



Working Scientifically

Year 1/2	Year 3/4	Year 5/6
<p>Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the science units:</p> <ul style="list-style-type: none">• asking simple questions and recognising that they can be answered in different ways• observing closely, using simple equipment• performing simple tests• identifying and classifying• using their observations and ideas to suggest answers to questions• gathering and recording data to help in answering questions	<p>Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the science units:</p> <ul style="list-style-type: none">• asking relevant questions and using different types of scientific enquiries to answer them• setting up simple practical enquiries, comparative and fair tests• making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers• 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• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions• identifying differences, similarities or changes related to simple scientific ideas and processes• using straightforward scientific evidence to answer questions or to support their findings.	<p>Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the science units:</p> <ul style="list-style-type: none">• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs• using test results to make predictions to set up further comparative and fair tests• reporting and presenting 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• identifying scientific evidence that has been used to support or refute ideas or arguments

Year	Approaches to enquiry	Asking Questions	Planning	Collecting Data	Presenting Data	Concluding and Evaluating
1	<p>Focus on observation and classifying.</p> <p>Observe closely using simple equipment</p> <p>Sort scientifically with given criteria and their own categories</p> <p>Observing over time</p> <p>Research using secondary sources</p>	<p>Ask simple questions.</p> <p>Begin to shape questions using different question stems.</p>	<p>Recognise that questions can be answered in different ways</p>	<p>Gather and record sorting data to help answer questions</p> <p>Choose and use appropriate simple equipment to make observations</p> <p>Use non-standard units to collect observations</p>	<p>Use observations and ideas to answer questions.</p> <p>Record observations in word and pictures</p> <p>Talk about what they have found out, using some scientific vocabulary</p>	<p>Identify simple changes</p> <p>Identify similarities and differences.</p> <p>Identify simple patterns and talk about them</p>
2	<p>Focus on traditional experiment.</p> <p>Comparative fair testing.</p> <p>Pattern seeking</p> <p>Group and classify things</p>	<p>Ask simple questions and recognise they can be answered in different ways.</p> <p>Ask questions about how and why objects, materials and living things:</p> <ul style="list-style-type: none"> o change o are similar or different to each other o connect with each other o are made or work <p>Suggest questions to investigate</p>	<p>Perform simple tests designed as a class.</p> <p>With support:</p> <ul style="list-style-type: none"> o Suggest how to find things out o Identify changes to observe and measure o Identify patterns to observe and measure o Identify variables to change and measure o Identify sorting criteria o Suggest how to take measurements o Suggest next steps or a sequence of steps in a plan 	<p>Choose and use appropriate simple equipment with increasing accuracy to collect comparative data</p> <p>Use non-standard units to collect data</p> <p>Sort objects by observable and behavioural features</p> <p>Make comparisons between simple features</p> <p>Gather data to answer questions from a variety of sources including talking to people, simple books and electronic media, first hand observation and practical activity.</p>	<p>Record observations and test results in simple prepared pictograms, tables, tally charts, bar charts and maps including ICT formats</p> <p>Record sorting in sorting circles or tables</p> <p>Communicate what they have found out, using some scientific vocabulary, through discussion and writing</p>	<p>Use results to answer the investigation question.</p> <p>Sequence changes</p> <p>Say whether the change was expected</p> <p>Make simple comparisons</p> <p>Make links between two sets of observations.</p> <p>Say whether data was useful</p> <p>Say whether an information source was useful</p>

