

Science Curriculum Progression Overview

Rationale	<ul style="list-style-type: none"> - Our Science curriculum is driven by our LEARN statement for our learners to achieve and succeed in science by providing engagement, ambition, relevance and nurture in our approach to this subject - to provide the foundations for understanding the world through the specific disciplines of biology, chemistry and physics - to build up a body of key foundational knowledge, concepts and vocabulary alongside strong enquiry skills - to value the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena
Approach	<ul style="list-style-type: none"> - to build understanding progressively through unit themes and science projects; - use relevant contexts, diverse scientists and role models to value the impact of scientific thinking to the world - promote understanding and accurate and precise use of vocabulary - highlight achievements of scientists and industry links to maximize pupils' engagement with and motivation to study science - embed 'working scientifically' and enquiry approaches and skills throughout the curriculum - make connections across learning and with the wider community e.g. apply their mathematical knowledge, geographical understanding, historical context
Working Scientifically	<p>'Working scientifically' is the ability to work and think like scientists in every science lesson. The enquiry approaches and skills of science for each year group below. These are taught in context of the unit or project content. Children learn to use a variety of enquiry approaches and skills to answer relevant scientific questions.</p>

Knowledge and Understanding by Theme

Science Projects	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	How do humans impact on the environment?	How long will our rubbish last?	How can we learn about space science through people and their discoveries?	How can we eat more sustainably? What can we do?	How do microbes effect our lives?	How can design in nature help us solve problems? What is biomimicry?	What is biodiversity? What are the biggest threats? What can we do?

	EYFS	Year 1	Year 2	Year 3	Year 5
Plants	<p>Know about similarities and differences in relation to places, objects, materials and living things.</p> <p>Make observations of animals and plants and explain why some things occur and talk about changes.</p> <p>Explores the natural world around him/her, making observations and drawing pictures of animals and plants. (Understanding of the World: The Natural World)</p> <p>Understands some important processes and changes in the natural world around him/her, including the seasons and changing states of matter. (Understanding of the World: The Natural World)</p> <p>(Spring 2 – Traditional Tales topic - plant growth & observations and recording, plant growth experiment, naming simple parts of the plants)</p>	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p>	<p><i>Identify and name a variety of plants and animals in their habitats, including micro-habitats.</i></p> <p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p> <p>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.</p> <p>Investigate the way in which water is transported within plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>	<p>Describe the life process of reproduction in some plants and animals.</p>

Animals	EYFS	Year 1	Year 2	Year 3	Year 5	Year 6
	<ul style="list-style-type: none"> • make observations of animals and plants and explain why some things occur and talk about changes <p>Explores the natural world around him/her, making observations and drawing pictures of animals and plants. (Understanding of the World: The Natural World)</p> <p>(Looking After our World – Summer 2 Learning about our habitat, damage to our world and how to look after the Earth/animals/plants).</p> <p>(Light and Dark– Autumn 2 – nocturnal/diurnal animals)</p>	<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, inc pets). 	<ul style="list-style-type: none"> • <i>Identify and name a variety of plants and animals in their habitats, including micro-habitats.</i> • 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). 	<ul style="list-style-type: none"> • <i>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.</i> 	<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 the ways in which nutrients and water are transported within animals, including humans.

Note: italics denotes content appearing in more than one unit

Humans	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<p>make observations of animals and plants and explain why some things occur and talk about changes.</p> <p>Explores the natural world around him/her, making observations and drawing pictures of animals and plants. (Understanding of the World: The Natural World)</p>	<p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p><i>Notice that animals, including humans, have offspring which grow into adults.</i></p> <p><i>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</i></p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p>	<p><i>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.</i></p> <p><i>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</i></p>	<p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions.</p>	<p>Describe the changes as humans develop to old age.</p>	<p>Identify and name the main parts of human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way bodies function.</p> <p><i>Describe the ways in which nutrients and water are transported within animals, including humans.</i></p>

