

# Science Curriculum Progression Overview

<b>Rationale</b>	<ul style="list-style-type: none"> <li>- provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics</li> <li>- all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science</li> <li>- building up a body of key foundational knowledge and concepts</li> <li>- recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena</li> <li>- understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes</li> </ul>				
<b>Approach</b>	<ul style="list-style-type: none"> <li>- describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely</li> <li>- build up an extended specialist vocabulary</li> <li>- apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data</li> <li>- use different contexts to maximise pupils' engagement with and motivation to study science</li> <li>- embed 'working scientifically' within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions</li> </ul>				
<b>Working Scientifically</b>	<p>'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand so that pupils learn to use a variety of approaches to answer relevant scientific questions. The types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. Pupils should show their understanding of scientific ideas through modelling and observing closely. 'Working scientifically' will be developed further at key stages 3 and 4 once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.</p>				
<b>EYFS</b>	<p>Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.</p>				
<b>Theme</b>	<b>Plants</b>				
<i>Italics show objectives covered under more than one theme.</i>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 5</b>	
	<ul style="list-style-type: none"> <li>• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</li> <li>• Identify and describe the basic structure of a variety of common flowering plants, including trees.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Identify and name a variety of plants and animals in their habitats, including micro-habitats.</i></li> <li>• Observe and describe how seeds and bulbs grow into mature plants.</li> <li>• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</li> <li>• 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.</li> <li>• Investigate the way in which water is transported within plants.</li> <li>• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Describe the life process of reproduction in some plants and animals.</i></li> </ul>	
<b>Theme</b>	<b>Animals</b>				
<i>Italics show objectives covered under more than one theme.</i>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 5</b>	<b>Year 6</b>
	<ul style="list-style-type: none"> <li>• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</li> <li>• Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</li> <li>• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Identify and name a variety of plants and animals in their habitats, including micro-habitats.</i></li> <li>• Notice that animals, including humans, have offspring which grow into adults.</li> <li>• Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</li> </ul>	<ul style="list-style-type: none"> <li>• <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></li> </ul>	<ul style="list-style-type: none"> <li>• Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</li> <li>• Describe the life process of reproduction in some plants and animals.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Describe the ways in which nutrients and water are transported within animals, including humans.</i></li> </ul>

Theme	Habitats					
<i>Italics show objectives covered under more than one theme.</i>	Year 1	Year 2	Year 4	Year 5		
	<ul style="list-style-type: none"> <li>Observe changes across the four seasons.</li> <li>Observe and describe weather associated with the seasons and how day length varies.</li> </ul>	<ul style="list-style-type: none"> <li>Explore and compare the differences between things that are living, dead, and things that have never been alive.</li> <li>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.</li> <li>Identify and name a variety of plants and animals in their habitats, including micro-habitats.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that living things can be grouped in a variety of ways.</li> <li>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> <li>Recognise that environments can change and that this can sometimes pose dangers to living thing.</li> <li>Construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>		
Theme	Evolution					
<i>Italics show objectives covered under more than one theme.</i>	Year 2	Year 3	Year 4	Year 6		
	<ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that environments can change and that this can sometimes pose dangers to living thing.</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</li> <li>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> <li>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</li> </ul>		
Theme	Humans					
<i>Italics show objectives covered under more than one theme.</i>	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	<ul style="list-style-type: none"> <li>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</li> </ul>	<ul style="list-style-type: none"> <li>Notice that animals, including humans, have offspring which grow into adults.</li> <li>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</li> <li>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the simple functions of the basic parts of the digestive system in humans.</li> <li>Identify the different types of teeth in humans and their simple functions.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the changes as humans develop to old age.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>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.</li> </ul>

Theme	Materials and their properties			
<i>Italics show objectives covered under more than one theme.</i>	Year 1	Year 2	Year 3	Year 5
	<ul style="list-style-type: none"> <li>Distinguish between an object and the material from which it is made.</li> <li>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</li> <li>Describe the simple physical properties of a variety of everyday materials.</li> <li>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</li> </ul>	<ul style="list-style-type: none"> <li>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</li> <li><i>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</i></li> <li>Recognise that soils are made from rocks and organic matter.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</li> </ul>
Theme	Changing Materials			
<i>Italics show objectives covered under more than one theme.</i>	Year 2	Year 4	Year 5	
	<ul style="list-style-type: none"> <li><i>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</i></li> </ul>	<ul style="list-style-type: none"> <li>Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>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).</li> <li>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>	<ul style="list-style-type: none"> <li>Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.</li> <li>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>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.</li> </ul>	
Theme	Forces			
<i>Italics show objectives covered under more than one theme.</i>	Year 2	Year 3	Year 5	
	<ul style="list-style-type: none"> <li><i>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</i></li> </ul>	<ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> <li>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</li> <li>Observe how magnets attract or repel each other and attract some materials and not others.</li> <li>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.</li> <li>Describe magnets as having two poles.</li> <li>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul>	<ul style="list-style-type: none"> <li>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> <li>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</li> <li>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li> </ul>	

