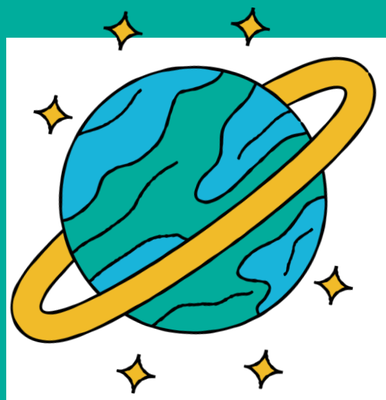
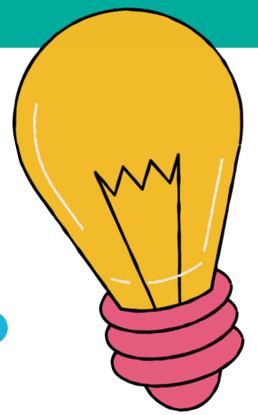
SCIENCE CURRICULUM

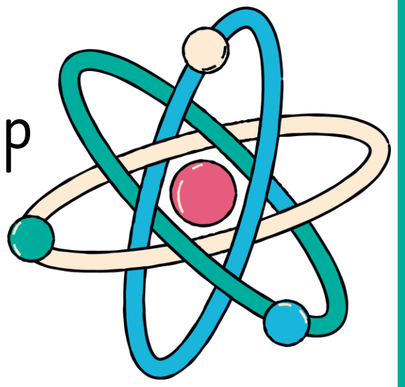


SUBJECT VISION



At St. Ursula's Catholic Primary School, we believe that our children should have a broad and balanced science education. As teachers we work hard to inspire our students so that they can reach their full potential, plus we encourage them to be active participants in taking charge to help protect our world. We hope to ignite pupil's natural curiosity to explore, and advocate questioning and practical work to obtain answers.

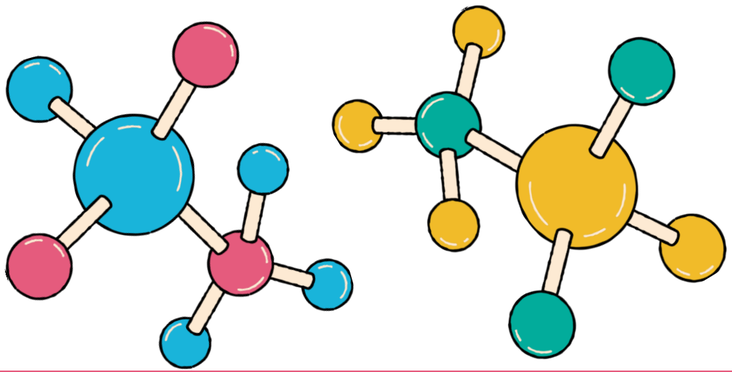
As Albert Einstein said: "The important thing is not to stop questioning. Curiosity has its own reason for existing."



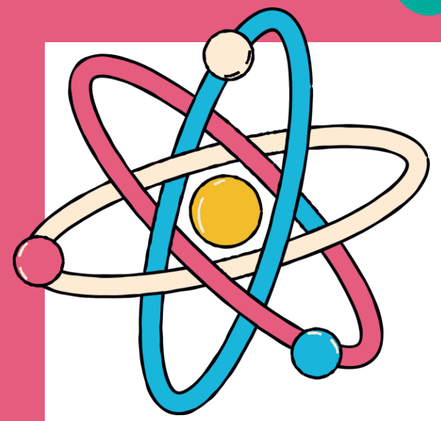
CURRICULUM OVERVIEW

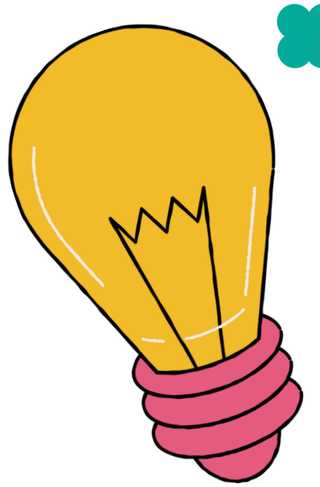
The curriculum aims to ensure students:

- Develop scientific knowledge and conceptual understanding
- Understand the nature, processes, and methods of science
- Gain skills for scientific enquiry (often called "working scientifically")
- Appreciate how science impacts the world and future society

