifying scientific evidence that has been used to support or refute ideas or arguments - arguments around the shape of the Earth

Key Diagrams







Year 5 Forces and magnets

Key Words

air resistance	A force which slows down an object moving through the air.
friction	The force that one surface or object encounters when moving over another.
gravity	The force that acts between all objects. The larger the mass the larger the gravitational pull.
Newton	A Newton is the unit of force. Named after scientist Sir Isaac Newton.
lever	A bar which reduces the amount of force needed to move an object.
pulley	A simple machine made of wheels and a rope used to lift objects.
gear	Wheels with teeth which fit together. When one gear turns the next gear turns in the opposite direction.
water resistance	A force which slows down an object moving through water.

Key Knowledge

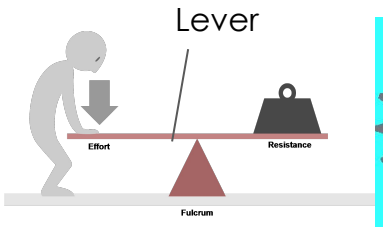
Forces can be measured using a device called a force meter.
Gravity acts much more strongly between objects that have more mass and that are close together
Unsupported objects are pulled towards the Earth by the force of gravity
Air resistance is caused by the object bumping into the gas particles that make up air; the quicker an object moves, the more gas particles it bumps into and the more air resistance it experiences
A falling object will accelerate until its air resistance matches the gravitational force pulling it down; at this point, the object will continue to move at this speed (called its terminal velocity) without getting any quicker or slowing down
A parachute's shape increases the air resistance that a falling object experiences, giving it a much lower terminal velocity
Know that water resistance is caused by the object bumping into the water particles
The shape of an object determines how much air resistance or water resistance it experiences; shapes of object that experience little air resistance or water resistance are described as streamlined
How to draw a force diagram with arrows representing the different forces acting on an object.
Know that gears, levers and pulleys are simple machines that used to allow a smaller force to have a greater effect; they do this by moving a smaller force over a longer distance at one end of the machine, which the machine turns into a larger forcer over a small distance at the other end.

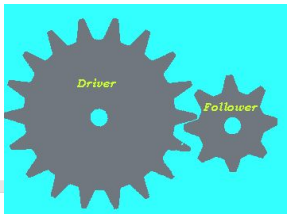
Practical Science

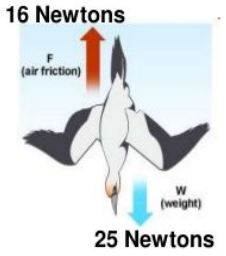
Using force meters to measure forces- increasing/ decreasing friction. - taking measurements, using a range of scientific equipment, with increasing accuracy and precision

Parachute investigation into air resistance -using test results to make predictions to set up further comparative and fair tests
+
planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

Key Diagrams







Year 5 Living things and their habitats

Key Words	
reproduction	The process where a plant or animal produces an individual similar to themselves.
sexual	Male and females are needed to produce a non-identical offspring.
asexual	Can produce identical offspring with no need for a male and female.
fertilisation	The mixture of male and female cells to produce a new being.
sperm	A male sex cell that fertilses an egg.
reproduce	To have babies or offspring.
egg	A female sex cell which is fertilised by sperm.
metamorphosis	When something develops into something entirely different.

Key Knowledge

Life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plants.

Most mammals (e.g. humans) a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again.

Amphibians (e.g. frogs) a fertilized egg develops into an embryo and then hatches into a tadpole; the tadpole develops adult characteristics, metamorphoses into the adult form after which it can reproduce and the cycle can begin again.

Many insects (e.g. butterflies) a fertilized egg develops into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin again.

In birds (e.g. robins) a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin again.

