

# Rushwick C of E Primary School

## *Ask, Seek, Knock*

*Ask and it will be given to you; seek and you will find; knock and the door will be opened to you. Matthew 7:7.*

# Science Curriculum Policy

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## **Rushwick C.E. Primary School**

### **Science Curriculum Policy**

#### **Intent:**

Our intent at Rushwick is that pupils are encouraged to be inquisitive, involved and engaged throughout their time at our school and beyond. We believe that having a scientific perspective allows pupils to develop a deeper understanding of how to keep themselves and others healthy, to go on to make thoughtful choices as consumers, to take responsibility for their own immediate environment and to recognise the ways in which we are all global citizens. The Science curriculum promotes a strong curiosity in pupils about the wider world and allows them to develop greater respect for the living and non-living. We believe the study of science should embrace the acquisition of knowledge, concepts, skills and positive attitudes. During the course of the programmes of study, pupils will acquire and develop the key knowledge identified within each unit and across each year group through the application of scientific skills. We ensure that the Working Scientifically skills are built-on systematically and developed throughout so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts with growing confidence. We encourage our pupils to continue to ask questions, to be curious about their surroundings and to appreciate the opportunities the study of Science opens up to all of us.

#### **Coverage – Key objectives and guidance for KS1 and KS2:**

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

- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

#### **Key Stage 1:**

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Asking simple questions and recognising that they can be answered in different ways
- Observing closely, using simple equipment
- Performing simple tests
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions.

#### **Lower Key Stage 2:**

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and

- raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings.

### **Upper Key Stage 2:**

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments.

### **Coverage –Guidance for KS1 and KS2:**

The programmes of study for science are set out year-by-year for key stages 1 and 2 in the National Curriculum. Rushwick School will teach the relevant programme of study accordingly using the wider school curriculum, the wider school environment and opportunities for internal and external visits to map the programme across the year.

The statutory requirements within the programmes of study provide clear guidance on the content for each year group and this should be the focus for all planning. In addition, the non-statutory guidance should also clearly inform planning in order that working scientifically is taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content and will ensure that coverage of these skills is timely and appropriate.

The curriculum map has a colour key which allows teachers to see where and when a topic is introduced and to provide a reference when activating prior knowledge.

**A curriculum programme is shown below:**

Year Group	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
1	Uses of Everyday Materials	Seasonal Changes Animals inc. Humans	Plants	Seasonal Changes Plants	Animals inc. Humans Diet	Seasonal Changes
2	Uses of Everyday Materials	Uses of Everyday Materials	Living Things and their Habitats	Plants	Animals inc. Humans	Animals inc. Humans
3	Rocks	Forces & Magnets	Light	Light	Plants	Animals inc. Humans
4	Electricity	States of Matter	Living Things and their Habitats	Sound	Animals inc. Humans	Animals inc. Humans
5	Earth and Space	Properties and Changes of Materials	Living Things and their Habitats	Forces	Animals inc. Humans	Animals inc. Humans
6	Light	Electricity	Evolution and Inheritance	Living Things and their Habitats	Animals inc. Humans	SRE

### **The importance of language in Scientific knowledge and conceptual understanding**

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary.

Pupils should read, spell and pronounce scientific vocabulary correctly.

In order to reflect the importance of language teachers will:

- Provide real opportunities for speaking and listening e.g discussing hypotheses, sharing observations and presenting conclusions.
- Display key vocabulary and refer to it throughout a topic. Follow the link below for the relevant resources.  
<https://www.stem.org.uk/elibrary/resource/34636>
- Know and understand the terminology required for each programme of study being taught (refer to table below).
- Correct spelling of scientific vocabulary (making clear the spelling error/concept misconception)

### **Science in a real-world context and science capital**

We are aware that there is a need to raise awareness of the role of science in health, innovation and careers and to understand the impact of scientific discovery on our culture. At Rushwick, we aim to show children the connections between their learning in school and the real-life context of the sciences. We wish to promote the curiosity and love of learning that could lead to a STEM career and to contributing to the fields of science as adults.

