

Science curriculum vision and rationale:

The aim of our Science curriculum is to provide young scientists with opportunities to learn in a creative and diverse way about relevant and real life science in our evolving world. We want our children to become young scientists, who are curious and ask questions; discuss their ideas and findings; have opportunities to learn through a creative and hands on approach; plan, carry out and evaluate relevant experiments and investigations that link to real life; are inspired by a diverse mix of past and present scientists from the real world.

Curriculum Drivers:**1. Reading, Language and Vocabulary development at heart of the curriculum**

A range of non-fiction resources and science texts are used to generate questions and give vocabulary in context enabling children to communicate scientifically: orally and in writing. Every lesson should include relevant core science vocabulary (displayed and used) that links to the five enquiry types. Vocabulary is available visually across the school e.g. in displays and all classrooms have a science working wall for this purpose.

2. Experiential learning opportunities, to excite, enthuse and engage. Raising Aspirations.

Every year each year group will take part in at least one science-focused field trip. It is really important that learning is hands-on. All science topics should begin with enquiry based investigations; children generate questions to be explored. All learning objectives are enquiry-based with key questions posed every lesson. Science is regularly and explicitly linked to real world, STEM news/events to develop enthusiasm about the relevance and context of the subject in the real world.

3. Creativity and Innovation. Developing independence, thinking and questioning.

Children are encouraged to be creative, innovative and take risks, while appreciating the importance of trial and error when working scientifically. In science lessons, we aim to develop children's resilience, thinking skills and independent learners who are capable of making informed choices (in their everyday life e.g. healthy eating) and carrying out investigations independently or communicating effectively and scientifically in a group. In science children will learn to hypothesise, test and to draw conclusions and make generalisations from what they have observed and measured. Every year each year group will focus on and learn about a relevant famous scientist (past or present) and consider how their research and work had an impact on modern society. Children will explore and learn about scientists and scientific innovations from different cultures.

4. **Children as teachers**, sharing knowledge. Knowing more and remembering more.

We recognise that when children explain or teach a skill, they have learnt they are more likely to retain it. In science, regular opportunities are provided for children to develop their own scientific knowledge and understanding by sharing what they have learnt, with teachers, parents and peers. This encourages children to question and be questioned, supporting a depth of knowledge and the ability to make connections. Each term there will be a whole-school, science themed event to work towards e.g science week, science fair and 'stay and investigate' (share knowledge/skills with parents).

5. **Valuing each other**. Promoting respect, responsibility tolerance and understanding

Science develops respect for the world, particularly through learning about real life scientists from a range of cultural backgrounds. Children develop respect for themselves and others when learning about nutrition and using practical equipment safely in lessons. Children the importance of science in protecting the environment and fighting against climate change.

Science Knowledge Progression: KS1 - KS2

Strands		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
B I O L O G Y	Plants	<ul style="list-style-type: none"> • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees; • identify and describe the basic structure of a variety of common flowering plants, including trees. 	<ul style="list-style-type: none"> • observe and describe how seeds and bulbs grow into mature plants; • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 	<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers; • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant; • investigate the way in which water is transported within plants; • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 			
	Animals inc humans	<ul style="list-style-type: none"> • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals; • identify 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); • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 	<ul style="list-style-type: none"> • notice that animals, including humans, have offspring which grow into adults; • find out about and describe the basic needs of animals, including humans, for survival (water, food and air); • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	<ul style="list-style-type: none"> • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat; • identify that humans and some other animals have skeletons and muscles for support, protection and movement. 	<ul style="list-style-type: none"> • describe the simple functions of the basic parts of the digestive system in humans; • identify the different types of teeth in humans and their simple functions; • construct and interpret a variety of food chains, identifying producers, predators and prey. 	<ul style="list-style-type: none"> • describe the changes as humans develop to old age. 	<ul style="list-style-type: none"> • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood; • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function; • describe the ways in which nutrients and water are transported within animals, including humans.

Strands		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
Living things and their habitats	Living things and their habitats		<ul style="list-style-type: none"> • explore and compare the differences between things that are living, dead, and things that have never been alive; • identify 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; • describe 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. 		<ul style="list-style-type: none"> • recognise that living things can be grouped in a variety of ways; • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment; • recognise that environments can change and that this can sometimes pose dangers to living things. 	<ul style="list-style-type: none"> • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird; • describe the life process of reproduction in some plants and animals. 	<ul style="list-style-type: none"> • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals; • give reasons for classifying plants and animals based on specific characteristics.
	Evolution and inheritance						<ul style="list-style-type: none"> • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago; • recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents; • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Electricity	Electricity				<ul style="list-style-type: none"> • identify common appliances that run on electricity; • construct a simple series electrical circuit, identifying 		<ul style="list-style-type: none"> • associate the brightness of a lamp or the volume of a buzzer with the number and