Practical Science

Cuttings of mint plant
-recording data and results

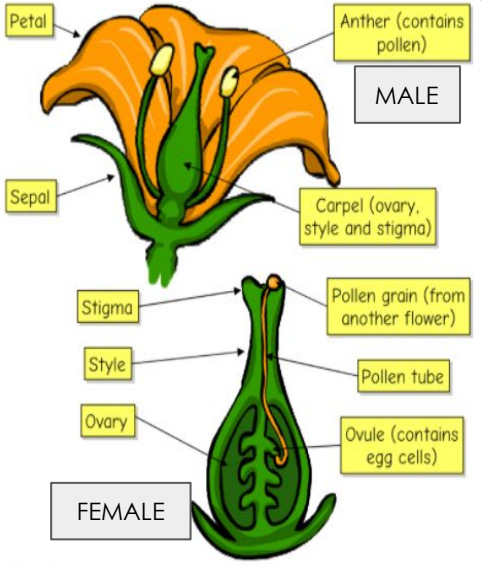
Dissecting flowers
-daffodil

Data on life cycles eg. Guestation

Visit from Bee Keeper

Spotting patterns in life cycle data

Key Diagram



Knowledge Organisers

Year 6

Year 6 Animals, including humans

Key Words

nutrients	A substance that provides nourishment essential for the maintenance of life and for growth.
blood vessels	They circulate blood throughout your body and help deliver oxygen to vital organs and tissues.
circulatory system	A network consisting of blood, blood vessels, and the heart.
pulse	A rhythmical throbbing of the arteries as blood is propelled through them.
arteries	Carry blood away from the heart
veins	Carry blood back to the heart.
oxygen	A colourless, odourless gas, and the life-supporting component of the air.

Key Knowledge

The heart and lungs are organs protected by the ribcage.
Blood travels around the body transporting nutrients that have been absorbed into the bloodstream from digestion; blood also carries oxygen around the body which is used to power the body; this use of oxygen to create energy is called respiration.
The heart beats, pumping blood around the body and that blood vessels carry the blood; arteries carry blood away from the heart; veins carry blood towards the heart; capillaries are tiny blood vessels that connect arteries and veins.
The heart is composed of four chambers: two atria and two ventricles; the aorta is the largest artery in the body and most major arteries branch off from it.
When we exercise, our heart beats more frequently so that the oxygen that is used around the body can be replenished; it returns to a resting heart rate afterwards; fitter people tend to have lower resting heart rates.
Drugs are chemicals that have an impact on the natural chemicals in a person's; know that drugs can be harmful or helpful, depending on what they are and how they are used; know that all drugs can be harmful if overused.
Paracetamol and aspirin are examples of drugs that can be helpful as a painkiller.
Cannabis and cocaine are examples of illegal drugs that can have serious negative effects.

Practical Science

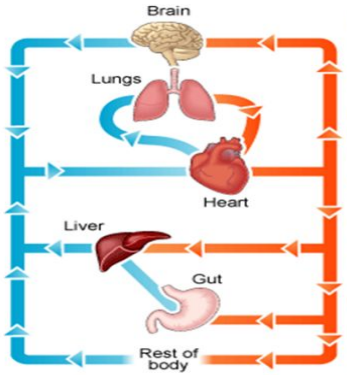
https://www.stem.org.uk/resources/community/collection/13109/year-6-animals-including-humans

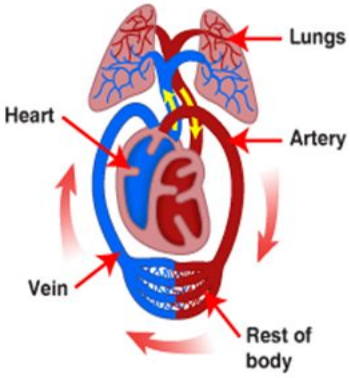
Explore and answer questions related to how the circulatory system enables the body to function.

Explore the work of scientists and scientific research about the relationship between diet, drugs, lifestyle and health.

Pulse rate investigation.

Key Diagrams





Year 6 Living things and habitats

Key Words	
Organism	An individual living thing, such as a plant, an animal, or a bacteria.
Unique	Being the only one of its type.
Vertebrate	Having a backbone
Invertebrate	Without a backbone
Mammal	Any animal that has hair and feeds its babies with milk from the mother.
Ecosystem	A community of living things, together with their environment.
Habitat	The natural environment of an animal or plant
Food chain	A series of living beings in which each serves as food for the next.

Key Knowledge

There are three types of micro-organism: viruses, fungi and bacteria; of these three, viruses are often not really considered to be alive by many scientists mainly because they don't have the 'machinery' to reproduce inside them.
Germs are disease-causing bacteria.
An arthropod is an invertebrate with a hard , external skeleton and jointed limbs.
Insects are a type of arthropod; their bodies consist of six legs, a head, a thorax and an abdomen; most insects also have a pair of antennae and a pair of wings.
An arachnid (e.g. spider) is a type of arthropod with eight legs and no antennae or wings.
A crustacean is a type of arthropod with two pairs of antennae (e.g. woodlouse).
A myriapod is an arthropod with a flat and long or cylindrical body and many legs (e.g. centipede).