In order to reflect the importance of providing real-life contact for learning, teachers will:

- Make clear links between observations, research and lesson content with real-life examples of science beyond the classroom.
- Share slide shows and videos from <https://pstt.org.uk/unique-resources/a-scientist-just-like-me/>
- Share the lives and works of famous scientists, from ancient civilisation to present day.  
<https://pstt.org.uk/resources/science-and-stem-clubs/> (engineering our world)  
<https://www.1001inventions.com/discover/> (diversity in science)
- Promote diversity in science by valuing and celebrating work achieved globally by scientists of different cultures and faiths and empowering everyone, especially women, to consider a career in STEM.
- Make links to their local environment and community and use local resources where possible. Make links to local careers and industry.

Key vocabulary					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p><b>Animals including humans</b> Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak</p>	<p><b>Animals including humans</b> Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene</p>	<p><b>Animals including humans</b> Movement, Muscles, Bones, Skull, Nutrition, Skeletons,</p>	<p><b>Animals including humans</b> Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar</p>	<p><b>Animals including humans</b> Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty</p>	<p><b>Animals including humans</b> Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration</p>
<p><b>Plants</b> Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem</p>	<p><b>Plants</b> Seeds, Bulbs, Water, Light, Temperature, Growth</p>	<p><b>Plants</b> Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower</p>	<p><b>Living things and their habitats</b> Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats</p>	<p><b>Living things and their habitats</b> Mammal, Reproduction, Insect, Amphibian, Bird, Offspring</p>	<p><b>Living things and their habitats</b> Classification, Vertebrates, Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, Insects</p>
<p><b>Everyday Materials</b> Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth</p>	<p><b>Living things and their habitats</b> Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert</p>	<p><b>Rocks</b> Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent</p>	<p><b>States of Matter</b> Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating</p>	<p><b>Properties and changes of materials</b> Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing</p>	<p><b>Evolution and Inheritance</b> Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics</p>
<p><b>Seasonal Changes</b> Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark</p>	<p><b>Everyday materials and their uses</b> Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil</p>	<p><b>Light</b> Light, Shadows, Mirror, Reflective, Dark, Reflection, Opaque</p>	<p><b>Sound</b> Volume, Vibration, Wave, Pitch, Tone, Speaker</p>	<p><b>Earth and Space</b> Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation</p>	<p><b>Light</b> Refraction, Reflection, Light, Spectrum, Rainbow, Colour,</p>

		<b>Forces and magnets</b> Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull	<b>Electricity</b> Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators	<b>Forces</b> Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys	<b>Electricity</b> Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell
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## **KEY TERMS AND DEFINITIONS**

**Absorbent** - a substance that can soak up a liquid, or to take in energy and retain it.

**Absorber** - an absorber does not reflect or transmit particles or radiation that hit it. Aluminium foil is an absorber of alpha particles. A dark, dull surface is an absorber of infra-red radiation.

**Accuracy** - is a term that refers to the properties of a measuring instrument.

**Acid** - an acid is a chemical that will neutralize a base such as an alkali. There are many different kinds of acid. Lemons are sour because they contain citric acid. Acid in vinegar is called acetic acid. .

**Acid rain** - is a kind of pollution. Sulphur and nitrogen oxides are produced from the burning of fossil fuels. When they escape into the atmosphere, they form sulphuric and nitric acids. These acids can have effects on our environment, e.g. erode stonework, lower the pH of lakes and rivers killing our wildlife, and cause damage to trees.

**Adhesive** - made to stick like glue.

**Air** - is a mixture of gases.

**Alkali** - is a metal oxide or hydroxide (base) that dissolves in water to form a solution with a pH greater than 7. An alkali is neutralised by an acid to form a salt and water. **Alloy** - is a metal made by melting and mixing two or more metals together, e.g. brass is a mixture of copper and zinc and bronze is an alloy of copper and tin.

**Amphibians** - are animals that live in water and on land. They have smooth, moist skins and lay their eggs in water.

**Antennae** - a pair of sensory organs found on the heads of insects.

**Apparatus** - are the things (equipment) needed to carry out an experiment.

**Aquatic** - belonging to , or living in water.

**Atomic** - an atom is the smallest particle (unit of matter) of an element which can exist and be part of a chemical reaction (a source of nuclear energy). The tiniest part of a substance. Atomic is the use of atomic bombs or energy.

