FEDERATION OF

FOLLIFOOT & SPOFFORTH

CHURCH OF ENGLAND PRIMARY SCHOOLS

Love Learn Thrive

Curriculum – Science

Progression of Knowledge and Skills in Science

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, children are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Progression in programmes of study			
Early Years	**Key Stage One**	**Lower Key Stage Two**	**Upper Key Stage Two**
Understanding the world – The Natural World For EY please see Whole school curriculum Map	Working Scientifically	Working Scientifically	Working Scientifically
	Animals Including Humans	Animals Including Humans	Animals including humans
	Living things and their habitats	Living things and their habitats	Living things and their habitats Evolution and Inheritance
	Plants	Plants	
	Everyday Materials Uses of everyday materials	States of matter Rocks	Properties and changes of materials
	Seasonal Changes	Light Sound	Light Earth and Space
		Forces and magnets	Forces
		Electricity	Electricity

Working Scientifically			
Early Years	**Key Stage One (Years 1&2)**	**Lower Key Stage Two (Years 3&4)**	**Upper Key Stage Two (Years 5&6)**
• Look closely at similarities, differences, patterns and change	• Know how to ask simple questions • Know how to use simple equipment • Know how to observe closely • Know how to perform simple tests • Know how to identify and classify Use observations and ideas to suggest answers to questions • Know how to gather and record data to help answer questions	• Know how to ask relevant questions • Know how to set up simple practical enquiries and comparative fair tests • Know how to make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. • Know how to gather, record, classify and present data in a variety of ways to help in answering questions. • Know how to record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables. • Know how to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Know how to use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. • Knows how to identify differences, similarities or changes related to simple, scientific ideas and processes. • Knows how to use straightforward, scientific evidence to answer questions or to support their findings	• Knows how to plan enquiries, including recognising and controlling variables where necessary. • Knows how to use appropriate techniques, apparatus, and materials during fieldwork and classwork . • Knows how to take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Knows how to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Knows how to report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Knows how to present findings in written form, displays and other presentations. • Knows how to use test results to make predictions to set up further comparative and fair tests. • Know how to use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.

Plants		
Key Stage One (Years 1&2)	Lower Key Stage Two (Years 3&4)	Upper Key Stage Two (Years 5&6)
• Know the difference between a deciduous and an evergreen tree. • Know the root, stem, leaf and flower on a diagram of a flowering plant/tree. • Know the stages of growth from seed to mature plant. • Know what plants need in order to stay healthy. • Know a variety of common wild and garden plants, including deciduous and evergreen trees. • Know identify and describe the basic structure of a • variety of common flowering plants (seeds, roots etc), including trees. • Know how seeds and bulbs grow into mature plants • Know and describe how plants need water, light and suitable temperature to grow and stay healthy	• Know the function of a plant's roots, stem/trunk, leaves and flowers. • Know the requirements for plants to live and grow. • Know different methods for seed dispersal. • Know how flowering plants are pollinated. • Know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • Know and understand the way in which water is transported within plants • Know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	

Animals Including Humans		
Key Stage One (Years 1&2)	Lower Key Stage Two (Years 3&4)	Upper Key Stage Two (Years 5&6)
• Know definitions of; carnivore, herbivore and omnivore. • Know five different categories of animal (fish, amphibian, reptile, bird and mammal). • Know what is different about two types of animal. E.g. be able to answer: *How is a fish different to a bird?* • Name the five senses and which parts of the human body are associated with each. • Be able to list the stages of human growth – baby, child, adolescent and adult. • Be able to list an animal's basic needs. • Say why it is important to eat healthily/ why it is important to exercise. • Know and name a variety of common animals that are carnivores, herbivores and omnivores describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • Know name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. • To know that animals, including humans, have offspring which grow into adults To know and describe the basic needs of animals, including humans, for survival (water, food and air) • Know and describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	• Know that plants and animals obtain food in different ways. • Know the different food groups and give examples of each, e.g. protein is found in meat. • Know the main bones in the body and how a skeleton protects, supports and helps the body to move. • Know how pairs of muscles work together to enable movement. • Know that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Identify and know that humans and some animals have skeletons and muscles for support, protection and movement • Know the simple functions of the basic parts of the digestive system in humans. • Know the different types of teeth in humans and their simple functions. • Know and interpret a variety of food chains, identifying producers, predators and prey.	• Describe the changes as humans develop to old age. • Know and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • Know and recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • Know the ways in which nutrients and water are transported within animals, including humans.