Practical Science

https://www.stem.org.uk/resources/community/collection/12740/year-6-all-living-things

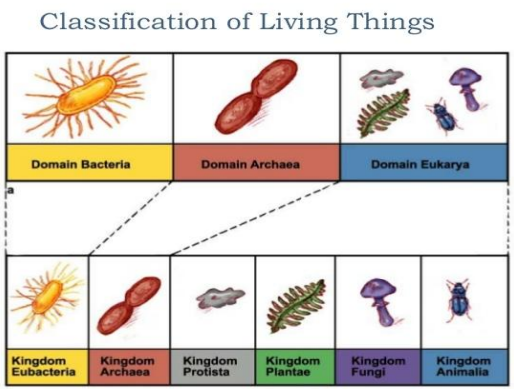
Classify animals into commonly found invertebrates and vertebrates. Identify some animals and plants in the immediate environment.

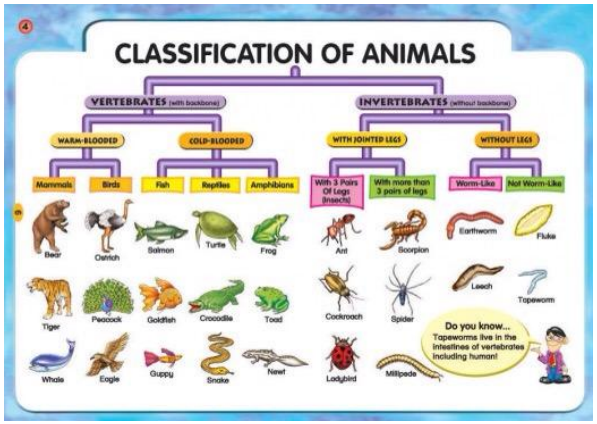
Discuss the reasons why living things are placed in one group and not another.

Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Find out about the significance of the work scientists such as Carl Linnaeus.

Key Diagrams





Year 6 Light

Key Words

angle of incidence	The angle which an incident line or ray makes with a perpendicular to the surface at the point of incidence.
angle of reflection	The angle made by a reflected ray with a perpendicular to the reflecting surface.
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.
spectrum	A band of colours, as seen in rainbows, produced by the components of light by their different degrees of refraction.
translucent	Allowing light, but not detailed shapes, to pass through.
periscope	An apparatus consisting of a tube attached to a set of mirrors or prisms, by which an observer can see things that are otherwise out of sight.

Key Knowledge

Translucent objects allow some light to pass through, but some of the light changes direction as it passes through the object; this means that an something seen through a translucent object is not clearly defined.

When light passes from one medium to another (e.g. from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media.

White light comprises all the colours of light.

White light refracted by two surfaces in a prism will spread out so that all of its constituent colours can be seen; this array of colours is called a spectrum; it happens because the different colours of that constitute white light travel at different speeds.

Draw a diagram to show why the shape of a shadow will match the shape of an object.

When light reflects off an object, the angle of incidence is equal to the angle of reflection.

A periscope takes advantage of the predictable angles of incidence and reflection to allow an image to be shown to a viewer.

Practical Science

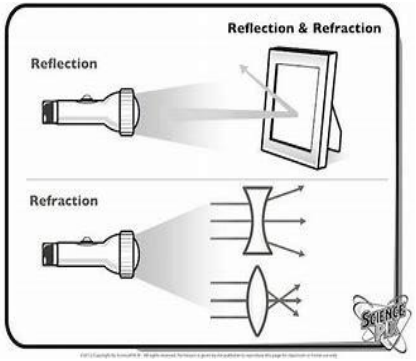
https://www.stem.org.uk/resources/community/collection/12741/year-6-light

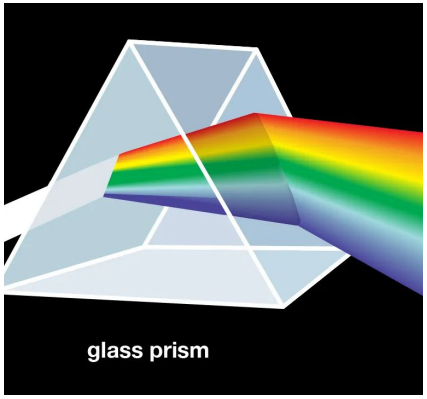
Decide where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works.

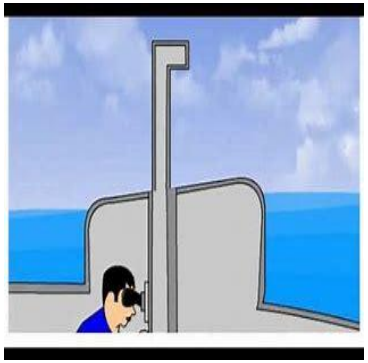
Investigate the relationship between light sources, objects and shadows by using shadow puppets.