## **B**

**Bacteria** - are very small single-celled organisms with no nucleus.

**Balance/Top Pan Balance** - is an instrument which is used to measure mass.

**Battery** - a battery consists of a number of electrical cells. These cells are usually connected in series to give a higher voltage than that from a single cell.

**Bedrock** - solid rock immediately beneath the surface soil.

**Biodegradable** - is a material that can rot and decay away quickly after we have used it.

**Biologist** - to study biology you will need to know the 7 life processes. A memory trick to remember what the life processes are is '**MRS GREN**'.

**M** - Movement - the moving parts of an organism

**R** - Reproduction - Producing offspring

**S** - Sensitivity - Reacting and responding to the environment

**G** - Growth - Increasing in size to adulthood

**R** - Respiration - Turning food into energy

**E** - Excretion - Getting rid of waste

**N** - Nutrition - Getting food to stay alive

**Birds** - are animals that have feather and wings. They lay eggs with hard shells and usually fly.

**Bonded** - Something that is bound, fastened or joined together.

**Braided** - interwoven hair and thread, or other fibres and yarns.

**Bulb** - part of the root of a plant which resembles a ball (e.g. onion).

## C

**Canopy** - a hanging cover forming a shelter.

**Carnivores** - are animals that eat other animals.

**Catalyst** - is something that alters the speed (speeds up) of a chemical reaction or change without being used up at the end of it or permanently changed itself.

**Cells** - one of the smallest parts of a plant or animal tissue.

**Circuit** - is one or more conducting paths between the two electrodes of a cell or battery of cells.

**Characteristics** - the distinguishing features or quality of something.

**Chemicals** - are the substances used in chemistry doing experiments..

**Chemist** - a chemist needs to be able to identify acids and alkalis. Universal Indicator can be used to show the pH of a substance.

**Classifying** - is to sort things into different groups.

**Climate** - the weather conditions of an area (e.g. the hot Siberian desert, the coldness of Iceland).

**Compound** - is a substance that has two or more elements in it.

**Concave** - describes the shape of a lens or other object where the center is thinner than the outside.

**Conclusion** - things that can be worked out from doing an experiment (making a decision). To draw to a close, to finish or conclude with an explanation, judgement or opinion based on interpretations.

**Condensation** - is the change from a gas to a liquid or solid.

**Conifers** - are relating to or part of trees or shrubs that do not have flowers and their seeds are made in cones.

**Consistence** - a degree of thickness or smoothness of a substance.

**Controlled Variable** - the things that you try to keep the same in an experiment or investigation.

**Corrosion** - is the wearing away of the surface of a metal by chemical reactions with oxygen and water. Rusting is one example of corrosion.

**Crystals** - a solid with a symmetrical arrangement of faces, usually bright and clear.

**Current** - is a flow of electric charge. The current in a metallic conductor is due to a flow of negatively charged electrons.

## D

**Data** - a collection of observations, measurements and/or facts.

**Decompose** - the breaking down of parts from a whole - to decay or rot, wasting away.

**Dense** - made up of very closely packed particles.

**Dilute** - is to make a liquid weaker or thinner by adding more liquid, usually more water.

**Dispersion** - is the splitting of white light into the seven colors of the visible spectrum - rainbow.

**Dissolving** - is the process that occurs when a solute is added to a solvent and the solute disappears. The particles of the solute fit between the particles of the solvent. The solute can be recovered by the evaporation process. To mix a solid with a liquid so it becomes a liquid as well. To melt, to become a liquid (ice melting, sugar dissolving in hot tea).

**Distillation** - this is to separate a liquid from other liquids by boiling it and condensing the steam. A substance that has been through an evaporation and condensing process.

## E

**Earth** - is the planet that we inhabit. In electricity, the term refers to an electrical connection to the Earth.

**Ecosystem** - is the sum total of all the living organisms and non-living factors in an environment and the way they interact. The relationship between the environment, its animals and its plants.