Habitats	EYFS	Year 1	Year 2	Year 4	Year 5
	<ul style="list-style-type: none"> Talk about the features of their own immediate environment and how environments might vary from one another. Know that the environment and living things are influenced by human activity. <p>Knows some similarities and differences between the natural world around him/her and contrasting environments, drawing on his/her experiences and what has been read in class. (Understanding of the World: The Natural World)</p> <p>Describes his/her environment using knowledge from observation, discussion, stories, non-fiction texts and maps. (Understanding of the World: People, Cultures and Communities)</p> <p>(Looking After our World – Summer 2 Learning about our habitat, damage to our world and how to look after the Earth/animals/plants).</p>	<ul style="list-style-type: none"> Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. 	<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 micro-habitats. 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. Construct and interpret a variety of food chains, identifying producers, predators and prey. 	<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	EYFS	Year 2	Year 3	Year 4	Year 6
	<p>Talk about the features of their own immediate environment and how environments might vary from one another.</p> <p>Make observations of animals and plants and explain why some things occur and talk about changes.</p> <p>Knows some similarities and differences between things in the past and now, drawing on his/her experience and what has been read in class. (Understanding of the World: Past & Present)</p> <p>(Dinosaurs topic – Spring 1)</p>	<p>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.</p>	<p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p>	<p>Recognise that environments can change and that this can sometimes pose dangers to living things</p>	<p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p>

Materials and their properties	EYFS	Year 1	Year 2	Year 3	Year 5
	<p>Know the properties of some materials and can suggest some of the purposes they are used for</p> <p>know that the environment and living things are influenced by human activity e.g. impact of waste</p> <p>Understands some important processes and changes in the natural world around him/her, including the seasons and changing states of matter. (Understanding of</p>	<p>Distinguish between an object and the material from which it is made.</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p> <p>Describe the simple physical properties of a variety of everyday materials.</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p>	<p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</p> <p>Understand what is meant by raw and synthetic materials</p>	<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter.</p>	<p>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.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Understand about the sustainability of materials, raw and synthetic materials and the issues around use of natural resources</p>

Note: italics denotes content appearing in more than one unit

	<p>the World: The Natural World)</p> <p>(Understanding of the World – recycling – soring materials)</p> <p>Safely uses and explores a variety of materials, tools and techniques, experimenting with colour, design, texture and function.</p> <p>(Materials in collage, junk modelling etc.)</p>				
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Changing Materials	EYFS	Year 2	Year 4	Year 5
	<ul style="list-style-type: none"> Know the properties of some materials and can suggest some of the purposes they are used for. <p>Understands some important processes and changes in the natural world around him/her, including the seasons and changing states of matter. (Understanding of the World: The Natural World)</p> <p>(Expressive Art and Design: changes in cooking, clay modelling, junk modelling, manipulating materials e.g. collage)</p>	<ul style="list-style-type: none"> <i>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</i> 	<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. 	<ul style="list-style-type: none"> 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. 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 with burning and the action of acid on bicarbonate of soda.

Forces	EYFS	Year 2	Year 3	Year 5
	<ul style="list-style-type: none"> Make observations of explain why some things occur, and talk about changes <p>Explores and talks about different forces he/she can feel (not ELG – nursery objective)</p>	<ul style="list-style-type: none"> <i>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</i> 	<ul style="list-style-type: none"> Compare how things move on different surfaces. Notice that some forces need contact between two 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 two poles. Predict whether two 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.

Light	EYFS	Year 3	Year 6
	<ul style="list-style-type: none"> Looks closely at similarities, differences, patterns and change E.g. exploring light from different sources, exploring shadows e.g. using shadow puppets <p>Understands some important processes and changes in the natural world around him/her, including the seasons and changing states of matter. (Understanding of the World: The Natural World)</p> <p>(Light and Dark topic – Autumn 2 – making shadows, day/night)</p>	<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.

Earth and Space	EYFS	Year 1	Year 5
	<ul style="list-style-type: none"> Talk about the features of their own immediate environment and how environments might vary from one another. Being to understand significance and difference between seasons and months <p>Knows some similarities and differences between the natural world around him/her and contrasting environments, drawing on his/her experiences and what has been read in class.</p>	<ul style="list-style-type: none"> Observe changes across the four seasons. <i>Observe and describe weather associated with the seasons and how day length varies</i> 	<ul style="list-style-type: none"> Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. 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.