Theme	Light		
<i>Italics show objectives covered under more than one theme.</i>	Year 1	Year 3	Year 6
	<ul style="list-style-type: none"> <li>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that they need light in order to see things and that dark is the absence of light.</li> <li>Notice that light is reflected from surfaces.</li> <li>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</li> <li>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</li> <li>Find patterns in the way that the size of shadows change.</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that light appears to travel in straight lines.</li> <li>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.</li> <li>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.</li> <li>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul>
Theme	Earth and Space		
<i>Italics show objectives covered under more than one theme.</i>	Year 1	Year 5	
	<ul style="list-style-type: none"> <li>Observe changes across the four seasons.</li> <li>Observe and describe weather associated with the seasons and how day length varies.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</li> <li>Describe the movement of the Moon relative to the Earth.</li> <li>Describe the Sun, Earth and Moon as approximately spherical bodies.</li> <li>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul>	
Theme	Electricity		
<i>Italics show objectives covered under more than one theme.</i>	Year 4	Year 6	
	<ul style="list-style-type: none"> <li>Identify common appliances that run on electricity.</li> <li>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>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.</li> <li>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>Recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul>	<ul style="list-style-type: none"> <li>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>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.</li> <li>Use recognised symbols when representing a simple circuit in a diagram.</li> </ul>	
Theme	Sound		
<i>Italics show objectives covered under more than one theme.</i>	Year 1	Year 4	
	<ul style="list-style-type: none"> <li>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</li> </ul>	<ul style="list-style-type: none"> <li>Identify how sounds are made, associating some of them with something vibrating.</li> <li>Recognise that vibrations from sounds travel through a medium to the ear.</li> <li>Find patterns between the pitch of a sound and features of the object that produced it.</li> <li>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</li> <li>Recognise that sounds get fainter as the distance from the sound source increases.</li> </ul>	

# Scientific Enquiry

## Scientific Enquiry

At Quality First Education Trust, we use 8 types of enquiry. Modelling and Observing closely have been added to support children's understanding of scientific ideas. We also recognise the need to build those skills required for scientific enquiry. The progression across these areas are shown in the table below. Children are expected to meet the statements by the end of each phase.

## Approach

### Scientific Enquiry Type

- Identifying, grouping and classifying things (noticing similarities and differences)
- Observing changes over time
- Noticing patterns (can be simple tests in KS1)
- Comparative testing (can be simple tests in KS1)
- Fair testing
- Finding things out using secondary sources of information (researching)
- Modelling
- Observing closely

### Scientific Enquiry Skill

- Asking questions
- Making predictions
- Deciding how to carry out an enquiry
- Collecting information
- Recording
- Analysing
- Communicating scientifically
- Understanding of the science community

## Asking Questions

### EYFS

- Answer 'how' and 'why' questions (CLL – U – ELG).
- Begin to use 'why' questions (CLL – U – ELG).

### KS1

- Ask simple questions about what they notice.
- Recognise that these questions can be answered in different ways.

### Lower KS2

- Ask relevant questions about what has been observed.

### Upper KS2

- Use science experiences to explore ideas and raise different kinds of questions about scientific phenomena.

## Making Predictions

### EYFS

- Use past, present and future forms accurately when talking about events that are to happen in the future. (CLL – S – ELG).
- Answer 'how' and 'why' questions (CLL – U – ELG).
- Begin to use 'why' questions (CLL – U – ELG).

### KS1

- Make simple predictions with support.
- With guidance, notice patterns and relationships between two different things.

### Lower KS2

- Use previous knowledge to predict what might happen.

### Upper KS2

- 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

### EYFS

- Suggest ways to answer a question.
- Carry out simple tests to see if suspected patterns and relationships between two different things are true.

### KS1

- 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.

### Lower KS2

### Upper KS2

- 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.