**Element** - is a pure substance made of one kind of atom. It cannot be split up into anything simpler without losing its characteristics. A substance that cannot be separated into simpler substances.

**Energy** - is transferred by heating by; radiation, conduction and convection. The amount of energy transferred is measured in joules.

**Environment** - the conditions or surroundings in which people and animals live.

**Enzymes** - is a substance that speeds up a chemical reaction in the body (a biological catalyst). Each enzyme works best at a particular temperature and pH.

**Erode** - is to wear away.

**Erosion** - is the process where rocks are worn away.

**Evaluating** - to decide if you have done something the best way and seeing what you could improve.

**Evaporation** - is the process in which a liquid changes to a vapour, due to particles leaving the surface of the liquid. A liquid turns to a gas. Changing from a liquid or a solid into vapours (gas).

**Evidence** - is anything that gives a reason to believe something.

**Expand** - is when the size of a substance increases due to being heated. The particles gain energy and move further apart.

**Experiment** - a test to find something out.

**Explosion** - is a very rapid reaction accompanied by a large expansion in gases.

## **F**

**Fabric** - any material made of fibers or yarn which has been woven or knitted together.

**Fair Test** - is controlling some of the things used or done in a test so they do not change. An experiment in which only one variable is changed at a time to allow a fair comparison.

**Felt** - is tightly matted fabric made of wool which has had the fibers worked together under pressure.

**Ferns** - a plant with strong stems, roots and leaves and do not have seeds.

**Fertilize** - to provide a plant with pollen to bring about fertilization.

**Filaments** - are single stands of fiber.

**Filter** - is to separate solids (that do not dissolve) from liquids.

**Fish** - are cold-blooded animals that live in water, they have a backbone, scaly skin, tails and fins for swimming and gills for breathing.

**Flammable** - a substance or material that easily sets on fire.

**Flowering Plants** - any plant that produces flowers and fruit.

**Force** - is a push or pull. Force is measured in units called newtons (N).

**Formula** - is a way of writing scientific information using letters, numbers and signs.

**Friction** - occurs when two surfaces move over each other. Air resistance and water resistance are friction forces caused by the movement of something through the air or the water.

**Freeze** - is when you cool something to a very low temperature and it usually forms ice.

**Function** - is the special purpose or use of something.

## **G**

**Galaxy** - is a group of millions of stars held together by gravity, like the Milky Way.

**Gas** - is a state of matter in which the particles move rapidly and are very spread out.

**Gravity** - is the force of attraction between any two bodies. It increases with increasing mass of the bodies and decreases if they are further apart.

## **H**

**Habitat** - is a place where an organism lives. It is the natural home of a plant or animal.

**Herbivores** - are animals that eat only plants.

**Humidity** - is warm dampness, it is a measure of the amount of water in the air.

**Humus** - bits of decaying plants and animals found in soil.

## **I**

**Igneous** - (of rock) is the matter formed as molten (extremely hot liquid) rock cools and hardens.

**Indicator** - is a chemical that can show if a substance is acidic or alkaline by changing color. Color turns red in acid and blue in alkali.

**Infiltration** - is the passing of a liquid or gas through a substance by means of a filter.

**Insoluble** - this is when a solid is unable to dissolve into a liquid.

**Insulator** - halts the passage of electricity, heat or sound through an object or substance.

**Invertebrates** - are animals without a backbone, such as worms.

**Investigating** - is to look for clues and try to work out what they mean.

## **J**

**Joule (J)** - is the unit for measuring energy or work.

## **K**

**Kaleidoscope** - is a tube filled with colored paper, which is lined with mirrors placed at different angles. Turning the tube will create amazing patterns for you to see through a small hole at the end of the tube.

**Keratin** - is a fibrous protein found in hair and nails.

**Kinetic Energy** - is the kind of energy in moving things.

## L

**Larva, larvae** - is an insect that is still in its caterpillar state.

**Leaf** - is a flat green blade attached to the stem of a plant.

**Lichen** - is a mutualistic relationship between a fungus and an alga (simple plant). They can be seen as crusty patches on tree trunks and walls.

