

Science Progression Document Scientific Enquiry

Nursery- Year 6

Early Learning Goals	<p>3 - 4 year olds (Nursery) will be learning to:</p> <ul style="list-style-type: none">- Use all their senses in hands-on exploration of natural materials.- Explore collections of materials with similar and/or different properties.- Talk about what they see, using a wide vocabulary.- Plant seeds and care for growing plants.- Understand the key features of the life cycle of a plant and an animal.- Begin to understand the need to respect and care for the natural environment and all living things. <p>Children in Reception will be learning to:</p> <ul style="list-style-type: none">- Explore the natural world around them.- Describe what they see, hear and feel whilst outside.- Recognise some environments that are different to the one in which they live.- Understand the effect of changing seasons on the natural world around them. <p>Children at the expected level of development at the end of Reception year will:</p> <ul style="list-style-type: none">- Explore the natural world around them, making observations and drawing pictures of animals and plants.- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.
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Scientific Enquiry Progression Map

Key Stage 1	The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.
Lower Key Stage 2	The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.
Upper Key Stage 2	The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

Scientific Enquiry Progression Map

Asking questions and recognising that they can be answered in different ways			
EYFS	KS1	LKS2	UKS2
<p>Can asks questions to clarify understanding and aspects of their familiar world e.g. place they live or natural world.</p> <p>The children shows curiosity about objects, events and people. They questions why things happen.</p>	<p>Can ask simple questions and recognising that they can be answered in different ways:</p> <p>While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions.</p> <p>The children answer questions developed with the teacher often through a scenario.</p> <p>The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.</p>	<p>Can ask relevant questions and using different types of scientific enquiries to answer them:</p> <p>The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions.</p> <p>The children answer questions posed by the teacher. (Light- Cycle A)</p> <p>Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.</p>	<p>Can planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary:</p> <p>Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry.</p> <p>Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.</p>
<p>★ I can ask questions about my familiar world.</p>	<p>★ I can ask questions about the world.</p> <p>★ I am recognise that questions can be answered in different ways.</p>	<p>★ I can ask <i>relevant</i> questions about the world.</p> <p>★ I can recognise that questions can be answered in different ways using the different types of Scientific Enquiry.</p>	<p>★ I can plan different types of scientific enquiry to answer questions.</p> <p>★ I can recognise and control variables where necessary.</p> <p>★ I can identify useful secondary sources to answer questions when practical enquires cannot be used.</p>

Making observations and taking measurements			
EYFS	KS1	LKS2	UKS2
<p>Can explore the natural world making observations (e.g seasons).</p> <p>The children explore different equipment and finding out what its uses are. The know similarities and differences between the natural world around them. They observe and describe what they see using everyday language.</p>	<p>Can observing closely, using simple Equipment:</p> <p>Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.</p> <p>They begin to take measurements, initially by comparisons, then using non-standard units.</p>	<p>Can making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers: (Rocks Cycle A)</p> <p>The children make systematic and careful observations. (Cycle A)</p> <p>They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. (Cycle A- Light)</p>	<p>Can take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate:</p> <p>The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale.</p> <p>During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).</p>
<ul style="list-style-type: none"> ★ I can find out the different uses for the equipment that I am using. ★ I can describe what I see using everyday language. 	<ul style="list-style-type: none"> ★ I can observe closely using simple equipment. ★ I can notice patterns and relationships (e.g. biggest to smallest). 	<ul style="list-style-type: none"> ★ I can make systematic and careful observations ★ I can take accurate measurements using standard units and a range of equipment 	<ul style="list-style-type: none"> ★ I can take measurements, using a range of scientific equipment, with accuracy and precision ★ I can make decisions on which observations or measurements to take. ★ I can repeat measurements when appropriate.

Scientific Enquiry Progression Map

Engaging in practical enquiry to answer questions			
EYFS	KS1	LKS2	UKS2
<p>Can find ways to solve problems/find new ways to do things.</p> <p>The children can test out ideas. The children can take risks through trial and error. The children engage in open ended activities. They can choose the resources they need for their chosen activity from their environment.</p>	<p>Performing simple tests: The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.</p> <p>Identifying and classifying: Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.</p> <p>They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.</p>	<p>Setting up simple practical enquiries, comparative and fair tests:</p> <p>The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.</p> <p>They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.</p> <p>Cycle A- Animals including humans, light and rocks.</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary:</p> <p>The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.</p>
<ul style="list-style-type: none"> ★ I can choose the correct equipment that I need. ★ I can test out ideas. ★ I can find ways to solve simple problems. 	<ul style="list-style-type: none"> ★ I can discuss my ideas about how to find things out ★ I can independently perform simple tests . 	<ul style="list-style-type: none"> ★ I can set up simple practical enquiries, comparative and fair tests ★ I can perform these enquiries and tests 	<ul style="list-style-type: none"> ★ I can recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. ★ I can suggest improvements to my method and give reasons.