Living things and their habitats

Key Stage One (Years 1&2)	Lower Key Stage Two (Years 3&4)	Upper Key Stage Two (Years 5&6)
• Know the difference between living things, things that are dead and things that have never been alive • Know and describe how a particular animal is suited to its habitat • Know some of the plants and animals that can be found in a particular habitat. • Know how to draw and label a simple food chain. • Know and compare the differences between things that are living, dead, and things that have never been alive • Know that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats • Know how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.	• Know that living things are grouped based on their observable characteristics. • Know how to use a classification key to name living things in the locality. • Know how living things are connected e.g. how changes in environment can affect living things in that ecosystem. • Know and name a variety of living things (plants and animals) in the local and wider environment • Know reasons for classifying plants and animals based on specific characteristics. • Know that environments are constantly changing and that this can sometimes pose dangers to specific habitats.	• Know how to list some of the characteristics of different groups of plants/animals/micro-organisms, e.g. mammals give birth to live young and feed their offspring milk. Birds have two wings, beaks and lay eggs. etc • Know how to group a variety of living things, explaining how they have grouped them. • Know and describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • Know reasons for classifying plants and animals based on specific characteristics. **Evolution and inheritance** • Know how fossils tell us about creatures that lived millions of years ago. • Know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Know how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution • Know that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • Know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Know how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Materials including rocks

Key Stage One (Years 1&2)	Lower Key Stage Two (Years 3&4)	Upper Key Stage Two (Years 5&6)
• Know a variety of common objects based on their main material. • Know which objects can be bent, twisted, stretched etc. • Know why an object is suitable for its use, e.g. *why is a saucepan made of metal and not plastic?* • Know the properties of materials like glass, wood or metal. • Know how to distinguish between an object and the material from which it is made identify and name • Know a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Know the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. • Know and compare the uses of a variety of everyday materials, including wood, metal, plastic, properties of a variety of everyday materials • Know how to group together a variety of everyday materials based on their simple physical properties.	**Rocks** • Know the difference in how igneous, sedimentary and metamorphic rocks are formed. • Know how a fossil is formed. • Know two things you would expect to find in any soil. • Know and group together different kinds of rocks on the basis of their appearance and simple physical properties • Know in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soil are made from rocks and organic matter **States of Matter** • Know how to sort a variety of items by category of solid, liquid or gas. • Know the changes that happen to water when it is cooled/heated. • Know the water cycle. • Know and group materials together, according to whether they are solids, liquids or gases. • Know that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. • Know the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	• Know and group together everyday materials on the basis of their properties. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Know examples of irreversible changes, explaining why the change is irreversible. • Know how to describe a reversible change, such as dissolving.

Seasonal Changes into Light & Sound and Earth and Space

Key Stage One (Years 1&2)	Lower Key Stage Two (Years 3&4)	Upper Key Stage Two (Years 5&6)
Seasonal Changes • Know key features of each season, e.g. leaves fall off the trees in autumn, flowers begin to grow in spring etc. • Know that the days are generally colder and shorter in winter and warmer and longer in summer. • Know and talk about changes across the four seasons Know and describe weather associated with the seasons and how day length varies, including • understanding that it is unsafe to look directly at the Sun.	**Light** • Know that we cannot see without light. • Know that all objects reflect light and this is how we see them. • Know ways to protect our eyes from the sun. • Know how a shadow is formed. • Know dark is absence of light • Know that light is reflected from surfaces • Know that light from the sun can be dangerous and that there are ways to protect the eyes. • Know that shadows are formed when light from a light source is blocked by a solid object • Know patterns in the way that the size of shadows change **Sound and hearing** • Know that sound is made by vibration. • Know how sound travels to the ear. • Know that high pitched sounds are made by vibrations that are very quick and low pitched sounds are made by vibrations that are relatively slower. • Know that loud sounds are made by large vibrations and quieter sounds are made by smaller vibrations. • Know how sounds are made, associating some of them with something vibrating. • Know that vibrations from sounds travel through a medium to the ear. • Know patterns between pitch of a sound and features of the object that produced it. • Know patterns between the volume of a sound and the strength of the vibrations that produced it. • Know that sounds get fainter as the distance from the sound's source increases.	**Light** • Know that light travels in straight lines. • Know that we see things because light reflects off them into our eyes. • Know different light sources. • Know why shadows have the same shape as the objects that cast them. • Know that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Know that light travels in straight lines to explain why shadows have the same shape as the objects that cast them **Earth and space** • Know the movement of the Earth and other planets relative to the sun. • Know the movement of the moon relative to the earth. • Know that the Sun, Earth and Moon are roughly spherical in their shape. • Know night and day in relation to the Earth's rotation • Know the movement of the Earth, and other planets, relative to the Sun in the solar system • Know the movement of the Moon relative to the Earth • Know the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky. • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

Electricity		
Key Stage One (Years 1&2)	Lower Key Stage Two (Years 3&4)	Upper Key Stage Two (Years 5&6)
	• Know common appliances into electrical and non-electrical. • Know how to construct a simple circuit. • Know if a circuit will or will not work. • Know some common electrical conductors and insulators. • Know common appliances that run on electricity Construct a simple series electrical circuit, identifying • Knows basic parts of circuit, including cells, wires, bulbs, switches and buzzers. • Knows whether or not a lamp will light in a simple series circuit based on whether or not the lamp is part of a complete loop with a battery. • Knows that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.	• Know that the amount of cells used in a circuit will have an effect on the other components. • Know ways to make a bulb shine brighter. • Know and correctly use recognised symbols when representing a simple circuit in a diagram. • Know that the associated brightness of a lamp or the volume of a buzzer with the number and voltage • Know and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • Know, use and recognised symbols when representing a circuit in a diagram.