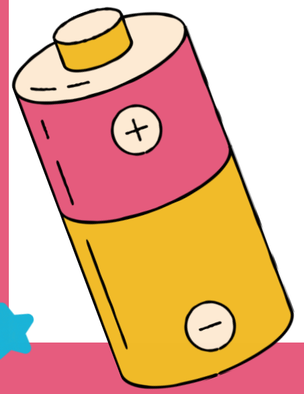


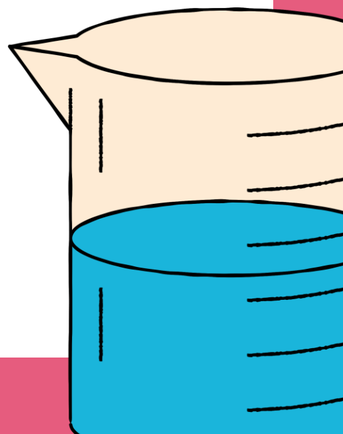
CURRICULUM OVERVIEW





	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery	**Understanding the World (All year)** 1. Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world. 2. Can talk about some of the things they have observed such as plants, animals, natural and found objects. 3. Talk about why things happen and how things work. 4. Developing an understanding of growth, decay and changes over time. 5. Shows care and concern for living things and the environment.					
Reception	**Understanding the World** 1. Looks closely at similarities, differences, patterns and change.				**Understanding the World** 1. Children know about similarities and differences in relation to places, objects, materials and living things. 2. Children talk about the features of their own immediate environment and how environments might vary from one another. 3. Children make observations of animals and plants and explain why some things occur, and talk about changes.	
Year 1	Everyday Materials	Seasonal Changes – Autumn and Winter	Animals, Including Humans	Seasonal Changes – Spring and Summer	Plants	Scientists and Inventors
Year 2	Living Things and their Habitats	Uses of Everyday Materials	The Environment	Animals, Including Humans	Plants	Scientists and Inventors
Year 3	The Human Body – Skeleton and Muscle	Rocks and Soils	Light and Dark	Magnets and Forces	Plants – How Plants Grow	Environmental topic
Year 4	The Human Body – Teeth and Digestion	States of Matter	Sound	Electricity	Living Things and their Habitats - Classification	Environmental topic
Year 5	The Human Body – Heart, Lungs and other Major Organs	Properties and Changes of Materials	Forces	Earth and Space	Living Things and their Habitats - Life Cycles of Animals and Plants	Environmental topic
Year 6	The Human Body – Keeping Healthy; Dangers of Drugs, Alcohol and Smoking	Evolution and Inheritance	Light	Electricity	Living Things and their Habitats - Micro-organisms	Environmental topic





YEAR GROUP EXPECTATIONS

EYFS

Within our 'Understanding the world' strand the children learn new scientific vocabulary, have an opportunity to explore and describe the natural world around them. They will observe and comment on changes they can see and develop their inquiry skills.

YEAR 1

Children will be:

Be curious about the world.
Observe closely using simple equipment.
Ask and answer simple questions.
Begin to group and classify things.

In Year 1 the focus is on 'hands-on exploration.

YEAR 2

Children move from simple recognition (Year 1) to:

Understanding basic processes.
Making simple explanations.
Using what they observe to answer questions.

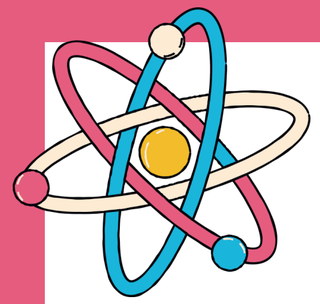
In Year 2 the shift is from "what is it?" → "How and why does it happen?"

YEAR 3

Children will develop more detailed scientific understanding.
Begin to explain simple processes and relationships.
Carry out investigations with greater independence.

In Year 3 the shift is from basic observation → explaining how things work

YEAR GROUP EXPECTATIONS

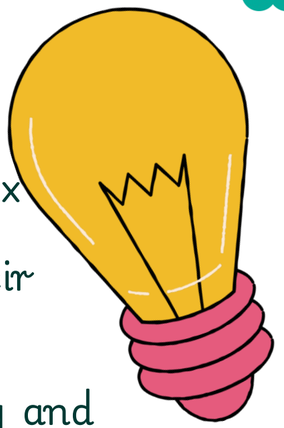


YEAR 4

Children build on their knowledge from Year 3 with greater depth and accuracy.
They will develop clearer scientific explanations.
Children will carry out investigations with more independence and control.

