

# SCIENCE

## CURRICULUM OVERVIEW



# Science Curriculum Overview

	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Autumn 1</b>	Using our senses to explore similarities and differences in materials / Autumn time – Naming features	Explore light and dark (Shadows) Noticing seasonal changes	Animals including Humans	Everyday Materials	Rocks	Sound	Properties and Changes of Materials	Light
<b>Autumn 2</b>	Explore how things work Exploring textures - wet and dry porridge (Goldilocks)	Exploring natural and man-made materials Making predictions (Disappearing Gingerbread Men)				Animals including Humans	Earth and Space	Animals including Humans
<b>Spring 1</b>	Wintertime - Exploring ice / melting and freezing / Caring for the environment and living things	Wintertime - Exploring ice / melting and freezing, then contrasting environments	Everyday Materials		Light	Electricity		Living Things and Habitats
<b>Spring 2</b>	Springtime – Growing (our timeline) / Planting seeds (lifecycle)	Springtime – Lifecycles Growth (planting seeds – gardening diary)		Animals including Humans	Forces and Magnets		Forces	Evolution and Inheritance
<b>Summer 1</b>	Naming and sorting animals / Life cycle of animals	Floating and sinking Exploring ramps	Plants	Plants	Plants	States of Matter	Living Things and Habitats	
<b>Summer 2</b>	Summertime – Effects of the weather / What do we wear in the seasons?	Growing diary – making observations and drawing plants Recycling		Living Things and Habitats	Animals including Humans	Living Things and Habitats	Animals including Humans	Electricity

**SC1 – Scientific Questions – Children will learn the methods used by scientists to ask and answer scientific questions**

- Using models and sources to make observations
- Making observations over time
- Identifying, classifying and grouping
- Making scientific predictions and hypotheses
- Pattern seeking
- Comparative and fair testing
- Independent and dependent variables

**SC3 – Scientific Data – Children will learn how to use, gather, process and present data so that they can draw scientific conclusions**

- Looking for correlations and relationships
- Use tables and graphs to allow analysis of results
- Create tables and graphs
- Communicate results verbally and in writing

**SC2 – Scientific Apparatus and Techniques – Children will learn how to carry out scientific procedures and protocols safely and make good choices about equipment and techniques.**

- Correct use of scientific apparatus e.g. reading on a scale on a conical flask for accuracy
- Choosing appropriate apparatus
- Accurate measurement and impact of inaccuracy
- Recording of data
- Scientific error and how to reduce this

**SC4 – Scientific Evidence – Children will learn how science uses evidence to develop explanations**

- Know how evidence is used alongside substantive knowledge to draw conclusions
- Researching using secondary sources
- Draw own conclusions
- Write own explanations about scientific learning, basing them on more than one point of evidence
- Learn how scientific laws, models and theories develop over time.

# Working Scientifically Skills Progression

	Scientific Questions – Children will learn the methods used by scientists to ask and answer scientific questions		Engaging in practical enquiry to answer questions
Year 1 & 2	<p><b>Asking simple questions and recognising that they can be answered in different ways</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• The children answer questions developed with the teacher often through a scenario.</li> <li>• 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.</li> </ul>	Year 1 & 2	<p><b>Performing simple tests</b></p> <ul style="list-style-type: none"> <li>• 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.</li> </ul> <p>Identifying and classifying</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.</li> </ul>
Year 3 & 4	<p><b>Asking relevant questions and using different types of scientific enquiries to answer them</b></p> <ul style="list-style-type: none"> <li>• The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions.</li> <li>• The children answer questions posed by the teacher.</li> <li>• 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.</li> </ul>	Year 3 & 4	<p><b>Setting up simple practical enquiries, comparative and fair tests</b></p> <ul style="list-style-type: none"> <li>• The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.</li> <li>• They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.</li> </ul> <p>Explanatory note - A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.</p>
Year 5 & 6	<p><b>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>	Year 5 & 6	<p><b>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</b></p> <ul style="list-style-type: none"> <li>• 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.</li> </ul>

	Making observations and taking measurements	
Year 1 & 2	<p><b>Observing closely, using simple equipment</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• They begin to take measurements, initially by comparisons, then using non-standard units.</li> </ul>	
Year 3 & 4	<p><b>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</b></p> <ul style="list-style-type: none"> <li>• The children make systematic and careful observations.</li> <li>• They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.</li> </ul>	
Year 5 & 6	<p><b>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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).</li> </ul>	

# Working Scientifically Skills Progression

Engaging in practical enquiry to answer questions		Scientific Data – Children will learn how to use, gather, process and present data so that they can draw scientific conclusions	
Year 1 & 2	<p><b>Performing simple tests</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p>Identifying and classifying</p> <ul style="list-style-type: none"> <li>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.</li> <li>They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.</li> </ul>	Year 1 & 2	<p><b>Gathering and recording data to help in answering questions</b></p> <ul style="list-style-type: none"> <li>The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.</li> <li>They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs.</li> <li>They classify using simple prepared tables and sorting rings.</li> </ul>
Year 3 & 4	<p><b>Setting up simple practical enquiries, comparative and fair tests</b></p> <ul style="list-style-type: none"> <li>The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.</li> <li>They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.</li> </ul> <p>Explanatory note - A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.</p>	Year 3 & 4	<p><b>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Children are supported to present the same data in different ways in order to help with answering the question.</li> </ul>
Year 5 & 6	<p><b>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul>	Year 5 & 6	<p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Children present the same data in different ways in order to help with answering the question.</li> </ul>

Scientific Data – Children will learn how to use, gather, process and present data so that they can draw scientific conclusions	
Year 3 & 4	<p><b>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</b></p> <ul style="list-style-type: none"> <li>They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.</li> </ul>
Year 5 & 6	<p><b>Reporting 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</b></p> <ul style="list-style-type: none"> <li>They communicate their findings to an audience using relevant scientific language and illustrations.</li> </ul>

# Working Scientifically Skills Progression

	Scientific Evidence – Children will learn how science uses evidence to develop explanations		Evaluating and raising further questions and predictions
Year 1 & 2	<p><b>Using their observations and ideas to suggest answers to questions</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul>	Year 3 & 4	<p><b>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</b></p> <ul style="list-style-type: none"> <li>They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.</li> </ul>
	<p><b>Using their observations and ideas to suggest answers to questions</b></p> <ul style="list-style-type: none"> <li>The children recognise ‘biggest and smallest’, ‘best and worst’ etc. from their data.</li> </ul>		<p><b>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.</li> </ul>
Year 3 & 4	<p><b>Using straightforward scientific evidence to answer questions or to support their findings</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul>	Year 5 & 6	<p><b>Reporting 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</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>They identify any limitations that reduce the trust they have in their data.</li> </ul>
	<p><b>Identifying differences, similarities or changes related to simple scientific ideas and processes</b></p> <ul style="list-style-type: none"> <li>Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.</li> </ul>		
	<p><b>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</b></p> <ul style="list-style-type: none"> <li>They draw conclusions based on their evidence and current subject knowledge.</li> </ul>		
Year 5 & 6	<p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>They talk about how their scientific ideas change due to new evidence that they have gathered.</li> <li>They talk about how new discoveries change scientific understanding.</li> </ul>	<p><b>Using test results to make predictions to set up further comparative and fair tests</b></p> <ul style="list-style-type: none"> <li>Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.</li> </ul>	
	<p><b>Reporting 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</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul>		