

# Working Scientifically

Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the key ideas:

	Exploring and planning	Gathering and presenting evidence	Interpreting results/ evidence	Explaining
	<p><b>Different ways children in all year groups should be answering scientific questions:</b></p> <ul style="list-style-type: none"> <li>observing changes over a period of time</li> <li>noticing patterns</li> <li>identifying, grouping and classifying things</li> <li>carrying out simple comparative tests</li> <li>using secondary sources</li> </ul>	<ul style="list-style-type: none"> <li>Use simple equipment provided (such as hand lenses / egg timers)</li> <li>Use a simple source to find answers</li> <li>Present findings using drawings and simple sentences</li> </ul>	<ul style="list-style-type: none"> <li>Talk about the investigation / enquiry being carried out and discuss what they have found out</li> <li>Make comparisons using simple scientific vocabulary</li> <li>Use photographs / diagrams to record answers to how/why questions</li> </ul>	<ul style="list-style-type: none"> <li>Write a simple sentence to describe what they observed / compared</li> <li>Link classroom experience to outside world</li> <li>Discuss and compare with peers what happened and what they found out</li> </ul>
Year 1	<ul style="list-style-type: none"> <li>Investigate key ideas</li> </ul>			
Year 2	<ul style="list-style-type: none"> <li>Ask a simple question and consider how that question could be answered</li> </ul>	<ul style="list-style-type: none"> <li>Sort things into groups according to own criteria and choose a title for sorting</li> <li>Record observations over time</li> <li>Talk about different drawings and charts</li> <li>Carry out a simple test</li> <li>Make simple measurements</li> <li>Identify similarities and differences</li> </ul>	<ul style="list-style-type: none"> <li>Discuss / talk about their investigations</li> <li>Make comparisons in the data / observations using scientific vocabulary</li> <li>Explain whether what happened was what they expected and if not why not</li> <li>Collect data on templates provided</li> </ul>	<ul style="list-style-type: none"> <li>Talk about their findings using the science vocabulary related to the key idea</li> <li>Use diagrams, photos, pictures to show findings in a simple form</li> </ul>
Year 3	<ul style="list-style-type: none"> <li>Begin to raise their own questions about the world around them.</li> <li>Begin to plan which type of enquiry will be the best way of answering a question</li> <li>Decide what to observe and how long to collect observations.</li> </ul>	<ul style="list-style-type: none"> <li>Measure accurately using equipment (including data loggers) with which they are familiar</li> <li>Record measurements on simple tables</li> <li>Begin to help decide which variables to keep the same and which to change.</li> <li>Use simple keys</li> <li>Decide upon criteria for sorting and classifying</li> </ul>	<ul style="list-style-type: none"> <li>Begin to collect data in a variety of ways, including labelled diagrams, bar charts and tables.</li> <li>Begin to communicate findings using simple scientific language.</li> <li>Suggest improvements to their test</li> </ul>	<ul style="list-style-type: none"> <li>Begin to answer my questions and draw simple cause and effect conclusions based on the results of my enquiry.</li> <li>Begin to use my findings to make new predictions, suggest improvements and think of new questions.</li> </ul>
Year 4	<ul style="list-style-type: none"> <li>Raise their own questions about the world around them.</li> <li>With support decide which different types of scientific enquiry to answer questions.</li> <li>Help decide which variables to keep the same and which to change.</li> <li>Think about what they can measure and make accurate measurements (including use of data loggers and thermometers)</li> <li>Plan how they will record results</li> </ul>	<ul style="list-style-type: none"> <li>With increasing independence make systematic and careful observations.</li> <li>Collect data in a variety of ways, including labelled diagrams, bar charts and tables.</li> <li>Present results in charts or graphs</li> </ul>	<ul style="list-style-type: none"> <li>Describe similarities, differences and patterns in what has been investigated</li> </ul>	<ul style="list-style-type: none"> <li>Draw simple conclusions based on the data I have collected and consider cause and effect</li> <li>Use my findings to make new predictions, suggest improvements and think of new questions.</li> </ul>
Year 5	<ul style="list-style-type: none"> <li>Begin to independently explore ideas and ask my own questions about scientific phenomena.</li> <li>Begin to decide and explain which variables to control.</li> </ul>	<ul style="list-style-type: none"> <li>Make accurate and precise measurements.</li> <li>Decide what to observe, how long to observe for and whether to repeat them.</li> <li>Take accurate and precise measurements using standard units</li> <li>Select equipment on my own and can explain how to use it accurately.</li> <li>Set up a range of fair tests.</li> <li>Begin to suggest improvements to my test, giving reasons.</li> <li>Begin to record data and results of increasing complexity</li> <li>Begin to develop my own keys and other information records to classify and describe.</li> </ul>	<ul style="list-style-type: none"> <li>Begin to draw scientific, causal conclusions using the results of an enquiry to justify my ideas.</li> </ul>	<ul style="list-style-type: none"> <li>Begin to communicate and explain my conclusion using scientific knowledge and understanding.</li> <li>Begin to use my findings to make predictions and set up further enquiries.</li> <li>Begin to use abstract models to explain my ideas.</li> </ul>
Year 6	<ul style="list-style-type: none"> <li>Plan different types of scientific enquiry to answer questions</li> <li>Decide which variables to control.</li> </ul>	<ul style="list-style-type: none"> <li>Make accurate and precise measurements.</li> <li>Decide what to observe, how long to observe for and whether to repeat them.</li> <li>Take accurate and precise measurements using standard units N, g, kg, mm, cm, mins, seconds, cm<sup>2</sup> V, km/h, m per sec, m/ sec.</li> <li>Select equipment on my own and can explain how to use it accurately.</li> <li>Record data and results of increasing complexity</li> <li>Choose how best to present data.</li> <li>Communicate findings using detailed scientific language.</li> </ul>	<ul style="list-style-type: none"> <li>Use my findings to make predictions and set up further enquiries</li> </ul>	<ul style="list-style-type: none"> <li>Explain my conclusion using scientific knowledge and understanding.</li> <li>Begin to use abstract models to explain my ideas.</li> <li>Use scientific conventions eg trends, rogue result, support prediction.</li> </ul>