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3	<p>Scientific write-ups to focus on key question, prediction and method.</p> <p>Observing over time.</p> <p>Comparative fair</p> <p>Pattern seeking</p>	<p>Ask relevant questions and use some scientific knowledge to answer them</p> <p>Recognise questions that can be investigated scientifically and those that cannot</p>	<p>Set up simple comparative fair tests designed as a class</p> <p>Set up observational activities</p> <p>Identify different ways to answer a question</p> <p>Choose the most appropriate method</p>	<p>record findings – identifying similarities and differences.</p> <p>Make careful observations and take measurements using standard units</p> <p>Carry out simple tests to sort and classify materials according to properties or behaviour</p>	<p>Record and report on findings using given scientific language. This could be orally or through drawings and diagrams</p> <p>Record data in tables and bar charts</p> <p>Use Carroll diagrams, and Venn diagrams to classify</p>	<p>Use results to discuss conclusions, answer questions posed and use scientific evidence</p> <p>Refer to a table or graph when reporting findings</p>
4	<p>Scientific write ups to focus on – key question, prediction, method (including fair testing) and results.</p> <p>Comparative fair testing</p> <p>Research using secondary sources (teeth)</p> <p>Grouping and classifying</p>	<p>Ask relevant questions and use some scientific knowledge to answer them</p> <p>Recognise when questions can be answered by first hand or second sources of evidence</p>	<p>Set up scientific enquiries as a class and fair tests – identify variables and measures</p> <p>Decide what observations to make, how often and what equipment to use</p> <p>Decide what measurements to take, how long to make them for and whether to repeat them</p> <p>Decide what sorting or classification criteria to use</p> <p>Recognise when a simple fair test is necessary</p> <p>With help, decide what variables to change and measure</p>	<p>Make careful observations, take accurate measurements and, where appropriate, use equipment including data loggers</p> <p>Gather data to answer questions from a variety of sources including using textbooks, simple keys, electronic media, first hand observation, practical activity and data collected by others</p>	<p>Record findings using given scientific language – this could be orally, written, through drawings, diagrams, charts and graphs</p> <p>Report on findings, including oral presentations and written explanations – use straightforward scientific language to support their findings</p> <p>Use and make simple keys to identify and classify</p>	<p>Use results to suggest further ideas for investigation, raise questions and predict what might happen</p> <p>Identify changes that are occurring using scientific ideas</p> <p>Find ways of improving enquiries</p>

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5	<p>Scientific write-ups focus on key question, fair test statement (where appropriate), results and conclusion</p> <p>Comparative fair testing</p> <p>Observing over time (changes in humans)</p> <p>Research using secondary sources (Earth and Space)</p> <p>Grouping and classifying</p>	<p>Independently ask questions and offer ideas for scientific enquiry</p> <p>Recognise when research using secondary sources will answer questions</p>	<p>With support and prompts, plan an experiment or enquiry to help answer a question, including the control of variables to ensure a fair test</p> <p>Plan systematic collection of data and which equipment to use</p> <p>Recognise when variables need to be controlled and why</p>	<p>Take measurements with increasing accuracy and repeat when necessary</p>	<p>Record data and results using scientific diagrams, tables, bar and line graphs</p> <p>Report and present findings from enquiries in oral and written form – use appropriate key scientific vocabulary from the topic studied.</p> <p>Use more than one source of scientific evidence to identify and classify things</p>	<p>Use test results to make predictions and design a further test</p> <p>Identify causal relationships</p> <p>Identify evidence used to support or refute ideas or arguments for the topic studied</p> <p>Begin to separate opinion from fact</p> <p>Use scientific evidence to justify ideas</p>
6	<p>Scientific write-ups focus on key question, fair test statement (where appropriate), results, conclusion and evaluation</p> <p>Research using secondary sources (Evolution)</p> <p>Grouping and classifying</p> <p>Pattern spotting</p> <p>Comparative fair testing</p>	<p>Independently ask questions and offer ideas for scientific enquiry</p> <p>Decide which sources of information to use to answer questions</p>	<p>Plan an experiment or enquiry to help answer a question, including the control of variables</p> <p>Explain why an enquiry method is the most appropriate to answer a question</p> <p>Recognise when variables cannot be controlled and a pattern seeking enquiry is appropriate</p> <p>Identify which variables have the greatest effect on the result</p>	<p>Take measurements with a range of equipment with increasing accuracy and repeat readings when necessary</p>	<p>Record data and results using scientific diagrams, tables, line graphs, scatter graphs and classification keys</p> <p>Report and present findings from enquiries in oral and written form – use appropriate key scientific vocabulary from the topic studied. Report on causal relationships</p> <p>Make keys and branching databases with 4 or more items</p>	<p>Use test results to make predictions and design a further test – when appropriate, conduct these tests and compare results orally</p> <p>Evaluate a designed test, including a statement of trust in the results and how valid they are</p> <p>Identify evidence used to support or refute ideas or arguments for the topic studied</p>