☞ In Year 4 the shift is toward explaining patterns and drawing conclusions from evidence.

YEAR 5



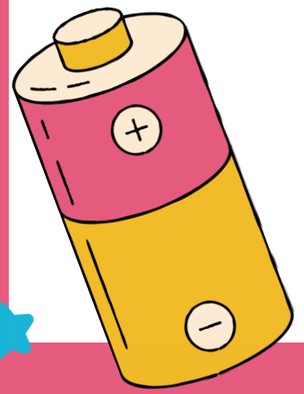
Children will develop deeper scientific understanding.
They will begin to explain more complex processes.
Children will use evidence to justify their ideas.

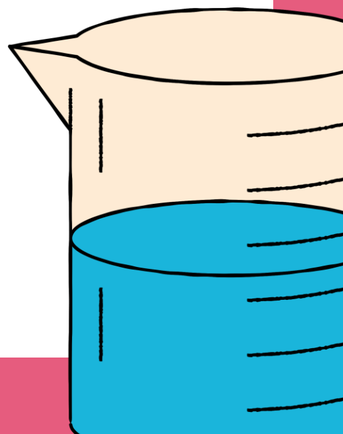
In Year 5 the shift is toward reasoning and explaining scientifically with confidence.

YEAR 6

Children will consolidate and deepen all prior learning.
They will develop independent scientific thinking and use evidence to justify, argue, and evaluate ideas.

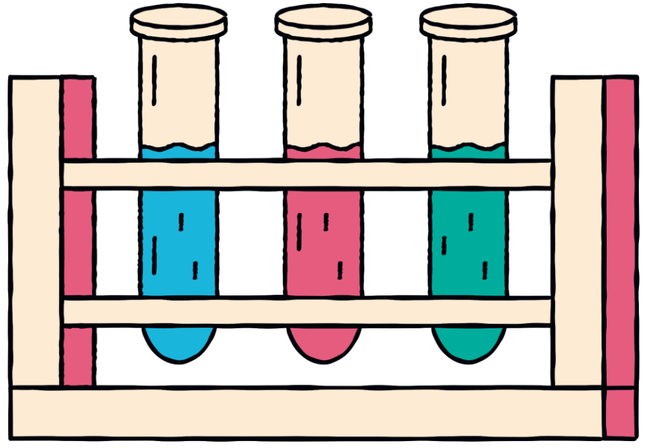
In Year 6 the focus is on confidence, reasoning, and preparing for secondary science (KS3).

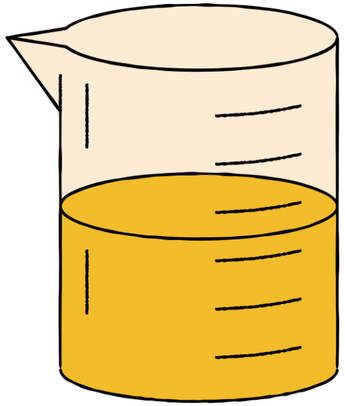




SCHEME OF WORK

Our scheme of work is bespoke allowing for our curriculum to be tailored to children's needs and interests as well as ensuring they receive a broad and enriched exposure to the curriculum. Learning is engaging, offers a balance between practical and theoretical. As the children progress through their learning journey, they have an opportunity to build upon the skills they have learnt, further embedding and building upon their skill set.



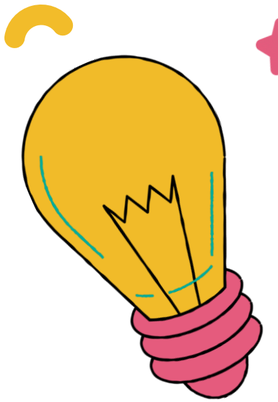


TEACHING AND LEARNING APPROACHES

At St Ursula's we use a hands-on enquiry based approach. "Thinking, Doing, Talking Science" is a pedological approach used to enhance high level thinking through practical, interactive lessons and discussions. Our curriculum ensures we deliver lessons to meet all learning styles through the use of:

- Modelling
- Investigations (hands-on practical learning)
- Formative and summative approaches
- Outdoor learning opportunities
- Group/Peer work