**Liquid** - is a state of matter in which the particles are close together but randomly arranged. The particles can move over each other.

## M

**Magnetic** - applies to any object or material that is repelled or attracted by a magnet. Magnetic materials include iron, steel, cobalt and nickel.

**Magnetic field** - is an area where a magnetic material experiences a force. Magnetic fields exist around permanent magnets, electromagnets and electric currents.

**Magnification** - to be magnified. To increase the size of an object to make it bigger than it actually is.

**Mammals** - are animals that are warm-blooded, usually have fur or hair and feed their young with milk from their mother.

**Matter** - is the material that something is made up of.

**Melting** - is when a solid changes to a liquid at the melting point by heating.

**Melting Point** - is when the temperature at which a solid changes to a liquid.

**Measuring Cylinder** - is an instrument that measures the volume of a liquid.

**Metamorphic** - (of rock) is a complete change from its original state caused by heat and pressure.

**Method** - is an orderly way of doing something.

**Methodology** - is a scientific study of method. A system of methods used in a particular activity.

**Microbes** - are very small living things, usually only one cell big. A tiny organism that can only be seen with a microscope. Some microbes can cause disease.

**Milky Way** - is the spiral galaxy of stars which the Earth is part of.

**Minibeasts** - are miniature or very small animals such as insects.

**Mixture** - is two or more substances mixed together without actually joining them so that they can be separated again.

**Molecule** - is a group of atoms joined together.

**Moss** - a plant that has weak roots, thin, delicate leaves and do not have seeds.

**Moult** - is the shedding or casting off of feathers, hair, fur and skin.

## N

**Nectar** - is the sweet juice of flowers from which bees make their honey.

**Neutralisation** - Acids react with bases, alkalis, reactive metals and carbonates. This is called a neutralisation reaction.

Acid + Alkali -> Salt + Water  
Acid + Base -> Salt + Water  
Acid + Metal -> Salt + Hydrogen  
Acid + Carbonate -> Salt + Water + Carbon Dioxide

**Neutron** - is an atomic particle found in the nucleus. It is similar in mass to a proton but has no charge.

**Newton (N)** - is the unit of force.

**Nocturnal** - active during the night.

## O

**Observations** - the things that can be seen, watched during an experiment and the taking of notes to record facts based on the experiment. Try using all your senses to notice what is happening.

**Omnivores** - are animals that eat both animals and plants.

**Opaque** - does not allow light through.

**Orbit** - the curved path taken by an object that moves round another object like a planet around the Sun.

**Organism** - (of animal, plant) a section or piece resembling a living creature in behaviour or structure.

## P

**Particles** - are the extremely tiny parts (substances) that scientists believe everything is made up of.

**Permeable** - is a material which allows water or liquids to flow through.

**Photosynthesis** - is the process from which plants use or changes sunlight into energy from the sun to make their own food. This energy is their food which contains oxygen and glucose. [carbon dioxide + water = glucose + oxygen] (also see [photosynthesis definitions page](#))

**Physical Change** - is when you mix two substances and their particles become jumbled up together. They do not necessarily combine chemically unless the atoms in the molecules are rearranged - this change is a physical change only. This new substance is called a mixture and can usually be separated quite easily.

**Physicist** - a physicist needs to get units right in calculations.

Physical Quantity    S.I. Units    Symbol

Length	Metres	m
Mass	Kilograms	kg
Time	Seconds	s
Force	Newtons	N
Energy	Joules	J

**Pipette** - a thin glass or plastic tube used to measure liquids.

**Planet** - is a large body that orbits a star.

**Plates** - are huge sections of the Earth's crust which float on the mantle.

**Pole** - in magnetism, the strongest part of a magnet. The pole of a magnet that points towards magnetic North is called its North seeking pole.

**Pollination** - is to fertilise by the transfer of plant pollen. The wind, birds and bees can pass pollens around.

**Predator** - is an animal which hunts and kills other animals for their food.

**Predicting** - to say what you think is going to happen in an experiment or investigation.

**Process** - is a number of actions for making or doing something.

**Properties** - are what a material or substance is like and how it behaves. Describes how a substance behaves. It can describe any piece of the material (for example if a material is strong or soft).