Strands		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
P H Y S I C S					and naming its basic parts, including cells, wires, bulbs, switches and buzzers; <ul style="list-style-type: none"> • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery; • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit; • recognise some common conductors and insulators, and associate metals with being good conductors. 		voltage of cells used in the circuit; <ul style="list-style-type: none"> • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches; • use recognised symbols when representing a simple circuit in a diagram.
	Forces			<ul style="list-style-type: none"> • compare how things move on different surfaces; • notice that some forces need contact between 2 objects, but magnetic forces can act at a distance; • observe how magnets attract or repel each other and attract some materials and not others; • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials; • describe magnets as having 2 poles; • predict whether 2 magnets will attract or repel each other, depending on which poles are facing. 		<ul style="list-style-type: none"> • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object; • identify the effects of air resistance, water resistance and friction, that act between moving surfaces; • recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect. 	
	Seasonal changes	<ul style="list-style-type: none"> • observe changes across the 4 seasons; 					

Strands		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
		<ul style="list-style-type: none"> observe and describe weather associated with the seasons and how day length varies. 					
	Light			<ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light; notice that light is reflected from surfaces; recognise that light from the sun can be dangerous and that there are ways to protect their eyes; recognise that shadows are formed when the light from a light source is blocked by an opaque object; find patterns in the way that the size of shadows change. 			<ul style="list-style-type: none"> recognise that light appears to travel in straight lines; use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye; explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes; use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
	Sound				<ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating; recognise that vibrations from sounds travel through a medium to the ear; find patterns between the pitch of a sound and features of the object that produced it; find patterns between the volume of a sound and the strength of the vibrations that produced it; recognise that sounds get fainter as the distance from the sound source increases. 		
	Earth and Space					<ul style="list-style-type: none"> describe the movement of the Earth and other planets relative to the sun in the solar system; 	

Strands		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
C H E M I S T R Y						<ul style="list-style-type: none"> describe the movement of the moon relative to the Earth; describe the sun, Earth and moon as approximately spherical bodies; use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. 	
	Materials	<ul style="list-style-type: none"> distinguish between an object and the material from which it is made; identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock; describe the simple physical properties of a variety of everyday materials; compare and group together a variety of everyday materials on the basis of their simple physical properties. 	<ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses; find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 			<ul style="list-style-type: none"> compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets; know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution; use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating; give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic; demonstrate that dissolving, mixing and changes of state are reversible changes; explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated 	

Strands		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6
						with burning and the action of acid on bicarbonate of soda.	
	Rocks			<ul style="list-style-type: none"> • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties; • describe in simple terms how fossils are formed when things that have lived are trapped within rock; • recognise that soils are made from rocks and organic matter. 			
	States of matter				<ul style="list-style-type: none"> • compare and group materials together, according to whether they are solids, liquids or gases; • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C); • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 		

Science Progression of Disciplinary Knowledge - being a scientist

Progression of disciplinary knowledge (skills) Being a scientist							
Strands	EYFS (NEEDS Reviewing)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Predict	Can I begin to say what I think may happen?	Can I say what I think may happen based on observations and life experience?		Can I use prior scientific knowledge to predict the outcomes of an investigation?		Can I use test results and previous science learning to make predictions for further investigations?	
Observe	Can I describe what I see, hear and feel whilst outside? Can I draw and make observations of the plants, animals and life cycles?	Can I observe closely using simple equipment and use my observations to suggest answers to questions?		Can I make systematic and careful observations?		Can I make decisions about what observations to make, how long to make them for and what type of equipment to use?	
Investigate	Can I be curious about the natural world around me?	Can I carry out simple comparative tests, selecting appropriate equipment with support?		Can I set up simple practical enquiries, comparative and fair tests?		Can I use test results to make predictions to set up further comparative and fair tests?	
Identify, classify and group	Can I draw and make observations of plants and animals?	Can I classify objects into groups and explain why?		Can I decide the criteria to group, sort and classify data in a variety of ways?		Can I decide the criteria to group, sort and classify data in appropriate ways whilst making more links?	
Measure and recording		Can I take measurements using non-standard and standard units? Can I record simple data, and talk about what I have found out and how I found it out.		Can I take accurate measurements using standard units and a range of equipment? Can I recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables		Can I take measurements with increasing accuracy and precision and take repeat readings where appropriate Can I record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	

Interpret and conclude	Can I describe and begin to explain what has happened?	Can I explain what has happened and suggest reasons why?	Can I use results to draw conclusions with some reasoning?	Can I use conclusions from a test to make predictions (eg. if a bulb is brighter with more batteries, what will happen to a buzzer with more batteries?)?
Evaluate	Can I make simple comments of experiences?	Can I use scientific vocabulary when making a conclusion about what we have found out?	Can I use technical vocabulary, make basic evaluations about my prediction (e.g. Was it reasonable?) and methodology? (e.g. Was it difficult to measure?)	Can I suggest improvements to methods, selecting by relevance and linking to my scientific knowledge? Can I show an awareness of scientific ethics and display a sensitivity when critiquing others?
Research	Can I explore the natural world around me? Can I use fiction and non-fiction books?	Can I start to select and use books, websites, photos and other sources to learn about science?	Can I independently select and use sources to construct my own opinions about science?	Can I select, organise and use relevant information from a range of sources to inform responses ? Can I justify my opinions using sources of evidence and point out the limitations of other people's ideas?