SUPPORTING SUBJECT LEARNING AT HOME



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*The STEM Learning website offers curated home-learning support and activities for Key Stage 1 and 2 https://www.stem.org.uk/primary/resources/collections/home-learning-support

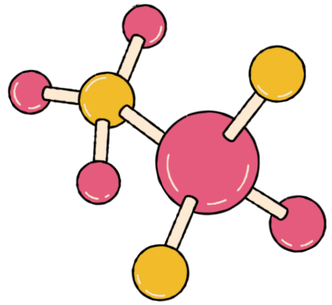
*Visit places linked to Science:

>Science Museum (London) >Natural History Museum > London Zoo

>Colchester Zoo >Sea Life (London or Southend)

>Royal Observatory (Greenwich) >National Space Centre (Leicester)

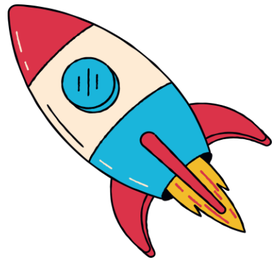
USEFUL RESOURCES AND LINKS



- BBC Science - http://www.bbc.co.uk/bitesize/articles/zyktfdm#zspqywx

- Royal Society of Chemistry – https://edu.rsc.org/primary-science/find-resources

FUN ACTIVITIES TO TRY AT HOME



2 TRY THIS OUTDOORS .... ROCKET LAUNCH

SAFETY NOTE **You need a clear empty space for this activity. An adult should do steps 4 and 5 and anyone else should keep well back. Eye protection is recommended.**

1. Tape 3 straws to the side of a 500ml plastic bottle so it will stand up, upside down.
2. Pour about 2 cm of vinegar into the bottle, and wrap the bicarbonate of soda in the kitchen roll to make a little parcel.
3. Choose a hard surface outside to be the launch site.
4. Drop the bicarbonate of soda parcel into the bottle.
5. Cork the bottle quickly and tightly, put the rocket down and **STAND WELL BACK!**

WHAT DO YOU NOTICE?
Things to talk about ...

Try experimenting with different amounts of vinegar and baking soda to find the perfect combination. Remember you don't want the reaction to happen too quickly. What if you try lemon or lime juice instead of vinegar?

3 WHAT IS THE SCIENCE?

A chemical reaction takes place between the vinegar and bicarbonate of soda which produces a gas called carbon dioxide. This builds up inside the plastic bottle. When the pressure of the gas in the bottle is high enough the cork is forced out. The downward force of escaping gas causes an upward force on the bottle, making it shoot up into the air. This is an example of Newton's Third Law of Motion: **for every action there is an equal and opposite reaction.** The balloon rocket works on the same principle. The air rushing out of the balloon (the action) causes the balloon to move forward (the reaction).

http://pstt.org.uk/resources/science-fun-at-home/

WHAT A GAS!

You will need

- A small bottle
- Balloon
- Bicarbonate of soda (baking soda)
- Funnel and spoon
- Vinegar
- Lemon/lime juice (optional)
- Plastic cup
- Small piece of card or plastic

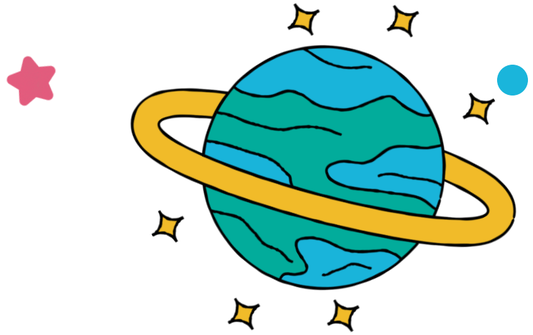
1 TRY THIS INDOORS ....

First, fill the bottle about one quarter full of vinegar. Then stretch the balloon by blowing it up and then letting the air out. Use a funnel to put 3 spoons of bicarbonate of soda into the balloon. If you don't have a funnel you can make one by rolling paper into a cone. Stretch the balloon over the top of the bottle, keeping the bicarbonate inside the balloon. When you are ready tip the balloon up so the bicarbonate of soda drops into the vinegar in the bottle.

WHAT DO YOU NOTICE?
Things to talk about ...