**Protein** - are nitrogenous compounds that are essential for life.

**Proton** - is an atomic particle found in the nucleus. It is similar in mass to the neutron but has a positive charge.

## Q

## R

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**Ray** - is a narrow beam of light.

**Reaction** - is something that happens in response to something else.

**Recycled** - is when something is used again in a system.

**Reflect** - is to bounce something back from a surface.

**Reflection** - is the change in direction when light or other wave motion rebounds at a boundary between two materials.

**Refraction** - is the change in speed when light or other wave motions passes from one material into another. The change in speed causes a change in wavelength and may cause a change in direction.

**Reliable** - things that can be taken to be true.

**Reptiles** - are animals that live mainly on land and lay eggs with soft shell. They have dry, scaly skin and crawl along on their belly and have short legs.

**Research** - is an investigation or study to find out facts in order to reach a conclusion.

**Residue** - is something that remains behind or is left over.

**Result** - is what happens at the end of an experiment.

**Rodent** - is an animal with strong incisor (cutting teeth at the front).

## S

**Safety Specs** - must be worn to protect your eyes from any danger.

**Scale** - is the marks on any measuring instrument.

**Sedimentary** - the material that has been deposited by wind or water. The matter that forms at the bottom of a liquid.

**Sieve** - is when you separate a solid or a liquid by using a sieve.

**Slaked lime** - calcium hydroxide.

**Soil** - is the top layer of land on the Earth's surface.

**Solar System** - is a star and all the objects that orbit it.

**Soluble** - is the liquid that is produced after you have dissolved a solid into another liquid.

**Solution** - chemical: is the mixture of two or more substances, a solute dissolves in a solvent. The substance made when a solid disappears in a liquid. The process of solving a problem.

**Specimen** - is a sample of blood, urine or tissue which is used for analysis.

**Spectrum** - the range of colors that make up white light is called the spectrum. White light is a mixture of colors. When splitting light through a prism you can see the spectrum of colors.

**Stalactite** - is a hanging formation of calcium carbonate dripping down from the roof of a cave.

**Stalagmite** - is the opposite of a stalactite; as it rises like a spike from the floor of a cave.

**Star** - is an astronomical object that generates energy due to nuclear fusion. A star gives out light and/or other forms of electromagnetic radiation.

**Static Electricity** - is an unbalanced charge that is not moving. A common cause of static electricity is the transfer of electrons when two objects are rubbed together. The object that gains electrons becomes charged negatively while the object that loses electrons becomes charged positively.

**Stem** - is the long, thin, supportive central part of a plant which bears a flower, fruit or leaf.

**Sun** - is the Earth's star.

**Symmetrical** - is two halves that are mirror images of each other like butterfly wings.

**Synthetic** - is a substance or material which is not made up of natural substances like cotton or wool, but are man-made artificially from chemical reactions.

### I

**Tectonic plates** - huge sections of the Earth's crust and upper mantle.

**Temperature** - is a measure of how hot or cold an object is.

**Texture** - is the appearance, feel and structure of a substance.

**Thermometer** - is an instrument used to measure temperature.

**Tsunami** - a large wave caused by an underwater earthquake or volcanic eruption.

### U

**Universe** - is everything that exists.

### V

**Variables** - are the things that can change during an experiment. Something that can vary during an experiment.

**Vertebrates** - are animals with a backbone.

**Volume** - is how much room something takes up. It is measured in centimeters (cm<sup>3</sup>).

### W

**Wasted energy** - energy that is not usefully transferred or transformed.

**Waterproof** - does not allow water to pass through..

**Weight** - is a force due to gravity acting on an object.

### X

**X-rays** - are used to detect broken bones. very penetrating, short wavelength electromagnetic waves.

### Y

### Z

## **Science Progression of Enquiry Skills Framework:**

This Framework provides information that can be used when planning and assessing pupil knowledge, understanding and skills in our primary Science curriculum. It covers the progression of skills for children at key transition points – EYFS into the end of Key Stage 1, the end of Year 4 and the end of Year 6.