Collecting Information (taking measurements, making observations, researching)				
	EYFS	KS1	Lower KS2	Upper KS2
	<ul style="list-style-type: none"> <li>Estimate, measure, weigh and compare and order objects and talk about properties, position and time. (M – SSM – ELG).</li> <li>Make observations of animals and plants (UTW ELG).</li> <li>Look at books and the internet to find things out (L-Reading).</li> </ul>	<ul style="list-style-type: none"> <li>Use simple measurements and equipment (for example egg timers) to gather data.</li> <li>Observe the naturally and humanly-constructed world closely, using simple equipment (e.g. magnifying glasses).</li> <li>Use simple secondary sources to find answers.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Choose suitable secondary sources to find answers to questions.</li> </ul>	<ul style="list-style-type: none"> <li>Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using an increasing range of equipment.</li> <li>Repeat where necessary and explain how to use equipment accurately.</li> <li>Recognise which secondary sources will be most useful to research ideas and begin to separate opinion from fact.</li> </ul>
Recording				
	EYFS	KS1	Lower KS2	Upper KS2
	<ul style="list-style-type: none"> <li>Record information collected.</li> </ul>	<ul style="list-style-type: none"> <li>Record information collected.</li> </ul>	<ul style="list-style-type: none"> <li>Collect data from own observations and measurements, using notes, simple tables and standard units</li> <li>Make decisions about how to record and analyse this data.</li> <li>Use simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</li> </ul>	<ul style="list-style-type: none"> <li>Decide how to record data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs.</li> </ul>
Analysing (comparing and classifying, answering questions, drawing conclusions, evaluating work)				
	EYFS	KS1	Lower KS2	Upper KS2
	<ul style="list-style-type: none"> <li>Talk about similarities and differences in relation to places, objects, materials and living things (UTW ELG).</li> <li>Answer 'how' and 'why' questions about their experiences and in response to stories or events (CLL – U – ELG).</li> <li>Explain why some things occur (CLL – U – EXC).</li> <li>Know that the environment and living things are influenced by human activity (UTW – EXC).</li> <li>Talk about things have changed (UTW ELG).</li> </ul>	<ul style="list-style-type: none"> <li>Use previous knowledge and simple features to compare, based upon a question. This can be for objects, materials and living things.</li> <li>With help, decide how to sort and group based on simple features.</li> <li>Use observations and ideas to suggest answers to questions.</li> <li>With help, talk about how things have changed over time.</li> <li>Say if an enquiry went well and begin to offer suggestions for improvements if not.</li> </ul>	<ul style="list-style-type: none"> <li>Use previous knowledge and known features to compare.</li> <li>Group, sort and classify using these comparisons.</li> <li>Use simple keys.</li> <li>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.</li> <li>Use results to suggest improvements and raise further questions.</li> </ul>	<ul style="list-style-type: none"> <li>Use and develop keys and other information records of own choice to identify, classify and describe living things and materials.</li> <li>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.</li> <li>Systematically analyse functions, relationships and interactions.</li> <li>Use results to identify when further tests and observations might be needed.</li> </ul>

Communicating scientifically (including modelling)				
	EYFS	KS1	Lower KS2	Upper KS2
	<ul style="list-style-type: none"> <li>Express themselves effectively, showing awareness of listeners' needs. Use past, present and future forms accurately when talking about events that have happened or are to happen in the future (CLL – S – ELG).</li> <li>Use a range of vocabulary to add information, express ideas or to explain or justify actions or events (CLL – S – EXC).</li> <li>Make models of objects and living things (EAD – ELG).</li> </ul>	<ul style="list-style-type: none"> <li>Use simple scientific language to talk about what has been found.</li> <li>Communicate ideas to a range of audiences in a variety of ways.</li> <li>Create models that show scientific ideas and support explanations or observations.</li> </ul>	<ul style="list-style-type: none"> <li>Use relevant scientific language to discuss ideas and communicate findings in ways that are appropriate for different audiences.</li> <li>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</li> <li>Create models that help explain scientific ideas.</li> </ul>	<ul style="list-style-type: none"> <li>Use relevant scientific language and illustrations to discuss, communicate and justify scientific ideas.</li> <li>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.</li> <li>Create models and use analogies to help explain scientific processes, concepts or observations</li> </ul>

Understanding of the science community				
	EYFS	KS1	Lower KS2	Upper KS2
		<ul style="list-style-type: none"> <li>Recognise some scientists and say what they are famous for.</li> </ul>	<ul style="list-style-type: none"> <li>Talk about a range of scientists and explain their main ideas.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to build on knowledge of the scientific community.</li> <li>Talk about how scientific ideas have changed and developed over time.</li> </ul>