What happens when the bicarbonate of soda mixes with the vinegar? Why does the balloon blow-up? What are the bubbles that you can see? If you hold the bottle in your hand what can you feel? How could you make the balloon blow-up more? What if you added more or less bicarbonate of soda, or used lime or lemon juice instead of vinegar?

How to make a volcano at home
http://www.nhm.ac.uk/discover/how-to-make-a-volcano.html



MUSICAL SCIENCE

You will need

- Empty tin can
- Small items: rice, buttons, beans
- Balloon
- Wooden and metal spoons
- String or wool
- Natural and/or human made items

1 TRY THIS INDOORS ... MAKE A DRUM

Place your small items - buttons, dried beans or rice work well - into the empty tin can so it's about half full. Take the balloon and cut off the end where you would tie the knot and stretch the rest of the balloon over the top of the tin can. Try shaking the can and tapping the balloon top, listening to the sounds the can makes. Try changing the items you put in the can, or changing how much you put into the can. You could try making more than one drum with different things in each.

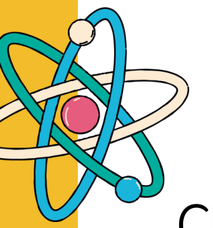
WHAT DO YOU NOTICE?
Things to talk about ...

Can you tell what is inside the can by the noise it makes? Is the sound different if you tap the balloon to when you shake the tin? What happens if you stretch the balloon more tightly over the tin? What does it sound like if you tap the side of the tin can with a wooden or metal spoon?

FAQs

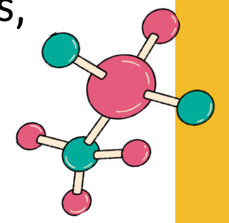
What scientific topics will my child cover in each year group?

Across the year your child will cover topics such as living things, everyday materials, plants, light and dark.



How does my child learn to do experiments and use scientific vocabulary?

Children learn through hands-on exploration, observation, and guided play, turning curiosity into structured experiments by predicting, testing, and discussing outcomes. We adopt a 'no-ceiling on learning' and constantly challenge our pupils to enhance their understanding.
Vocabulary is taught during lessons – through keyword loops, mind maps, wordsearches / word banks, visual aids and through every day experiences, moving beyond definitions to active usage.



How does science teach critical thinking and pattern seeking?

By fostering curiosity, logical reasoning, and systematic investigation – science enables people to spot patterns and re-test where necessary to prove or disprove a theory.

How does school connect science to real life and STEM careers?

We provide hands-on learning opportunities, linking curriculum topics to every day contexts. We also invite science professions into school to showcase their profession and to also inspire our pupils.
At. St. Ursula's, we also take our children on science trips and in Year 5/6, we attend some secondary schools to see what science is like there.

GLOSSARY

Absorbent	A **property** of a **material** which means it is able to take in and hold water.
Adaptation	Ways in which an animal or plant has **evolved** over time to suit the **environment** in which it lives.
Air resistance	A **force** acting on an object moving through air. The amount of air resistance will affect how quickly the object moves.
Amphibian	A group of cold-blooded **vertebrates** characterised by having gills and breathing in water as young, then developing lungs and breathing air as adults. For example, tadpoles and frogs.
Anther	The part of a flower's **stamen** that contains **pollen**.
Artery	A vessel forming part of the **circulatory system** which carries oxygen-rich blood away from the heart and lungs and to the rest of the body.

Attract	Certain metals are attracted to magnets, meaning that they are pulled in by the magnet's magnetic field. Magnets also attract one another, opposite **pole** to opposite pole.
Battery	A **cell** consisting of certain chemicals which combine to create **electricity** in a **circuit**.
Canines	Sharp, pointed teeth used for ripping and tearing food. Humans have four canine teeth.
Carnivore	An animal which mainly eats meat and hunts for **prey**.
Cell	See **battery**.
Changing state	The process by which a material changes from a **solid**, to a **liquid**, to a **gas** and back again.