Forces and Magnets		
Key Stage One (Years 1&2)	Lower Key Stage Two (Years 3&4)	Upper Key Stage Two (Years 5&6)
	• Knows how to sort objects that into magnetic/not magnetic. • Knows that on a magnet, like poles repel and opposites attract. • Knows and understand friction slows objects down. • Knows how to compare how things move on different surfaces • Knows that some forces need contact between 2 objects, • Knows magnetic forces can act at a distance • Knows how magnets attract or repel each other and attract some materials and not others • Knows and can group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • Knows magnets as having 2 poles • Knows how to predict whether 2 magnets will attract or repel each other, depending on which poles are facing.	• Identify gravity as the reason unsupported objects fall towards the Earth. • Give examples of air resistance, water resistance or friction, explaining how the forces are working. e.g. when brakes are used on a bike, the brake pad rubs against the wheel, causing friction so the wheel slows down. • Explain how a lever, pulley or gear works. • Know the effects of air resistance, water resistance and friction, that act between moving surfaces • Know that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

SCIENCE		RECEPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	Upper KS2 (Y5 and Y6)	
QUESTION		**Ask simple questions** about immediate environment.	**Ask questions** and know some can be answered using scientific enquiry.		**Identify scientific questions.** ie can be investigated through scientific enquiry.		**Raise scientific questions** and **hypothesise**	
SCIENTIFIC ENQUIRY	**OBSERVE**	**Qualitative** Talk about similarities and differences.	**Qualitative and Simple Quantitative**		**Qualitative and Quantitative**		**Qualitative and Quantitative**	
			Observe change over time. Use Senses/ equipment.	Measure change over time e.g. plant growth. Select equipment	Systematic/ careful observations. Use bar charts, pictograms, tables.	Accurate measurements. Use time graphs and other graphs.	Accurate/ precise measurements, Diagrams, tables, bar and line graphs.	Take repeat readings when appropriate. Scatter graphs.
	CLASSIFY and FIND PATTERNS	**Talk and Sort**	**Identify and Classify**		**Classify and Find Patterns**		**Classify and Find Patterns**	
		Use simple scientific criteria.	e.g. familiar plants, animals, materials Compare and contrast	e.g. living/ dead/ never alive; materials Compare differences	Classify animals/ materials. Link two variables e.g. *the closer the magnet the bigger the force.*	Use simple classification keys. Link two variables e.g. *the more cells in a circuit, the brighter the bulb.*	Use complex classification keys. Identify causal relationships.	Develop classification keys. Identify evidence that supports/ refutes causal relationship.
	CONTROL INVESTIGATIONS: comparative and fair testing	**Explore** objects/ materials/ living things/ resources designed to model scientific processes.	**Simple comparative tests**		**Comparative and fair tests**		**Design own comparative and fair tests**	
			e.g. *What is the best material for an umbrella?*	e.g. *What if plants do not get light and water?*	**Predict.** Fair tests e.g. *How does distance affect magnet strength?*	**Predict.** Language of independent and control variable.	Identify when and how to use tests. Recognise and control variables. Make predictions based on previous test results.	
	RESEARCH	**Listen and respond to stories** about scientific processes/ events/ objects.	**Find information** using given sources. e.g. *animals.*	**Select information** from a range of given sources**.**	**Research** using given sources. e.g. *research different food groups and how they keep us healthy*	**Select information** to support findings. e.g. *research animals*	**Explore relevant information by using a wide range of secondary sources.**	
							Explore how scientific ideas have developed over time.	Identify evidence that has been used to support or refute ideas.
	MODEL	**Concrete** context. Create drawings and models of their environment	**Concrete** context Draw diagrams e.g. *parts of plants/ the body*.	**Explore** and **create** drawings and physical models e.g. *habitats.*	**Abstract** contexts e.g. processes and phenomena such as forces/ light. **Use** labelled diagrams and drawings and physical models.	**Abstract** contexts e.g. processes and phenomena such as sound/ electricity. **Create** labelled diagrams and drawings and physical models.	**Abstract** contexts. **Evaluate** diagrams/ models e.g. states of matter; solar system.	**Abstract** contexts. **Create** own versions of models. e.g. circulatory system; light.
CONCLUDE		**Explain** simple phenomena: How? Why?	**Describe** what has happened or been observed.	**Explain** why a simple observation occurred. **Evaluate** the effectiveness of observations.	**Explain an observation or an event in scientific terms.** Distinguish between what has been observed and why it happened. Begin to link evidence from secondary sources as well as primary. Suggest improvements.		**Evaluate original hypothesis against observed evidence and reach appropriate conclusions.** Identify causal relationships. Begin to identify how reliable the data is.	