

Being a Scientist Principles & Progression

Working Scientifically	Year 1/ Year 2	Year 3 / 4	Yr 5/ 6
<p><i>Children should learn about the scientific process of enquiry through explicit teaching in EVERY topic they encounter. As scientists, 1) we ask questions, 2) we choose HOW we are going to answer our question (one of 5 possible lines of enquiry), 3) we consider our results/ findings, 4) we answer our question and present what we have found out e.g. orally/ visually/ written conclusions.</i></p> <p>Questioning The teacher models how to ask a range of questions in lessons, using different question stems. Children are reminded that asking questions, being inquisitive and seeking to solve these problems is an essential part of 'being a scientist'. The level of difficulty progresses in 2 ways: a) in terms of content (associated with the current topic taught) and b) the formulation of the question (e.g. from Reception 'What is....?' To Year 6 'As scientists, how do we know that ... impacts on....?') Children are encouraged to raise their OWN questions through exploration of the topic and to consider which line of scientific enquiry they would pursue to answer the question, with increasing independence.</p>			
Question Stems:	What is the name of ...? What is the evidence that? Are all the same? What is made from? How do I know that...? What is happening? What is same/ different about...? What are the parts/ names of? Give an example of? List all the you know. Can you predict...? Compare... with...	What link is there between and? How does ... impact on? Can you define:? How do you distinguish between ... and ..? Suggest reasons why...? Which variable are you changing/ keeping the same/ measuring in your fair test? Prove that (item) ... goes in this group	What might happen if ...(practical context)? Why is significant? To what extent does affect? Which evidence supports the idea that...? Which evidence refutes the idea that...?
Enquiry Planning	Chn begin to understand that questions can be answered in different ways e.g. I can make observations, carry out an investigation/ experiment, sort/ group items, to answer my question.	I understand that questions can be answered in different ways e.g. 5 lines of scientific enquiry: observation (over time), research (using secondary sources), sorting/ classifying, fair / comparative testing, pattern-seeking. I can predict the outcome to an investigation.	I understand that questions can be answered in different ways and can choose the most appropriate line of enquiry. I can make predictions and explain my reasoning.

Identifying & Classifying	I can sort, name, identify and group (classify) items.	I can sort, name, identify and classify items (beginning to use keys in Year 4).	I can identify and classify items based on their characteristics (using a Linnean system- Yr 6).
Observing Over Time/ Observing	I can observe closely using simple equipment e.g. magnifiers I can make share my observations verbally (and in writing Yr 2)	I can observe closely, share my ideas verbally and write simple notes and scientific language to record my findings. I can take accurate measurements using standard units, using a range of equipment e.g. rulers/ thermometers/ data loggers. I can decide what observations to make, how long to make them for and the type of simple equipment which might be used.	I can write detailed observations, scientific language and diagrams to record my findings.
Pattern Seeking	I am beginning to see links / relationships between things e.g. sun= warm weather	I can consider how one variable might be linked to another e.g. pitch/ length of violin vibrating violin string.	I can look for patterns in a data set (e.g. planets/ orbit lengths). I can spot anomalies in a set of data.
Testing (Comparative/ Fair testing/ Investigative)	I can carry out a simple test e.g. Which material is better for a leotard? What do plants need to grow?	I can carry out a comparative or fair test. I understand that in a fair test one variable must be kept the same, another measured to give results and all of the others kept the same/ 'controlled'.	I can plan and design my own fair tests. I can use test results to make predictions to set up further comparative/ fair tests.
Research/ Gathering data/ Information	With help, I can gather and record data to help in answering questions. I can use a tally/ table to record my data.	I can gather data and record data, to help in answering questions, with greater independence. I can present my findings in tables and simple bar graphs.	I can gather and record data of increasing complexity, using scientific diagrams, labels, classification keys, tables, bar, line & scatter graphs .

<p>Concluding/ Answering questions</p>	<p>I can use my observations and findings to suggest answers to questions e.g. What happens to trees through the seasons? Some trees lose their leaves but grow new ones in Spring.</p> <p>I can present my findings verbally using scientific language (to the class- Yr 2)</p> <p>(Yr 2) I can write a simple conclusion with support.</p>	<p>I can use my observations to suggest answers to questions.</p> <p>I can explain a process using key scientific language e.g. digestion.</p> <p>I can use appropriate language to share my findings.</p> <p>I can write a simple conclusion, answering my original question, based on my findings.</p>	<p>I can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (Yr 6), in oral and written forms such as displays and other presentations.</p> <p>I can write detailed explanations using key scientific language.</p> <p>I can identify scientific evidence that has been used to support or refute ideas or arguments.</p>
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