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	(Understanding of the World: The Natural World) (Light and Dark – Autumn 2 – planets in our solar system, seasons)		
Electricity	Year 4		Year 6
	<ul style="list-style-type: none"> Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. 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. 		<ul style="list-style-type: none"> Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. 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.
Sound	EYFS	Year 1	Year 4
	<ul style="list-style-type: none"> Looks closely at similarities, differences, patterns and change e.g. exploring sounds made by different instruments <p>Performs songs, rhymes, poems and stories with others, and – when appropriate – tries to move in time to music. (Expressive Art and Design: Being Imaginative & Expressive)</p> <p>(Expressive Art and Design – exploring the sounds of different instruments, changes in pitch, rhythm, volume and speed)</p>	<ul style="list-style-type: none"> <i>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</i> 	<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.

Scientific Enquiry

Approach	Enquiry and knowledge and understanding are explicitly referenced in lessons. We teach the use of 8 types of enquiry and the enquiry skills to ensure children understand all that is involved in the scientific process..			
	Scientific Enquiry Type <ul style="list-style-type: none"> Identifying, grouping and classifying things (noticing similarities and differences) Observing changes over time Observing closely Noticing patterns (can be simple tests in KS1) Researching (finding things out using secondary sources of information) Modelling Comparative testing (can be simple tests in KS1) Fair testing 	Enquiry Skills <ul style="list-style-type: none"> Ask questions Make predictions Decide how to carry out an enquiry Collect information - <i>measure, observe, research</i> Record Analyse - <i>compare, classify, make conclusions, evaluate</i> Communicate scientifically Understand the science community – now and in the past 		
Scientific Enquiry Skill Progression				
	EYFS	KS1	Lower KS2	Upper KS2
Asking Questions	Answer 'how' and 'why' questions Begin to use 'why' questions <i>Makes comments about what he/she has heard and asks questions to clarify his/her understanding. (Communication & Language: Listening, Attention and Understanding)</i>	Ask simple questions about what they notice. Recognise that these questions can be answered in different ways	Ask relevant questions about what has been observed.	Use science experiences to explore ideas and raise different kinds of questions about scientific phenomena.
Making Predictions	Use past, present and future forms accurately when talking about events that are to happen in the future. Answer 'how' and 'why' questions <i>Anticipates, where appropriate, key events in stories. (Literacy: Comprehension)</i> <i>Offers explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction books rhymes and poems when appropriate. (Communication & Language: Speaking)</i>	<ul style="list-style-type: none"> Make simple predictions with support. With guidance, notice patterns and relationships between two different things. 	<ul style="list-style-type: none"> Use previous knowledge to predict what might happen. 	<ul style="list-style-type: none"> Use more abstract ideas and identify scientific evidence to help them understand and predict how the world operates.
Deciding how to carry out an enquiry	<ul style="list-style-type: none"> Begin to use 'why' questions (CLL – U – ELG) 	<ul style="list-style-type: none"> Suggest ways to answer a question. Carry out simple tests to see if suspected patterns and relationships between two different things are true. 	<ul style="list-style-type: none"> Make decisions about which types of scientific enquiry are likely to be the best way of answering a question. Are guided in their use of controlling variables. Suggest what observations to make, how long to make them for, and what equipment to use when planning an investigation. 	<ul style="list-style-type: none"> Select and plan the most appropriate type of enquiry to answer questions. Set up tests explaining which variables need to be controlled and why. Decide what observations or measurements to make, how long to make them for, what equipment to use, and whether to repeat them.
Collect Information <i>take measurements, make observations research</i>	<ul style="list-style-type: none"> Estimate, measure, weigh and compare and order objects and talk about properties, position and time. (M – SSM – ELG). Make observations of animals and plants (UTW ELG). Look at books and the internet to find things out (L-Reading). <i>Explores the natural world around him/her, making observations and drawing pictures of animals and plants.</i>	<ul style="list-style-type: none"> Use simple measurements and equipment (for example egg timers) to gather data. Observe the naturally and humanly-constructed world closely, using simple equipment (e.g. magnifying glasses). Use simple secondary sources to find answers. 	<ul style="list-style-type: none"> Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including microscopes, thermometers and data loggers. Choose suitable secondary sources to find answers to questions. 	<ul style="list-style-type: none"> Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using an increasing range of equipment. Repeat where necessary and explain how to use equipment accurately. Recognise which secondary sources will be most useful to research ideas and begin to separate opinion from fact.
Record	<ul style="list-style-type: none"> Record information collected in a variety of ways including photos, drawings, notes. <i>Explores the natural world around him/her, making observations and drawing pictures of animals and plants.</i>	<ul style="list-style-type: none"> Record information collected Use simple tables, make tally, pictograms, take photos, make observations. 	<ul style="list-style-type: none"> Collect data from own observations and measurements, using notes, simple tables, standard units Make decisions about how to record and analyse this data. Use simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. 	<ul style="list-style-type: none"> Decide how to record data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs.
Analyse <i>compare classify draw conclusions evaluate</i>	<ul style="list-style-type: none"> Talk about similarities and differences in relation to places, objects, materials and living things (UTW ELG). Answer 'how' and 'why' questions about their experiences and in response to stories or events (CLL – U – ELG). Explain why some things occur (CLL – U – EXC). Know that the environment and living things are influenced by human activity (UTW – EXC). Talk about things have changed (UTW ELG). <i>Can compare length, weight and capacity. (Mathematics: Numerical Patterns – nursery objective)</i> <i>Shares his/her creations, explaining the process he/she has used.</i>	<ul style="list-style-type: none"> Use previous knowledge and simple features to compare, based upon a question. With help, decide how to sort and group based on simple features. Use observations and ideas to suggest answers to questions. With help, talk about how things have changed over time. Say if an enquiry went well and begin to offer suggestions for improvements if not. 	<ul style="list-style-type: none"> Use previous knowledge and known features to compare. Group, sort and classify using these comparisons. Use simple keys. Use changes, patterns, similarities, and differences in data in order to draw simple conclusions, answer questions, and make predictions for new values within or beyond the data collected. Use results to suggest improvements and raise further questions. 	<ul style="list-style-type: none"> Use and develop keys and other information records of own choice to identify, classify and describe living things and materials. Draw conclusions and make predictions based on different causal relationships in data and observations, use evidence to justify ideas, and use scientific knowledge and understanding to explain findings. Systematically analyse functions, relationships and interactions. Use results to identify when further tests and observations might be needed.