Chrysalis	A stage in the **life cycle** of many insects, where the **larva** changes into an adult. See also **pupa**.
Circuit	A circuit is a closed loop for **electricity** to move around. In primary school children build simple **series circuits** which contain a **battery** and wires, and may also contain a **switch**, motor, bulb or buzzer.
Circuit diagram	A simple way of representing an electrical **circuit** using lines and symbols to represent the components of the circuit.
Circulatory system	The network of organs (including the heart and lungs) and blood vessels which carry blood, oxygen and nutrients around the body.
Classifying	The scientific process of deciding which group an animal or plant belongs to, based on its characteristics.
Comparative test	A test which compares the effect of different actions or the characteristics of different **materials**.
Condensation	The process by which a **gas** turns into a **liquid**, due to a reduction in the energy in its particles.
Conductor	A **material** which allows heat and/or **electricity** to pass through it. Most metals are good electrical and thermal conductors.

Consumer	In a **food chain**, an animal (or occasionally plant) which eats another animal or plant. For example, when a cow eats grass, it is a **consumer**.
Crust	The outer layer of the Earth.
Current	An electrical flow through a **circuit**.
Data logger	An instrument often used in schools to record data over time, using recording devices and probes. For example, a data logger can be used to measure the changing temperature of water or the rising and falling level of noise or light in a room.
Deciduous	Any species of tree which loses its leaves in autumn and winter and grows new ones in the Spring.
Decomposer	In a **food chain**, any plant or animal which eats dead and decaying material. For example, woodlice are decomposers as they eat dead leaves and other plant material.
Digestive system	The network of organs within the body that break down and process the food that has been eaten.
Dispersal	The means by which a plant ensures its seeds are spread as far as possible from the parent plant, to give the seeds the best chance of **germination**.

GLOSSARY

Dissolving	A way of mixing a solid and a liquid. When a solid dissolves in a liquid, this creates a **solution**. Not all solids are **soluble**.
Eco-system	A community of interacting organisms, plants and animals within an **environment**.
Electricity	A form of energy caused by the movement of electrons.
Enquiry	The process of doing practical and experimental activities in order to learn about science.
Environment	The surroundings or conditions within which an **organism** lives.
Erosion	The action of elements such as wind or water in breaking down rocks and soils and moving them to other places.
Evaporation	The process by which a liquid turns into a gas as a result of increased energy in its particles.
Evergreen	Any species of tree which does not lose its leaves in the autumn, but keeps them all year round.
Evolution	The process of change in animal and plant species over very long periods of time, or how species change from generation to generation. Often connected with **adaptation**.
Fair test	A test which controls all but one **variable** in an attempt to answer a scientific question.
Fertilisation	This occurs when two sex cells fuse together, for example sperm and egg, or **pollen** and **ovule** in a plant
Filament	The part of a flower's **stamen** which supports the **anther** and often holds it up in order to make **pollination** easier.
Filtering	Removing small particles of **insoluble** or undissolved material from a liquid, usually by using a barrier with very small holes such as filter paper. See also **sieving.**
Food chain	A diagram that shows us how animals are linked by what they eat, for example grass -> rabbit -> fox
Food web	A set of linked food chains, often occurring within the same **ecosystem**.

Force	Pushes and pulls which act on objects to make them move or stop moving.
Fossil	The remains or imprint of a prehistoric **organism** which has been embedded in rock and has turned to rock itself over millions of years.
Freezing	The process by which a liquid turns into a solid, as a result of lowered energy in its particles.
Friction	A force which is caused when two surfaces rub against one another. It is a 'sticking force', causing objects to slow down or stop. **Air resistance**, **water resistance** and **surface resistance** are all types of friction.
Gas	A **material** whose particles have high energy and large gaps between eachother. A gas takes the shapes the container it is in and will flow; unless it is contained, it will not stay within a vessel but will rapidly move through a room.
Germination	The process by which a seed begins to grow and develop into a plant. Most seeds need warmth and water to germinate but do not need light.
Gestation period	The length of time it takes for an animal's young to develop before birth.
Gravity	A pulling force exerted by the Earth on falling objects, causing them to move towards the ground.
Habitat	A home **environment** for plants and animals.
Herbivore	An animal which eats only plant material.
Igneous rock	A rock formed when **magma** breaks though the earth's **crust** and cools. Examples include, basalt, granite and pumice.
Incisors	Flat, sharp-edged teeth used for cutting and slicing food. Humans have eight incisors.
Insoluble	An insoluble **material** does not dissolve in water.
Insulator	A **material** which does not easily allow heat and/or electricity to pass through it. Wood is an example of a good insulator.