Look at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters.

Key Diagrams







Year 6 Electricity

Key Words	
current	How much electric charge flows through a circuit.
electricity	A form of energy which is commonly used in the home.
series circuit	A circuit where electricity flows through each component if one component fails the circuit is broken,
voltage	The force of the current flowing around the circuit.
components	The basic elements of an electrical circuit.

Key Knowledge

Voltage is a measure of the power of a cell to produce electricity; it is a measure of the 'push' of electric current, not the size of the electric current.

As the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase (though too high a voltage may 'blow' the bulb or buzzer).

Draw simple circuit diagrams.

Know the recognized symbols for a battery, bulb, motor, buzzer and wire.

Predict whether components will function in a given circuit, depending on whether or not the circuit is complete; whether or not a switch is in an on or off position; and whether or not there is a cell to provide electrical current to the circuit.

Two bulbs in a circuit can be wired up to create a series circuit or a parallel circuit; if one bulb blows in a series circuit the other will not shine as the circuit has been broken; in contrast, if one bulb blows in a parallel circuit, there will still be a complete circuit for the other bulb so it will continue to shine; use this knowledge to explain the advantages of using parallel circuits (e.g. in the lighting in homes).

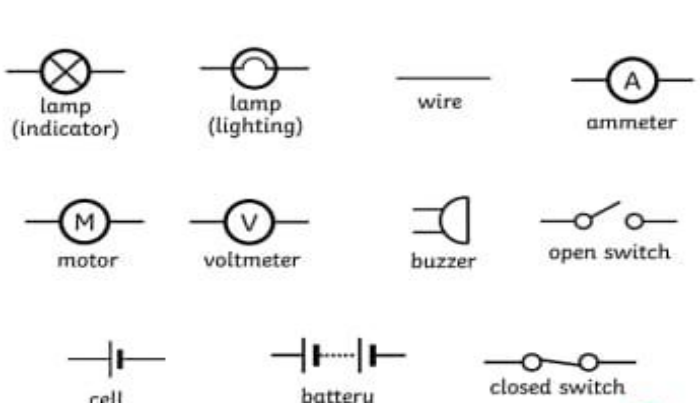
Practical Science

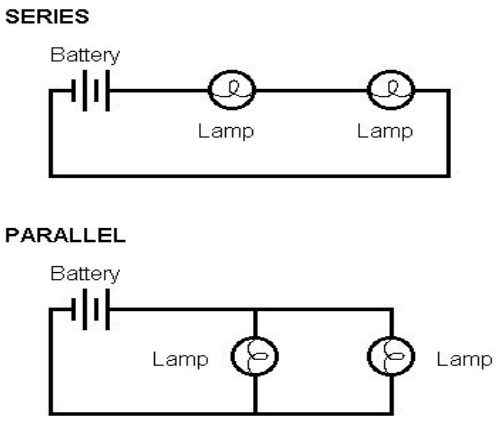
https://www.stem.org.uk/resources/community/collection/12390/year-6-electricity

Systematically identify the effect of changing one component at a time in a circuit.

Design and make a set of traffic lights, a burglar alarm or some other useful circuit.

Key Diagrams





Year 6 Evolution and adaptation

Key Words	
adaptation	The process of change so that an organism or species can become better suited to their environment.
ancestor	A person from whom one is descended.
Sexual reproduction	A form of reproduction in which genetic material from two individuals of opposite sexes mixes to create offspring.
evolution	The process which different kinds of living organisms are believed to have developed from earlier forms during the history of the Earth.
inherit	To gain a quality, characteristic of predisposition genetically from a parent or ancestor.
natural selection	The process whereby organisms better adapted to their environment tend to survive and produce more offspring.
variation	A different or distinct form or version of something.

Key Knowledge

All life on Earth began from a single point around 4.5 billion years ago.
Living things changes over time and that this gradual change is called evolution.
Natural selection is the cause of this change; natural selection works as across a species there is natural variation within a species; there is also competition to survive and reproduce and that members of a species with advantageous characteristics survive and reproduce - these characteristics are passed down to their offspring; members of a species with less advantageous characteristics do not survive and reproduce – these characteristics are not passed down to offspring.
Offspring vary and are not identical to their parents.
Charles Darwin posited this theory of evolution by natural selection.
The gradual change of species over millions of years can be observed by looking at examples of fossil.

Practical Science

https://www.stem.org.uk/.../community/collection/12648/year-6-evolution-and-inheritance

Observe and raise questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions.

Analyse the advantages and disadvantages of specific adaptations , such as having a long or a short beak.

Key Diagrams