Scientific Enquiry Progression Map

Recording and presenting evidence			
EYFS	KS1	LKS2	UKS2
<p>Can draw pictures of animals and plants.</p> <p>The children can draw pictures of objects in their own environment. The can take photos of things of interest to them. The can count results. They can start to mark make to record results. They can order items. The children can sort in more than 2 groups using familiar categories. The can create a class chart using pictures and objects.</p>	<p>Can gather and record data to help in answering questions:</p> <p>The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.</p> <p>They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs.</p> <p>They classify using simple prepared tables and sorting rings.</p>	<p>Can gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables: (Cycle A- Force and magnets (bar chart))</p> <p>The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.</p> <p>Children are supported to present the same data in different ways in order to help with answering the question.</p>	<p>Can recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs:</p> <p>The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.</p> <p>Children present the same data in different ways in order to help with answering the question.</p>
<ul style="list-style-type: none"> ★ I can draw pictures of animals and plants. ★ I can count results. ★ I can make a class chart using pictures and objects. 	<ul style="list-style-type: none"> ★ I can gather and record data (prepared tables, tallys, block graphs and pictograms) ★ I can use my observations to help me answer questions. 	<ul style="list-style-type: none"> ★ I can gather, record, classify and present data in a variety of ways to answer questions (diagrams, keys, bar charts and tables) ★ I can decide how best to record my findings using simple scientific language 	<ul style="list-style-type: none"> ★ I can record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar, scatter and line graphs. ★ I can decide how to record data from a choice of familiar approaches.

Scientific Enquiry Progression Map

Answering questions and concluding			
EYFS	KS1	LKS2	UKS2
<p>Can offer explanations for why things happen- making use of some recently introduced scientific vocabulary.</p> <p>Can express their ideas and feeling about their experiences.</p> <p>The children can develop own narrative and explain by connecting ideas or events. They develop vocabulary which meets the breadth of their experiences. They can describe what they see, hear and feel whilst outside.</p>	<p>Can use their observations and ideas to suggest answers to questions:</p> <p>Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.</p>	<p>Can use straight forward scientific evidence to answer questions or to support their findings:</p> <p>Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence. (Cycle A- Summer- Plants)</p>	<p>Can identify scientific evidence that has been used to support or refute ideas or arguments:</p> <p>Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.</p> <p>They talk about how their scientific ideas change due to new evidence that they have gathered.</p> <p>They talk about how new discoveries change scientific understanding.</p>
	<p>Can use their observations and ideas to suggest answers to questions:</p> <p>The children recognise 'biggest and smallest', 'best and worst' etc. from their data.</p>	<p>Can identify differences, similarities or changes related to simple scientific ideas and processes:</p> <p>Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p>	<p>Can report and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations:</p> <p>In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.</p>

Scientific Enquiry Progression Map

		They draw conclusions based on their evidence and current subject knowledge.	
<ul style="list-style-type: none"> ★ I can say why things happened in my experiment. ★ I can use some scientific words when answering simple questions. 	<ul style="list-style-type: none"> ★ I am beginning to answer questions in different ways. 	<ul style="list-style-type: none"> ★ I can use my results and subject knowledge to explain my finding and draw simple conclusions. ★ I can use scientific evidence from my enquiry to answer questions. ★ I am beginning to discuss my results in relation to my prediction. 	<ul style="list-style-type: none"> ★ I can report and presenting findings from enquiries, including conclusions, causal relationships and explanations of results. ★ I can choose how best to present data to help answer a question. ★ I can identify scientific evidence that has been used to report or refute ideas and arguments.

Scientific Enquiry Progression Map

Evaluating and raising further questions and predictions			
EYFS	KS1	LKS2	UKS2
		<p>Can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions:</p> <p>They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.</p>	<p>Can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations:</p> <p>They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.</p> <p>They identify any limitations that reduce the trust they have in their data.</p>
<p>★ I can say how I feel about what has happened.</p>	<p>★ I am beginning to say what I would change about my investigation.</p> <p>★ I am beginning to discuss my results in relation to my prediction.</p>	<p>★ I am beginning to say what I would change about my investigation to improve it.</p> <p>★ I can pose further questions from my investigation.</p>	<p>★ I can evaluate my choice of method, variables and precision and accuracy of measurements.</p> <p>★ I can look for different causal relationships in my data.</p>
<p><i>*Children in KS1 and foundation are not expected to make predictions as they do not have enough subject knowledge to do this. You can still question what they think may happen and they may use experience or a guess to have an answer.</i></p>		<p>Can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions:</p> <p>Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface.</p> <p>Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.</p>	<p>Use test results to make predictions to set up further comparative and fair tests:</p> <p>Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.</p>

Scientific Enquiry Progression Map

<ul style="list-style-type: none">★ I am beginning to say what I think will happen in me experiment.	<ul style="list-style-type: none">★ I am beginning to make predictions based on my own ideas and observations.	<ul style="list-style-type: none">★ I can identify new questions arising from the data★ I can make new predictions based on my results	<ul style="list-style-type: none">★ I can use test results to make predictions to set up further comparatives and fair tests.★ I can use my results to identify when further tests and observations are needed.
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Scientific Enquiry Progression Map

Communicating their findings

EYFS	KS1	LKS2	UKS2
		<p>Can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions:</p> <p>They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary. (Cycle A)</p>	<p>Can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p>They communicate their findings to an audience using relevant scientific language and illustrations.</p>
			<p><i>*See previous star bullet points and they cover these skills.</i></p>