GLOSSARY

Invertebrate	An animal which does not have an internal backbone. An example is a beetle, which has a hard external shell (exoskeleton) but no backbone.
Irreversible change	A chemical change where new materials are created and the original materials cannot be recovered. Examples include, boiling an egg, or mixing bicarbonate of soda with vinegar, which creates carbon dioxide gas.
Key	A way of sorting and **classifying** organisms according to their characteristics.
Life cycle	The different stages of life of a living creature. For example, egg, larva, **pupa**, adult insect.
Light	A type of energy that enables us to see.
Light source	A light source generates **light** using another form of energy such as heat or **electricity**.
Liquid	A **material** whose particles have gaps between them and moderate energy. A liquid takes the shape of the container it is in; it will flow but can be contained relatively easily.
Magma	Hot liquid and semi-liquid rock which is found beneath the Earth's **crust**. It forms **igneous rock** if it comes through the **crust** and cools.
Magnet	An object which has an invisible magnetic field and can attract or repel some materials.

Magnetic force	An invisible force created by electrons. It controls and creates magnetism and electricity.
Magnetism	A force caused by electrons in a magnet.
Mammal	A group of **vertebrates** characterised by being warm-blooded, giving birth to live young, feeding their young on milk, and having hair or fur.
Material	The **matter** or substances that objects are made from. Examples are metal, wood, rock and plastic. Different materials have different **properties**.
Matter	Matter makes up our Earth and the universe. On Earth, matter exists in one of three states - **solid**, **liquid** or **gas**.
Mechanism	A system of parts that work together in a machine.
Melting	The process by which a **solid** turns into a **liquid** due to an increase in energy in its particles.
Micro-habitat	A very small, specific **habitat** for animals and plants, for example a pond or a rotting log.
Micro-organism	An **organism** too small to be seen by the naked eye. Examples include, mould spores, viruses and bacteria.
Molars	Large, square teeth with a rough edge, used for grinding and chewing food. Adult humans have 24 molar teeth.

GLOSSARY

Moon	A celestial object that orbits a **planet**.
Metamorphic rock	Rock which is created when other existing rocks are subject to intense heat and/or pressure as a result of seismic activity in the Earth's crust, and change as a result. Examples include, anthracite, marble and slate.
Nutrition	The process of providing or obtaining the food needed for health and growth.
Oesophagus	The tube which leads from the mouth to the stomach.
Omnivore	An animal which eats both meat and plant material.
Opaque	An opaque **material** does not allow light to pass through it.
Organism	Any living creature, plant or animal.
Ovary (plant)	Part of the female **reproductive** organ of a flower. It contains **ovules** that will develop into seeds, if **fertilised** by **pollen.**
Ovule	A part of a flower which contains the female seed cell, and after **pollination** becomes the seed.
Photosynthesis	The process by which plants convert energy from the Sun into carbohydrates for growth. Also requires water and carbon dioxide.
Pistil	The female parts of a flower. Consists of the **stigma, style** and **ovary**.
Pitch	The quality of a sound. Pitch depends on how fast or slow an object is **vibrating**.
Planet	A celestial object that orbits a star.
Pole	One of two ends of a **magnet**, with magnets having a North and a South pole. Like poles **repel** and opposite poles **attract**.
Pollen	A fine powdery substance produced by flowering plants, which contains the male sex cell. When joined with the **ovule, fertilisation** occurs, which leads to the creation of a seed.

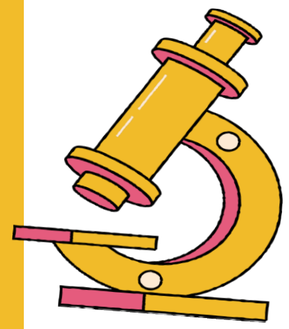
Pollination	The process by which a plant's **pollen**, from the male **anther,** is transferred to the female **ovule** in order to **fertilise** it and create a seed.
Precipitation	Rain, sleet, hail or snow - an element of the **water cycle.**
Predator	An animal which hunts other animals for food.
Prey	An animal which is hunted for food. An animal can be both **predator** and prey.
Producer	In a **food chain**, an **organism** which provides food for another living thing but is not itself a **consumer**. Typically, producers are green plants.
Properties	The qualities which a **material** possesses which may suit it to specific purposes. Examples of properties are hardness, flexibility and **absorbency**.
Puberty	The period during which an animal reaches sexual maturity and is capable of **reproduction**.
Pupa	See **chrysalis**
Reflection	When light hits the surface of an object and bounces back into our eyes so that we can see the object.
Repel	In a **magnet**, like poles will repel each other - their magnetic fields will push each other away.
Reptile	A group of **vertebrates** characterised by being cold-blooded, laying eggs and having scaly skin.
Reproduction	The process by which an **organism** creates new versions of itself.
Reversible change	A chemical change where no new **materials** are created, and the original materials can be recovered. Examples include, freezing water to make ice, or **melting** chocolate.