The progression statements are taken from the statutory and non-statutory guidance and help to clarify the development of skills across the year groups and what this looks like at each stage. They are designed to support planning for teaching and learning and to ensure continuity as well as appropriate level of challenge.

Teachers should also use this document to formulate Working Scientifically learning objectives and to ensure that all areas of enquiry have been taught throughout the academic year. It is also useful for both formative and summative assessment purposes allowing teachers to highlight particular skills that have been achieved by either individuals or groups of children and then use this information to target areas of weakness as well as to indicate 'next steps' in learning.

The Progression of Enquiry Skills Framework should therefore be used to:

- Plan science lessons during which children can show progress in their learning.
- Ensure continuity and progression of essential enquiry skills across the key stages.
- Differentiate activities and add challenge for more able children within the class.
- Make accurate assessments, and facilitate high quality peer and self-assessments in the understanding of the nature, processes and methods of science for each year group.

## Progression of Enquiry Skills from Early Years Foundation Stage to Key Stage One

EYFS	Key Stage One
Show curiosity about objects, events and people Playing & Exploring Questions why things happen Speaking: 30-50 months	Explore the world around them and raise their own simple questions
Engage in open-ended activity Playing & Exploring	Experience different types of science enquiries, including practical activities
Take a risk, engage in new experiences and learn by trial and error Playing & Exploring	Begin to recognise different ways in which they might answer scientific questions
Find ways to solve problems / find new ways to do things / test their ideas Creating & Thinking Critically	Carry out simple tests
Develop ideas of grouping, sequences, cause and effect Creating & Thinking Critically Know about similarities and differences in relation to places, objects, materials and living things ELG: The World	Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)
Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world The World: 30-50 months	Ask people questions and use simple secondary sources to find answers
Closely observes what animals, people and vehicles do The World 8-20 months Use senses to explore the world around them Playing & Exploring	Observe closely using simple equipment With help, observe changes over time
Make links and notice patterns in their experience Creating & Thinking Critically	With guidance, they should begin to notice patterns and relationships
Choose the resources they need for their chosen activities ELG: Self Confidence & Self Awareness Handle equipment and tools effectively ELG: Moving & Handling	Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data
Create simple representations of events, people and objects Being Imaginative: 40-60+ months	Record simple data
Answer how and why questions about their experiences ELG: Understanding Make observations of animals and plants and explain why some things occur, and talk about changes ELG: The World	Use their observations and ideas to suggest answers to questions Talk about what they have found out and how they found it out
Develop their own narratives and explanations by connecting ideas or events ELG: Speaking Builds up vocabulary that reflects the breadth of their experience Understanding: 30-50 months	With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language

## Progression of Enquiry Skills from Key Stage One to Key Stage Two

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Explore the world around them and raise their own simple questions	Raise their own relevant questions about the world around them	Use their science experiences to explore ideas and raise different kinds of questions
Experience different types of science enquiries, including practical activities	Should be given a range of scientific experiences including different types of science enquiries to answer questions	Talk about how scientific ideas have developed over time
Begin to recognise different ways in which they might answer scientific questions	Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions	Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions
Carry out simple tests	Set up simple practical enquiries, comparative and fair tests Recognise when a simple fair test is necessary and help to decide how to set it up	Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why
Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)	Talk about criteria for grouping, sorting and classifying; and use simple keys	Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment
Ask people questions and use simple secondary sources to find answers	Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations	Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact
Observe closely using simple equipment with help, observe changes over time	Make systematic and careful observations Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	Make their own decisions about what observations to make, what measurements to use and how long to make them for
With guidance, they should begin to notice patterns and relationships	Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them	Look for different causal relationships in their data and identify evidence that refutes or supports their ideas
Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data	Take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately	Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate.
Record simple data	Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data	Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Use their observations and ideas to suggest answers to questions Talk about what they have found out and how they found it out	With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions	Identify scientific evidence that has been used to support or refute ideas or arguments
With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language	Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions	Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas, use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results
	With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.	Use their results to make predictions and identify when further observations, comparative and fair tests might be needed