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	<p>(Expressive Art & Design: Creating with Materials)</p> <p>They can talk about features of their own and others' work, recognising the differences between them and the strengths of others (Expressive Art & Design: Creating with Materials)</p>			
<p>Use scientific vocabulary</p> <p>including when modelling</p>	<ul style="list-style-type: none"> Express themselves effectively, showing awareness of listeners' needs. Use a range of vocabulary to add information, express ideas or to explain or justify actions or events (Make models of objects and living things (EAD – ELG). <p>Uses and understands recently introduced vocabulary during discussions about stories, non-fiction, rhymes and poems and during role play.</p>	<ul style="list-style-type: none"> Use simple scientific language to talk about what has been found. Communicate ideas to a range of audiences in a variety of ways. Create models that show scientific ideas and support explanations or observations. 	<ul style="list-style-type: none"> Use relevant scientific language to discuss ideas and communicate findings in ways that are appropriate for different audiences. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Create models that help explain scientific ideas. 	<ul style="list-style-type: none"> Use relevant scientific language and illustrations to discuss, communicate and justify scientific ideas. Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Create models and use analogies to help explain scientific processes, concepts or observations
<p>Explore the science community</p>	<ul style="list-style-type: none"> Talk about jobs and what skills are needed to do them Understand the importance of working collaboratively <p>Talks about the lives of the people around him/her and their roles in society.</p>	<ul style="list-style-type: none"> Become aware of the ways in which science and technology influence our lives Recognise some scientists and say what they are famous for. 	<ul style="list-style-type: none"> Be aware of the specific contributions of science in industry and every day life Talk about a range of scientists and explain their main ideas. 	<ul style="list-style-type: none"> Be aware of the contributions of science in industry and every day life including the future of science Talk about a range of scientists, their main ideas and the context of their work and achievements Talk about how scientific ideas have changed and developed over time.