GLOSSARY

Season	A period of the year in certain parts of the world which is characterised by certain changes in weather patterns and in the environment. Caused by the earth's tilt as it orbits the Sun.
Sedimentary rock	Rocks formed over millions of years by the build-up and pressurisation of layers of tiny rocks, particles and decaying plants or animals. Examples include, sandstone and chalk.
Senses	The five senses enable us to make sense of the world. They are sight, hearing, touch, smell and taste.
Sepal	Green, leaf-like structures which enclose a flower bud before it opens.
Series circuit	A type of **circuit** where all the elements are laid out in a chain, so there is only one path that the electrical current can take.
Shadow	A shadow is created when an **opaque material** or object is placed in front of a **light source** and prevents the light from passing through.
Sieving	Removing particles of **insoluble** or undissolved material from a liquid, usually by using a barrier with small to medium-sized holes. See also **filtering**.
Simple machines	Simple machines turn small forces into larger ones. Examples include, levers, pulleys and gears.

Solid	A material whose particles are closely packed together and have low energy. A solid holds its own shape. It can sometimes be stretched or squeezed but it does not run or flow.
Soluble	A soluble material will dissolve in a liquid.
Solution	A liquid containing **dissolved** material.
Sound	Sound is created when an object vibrates and sends waves of energy into our ears.
Spawn	The eggs of certain organisms, typically **amphibians**, which are laid without a shell and are often fertilised in water, outside the parent's body.
Stamen	The male, pollen-producing part of a flower. Consists of the **anther** and the **filament.**
Standard units	Units of measurement which are in common use, e.g. centimetres, grams, litres, degrees Centigrade.
States of matter	**Matter** exists in one of three states - **solid, liquid** or **gas**.
Steam	Tiny droplets of **liquid** water suspended in air. Not to be confused with **water vapour.**
Stigma	Part of the female **reproductive** organ of a flower. The stigma often sits on top of the **ovary** and holds the **style** up to receive **pollen,** then allows the **pollen** to be transferred to the **ovule** to **fertilise** it and create a seed.
Style	Part of the female **reproductive** organ of a flower, and the place where **pollen** is transferred to the **stigma** and from there to the **ovule.**

GLOSSARY

Sun	A star – a giant ball of hot gas and the nearest star to Earth. The centre of our solar system. Enables all life on Earth.
Surface resistance	See **friction**.
Switch	A component within an electrical **circuit** which enables the flow of electricity to be turned on and off.
Transparent	A transparent **material** allows **light** to pass through easily.
Variable	In a **fair test** any one of the elements of the test which could be changed. In a fair test, only one variable is allowed – all others have to be kept the same. For example, if testing whether seeds need warmth to **germinate**, only the temperature could vary – any other elements which may influence germination, such as water or light, have to be kept constant.
Vein	A vessel within the body which carries the blood back to the heart once it has delivered oxygen to the body's organs and systems.
Vertebrates	Organisms which have an internal backbone and skeletal system. **Classified** in five main groups: **mammals,** birds, fish, **reptiles** and **amphibians**.
Vibration	Very quick movement of an object back and forth, which in turn creates waves of energy in the air, typically heard as sound.
Voltage	The amount of **electrical** energy used. Measured in volts.

Water cycle	The process of **precipitation, evaporation** and **condensation** which explains such events as cloud formation and weather patterns. Water evaporates from large bodies such as oceans and lakes, turning into **water vapour** and rising up, where it cools and condenses into tiny droplets (clouds). When the droplets combine and become larger, they fall to earth as rain, snow or hail (precipitation), back into rivers, lakes and oceans, and the cycle continues.
Water resistance	A force acting on an object moving through or floating on water. Objects which float do so due to water resistance.
Water vapour	Water in the form of a **gas**. Water vapour is invisible and should not be confused with steam, which is actually lots of tiny droplets of water.