

## Mapping Progression in Scientific Enquiry Skills

This document is based on The [National Curriculum Framework in England](#), working scientifically statements [Sciences in Curriculum for Excellence](#), Scotland. [Science in the national curriculum for Wales](#) (starts at age 7) [Council for the curriculum, Examinations and Assessment in Northern Ireland](#)

<b>Scientific Enquiry and Investigation Skills</b>			
<b>5-7 year olds (P2-P3)</b>	<b>7-9 year olds P3/P4</b>	<b>9-11 year olds P5/6</b>	<b>11-14 year olds P7, S1-S2</b>
Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of relevant scientific content	Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of relevant scientific content	Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of relevant scientific content	Through the content of biology, chemistry and physics, pupils should be taught to develop their scientific enquiry skills and .....
<b>Scientific attitudes:</b>			
			Pay attention to objectivity and concern for <b>accuracy, precision, repeatability and reproducibility</b>
			Understand that scientific methods and theories develop as scientists modify earlier explanations to take account of new evidence and ideas, together with the importance of publishing results and peer review
Identifies obvious risks and takes appropriate steps to protect themselves and others.	Identifies risks and hazards and ensures safe use of all tools, equipment and procedures.	Anticipates some risks and hazards	Anticipates most risks and hazards Evaluate risks
<b>Experimental skills and investigations:</b>			
Ask questions arising from play activities Asking simple questions and recognising that they can be answered in different ways	asking relevant questions and using different types of scientific enquiries to answer them		Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
Measures using simple equipment and non-standard units performing simple tests	setting up simple practical enquiries, comparative and fair tests	planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	Plan and design investigations and experiments to make observations and to test predictions, including identifying independent, dependent and control

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			variables and their intrinsic nature and other factors to be taken into account when collecting evidence and data
<b>5-7 year olds</b>	<b>7-9 year olds</b>	<b>9-11 year olds</b>	<b>11-14 year olds</b>
observing closely, using simple equipment	making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	Make and record observations and measurements using a range of methods for different investigations;
			Evaluating the reliability of methods and suggest possible improvements.
			Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.
			Apply sampling techniques
			Make predictions using scientific knowledge and understanding
<b>Analysis and Evaluation:</b>			
Provides oral descriptions of what was done and what happened gathering and recording data to help in answering questions	gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	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	Present observations and data using appropriate methods, including tables and graphs
identifying and classifying	identifying differences, similarities or changes related to simple scientific ideas and processes	identifying scientific evidence that has been used to support or refute ideas or arguments	Apply mathematical concepts and calculate results
Presents and sorts data/information using displays, photographs, simple charts and drawings	recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Evaluate data, showing awareness of potential sources of random and systematic error

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	using straightforward scientific evidence to answer questions or to support their findings.		Identify further questions arising from their results
<b>5-7 year olds</b>	<b>7-9 year olds</b>	<b>9-11 year olds</b>	<b>11-14 year olds</b>
Using their observations and ideas to suggest answers to questions	using results to draw simple conclusions, make predictions for new values and suggest improvements and raise further questions	using test results to make predictions to set up further comparative and fair tests	Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
	reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	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	Present reasoned explanations, including explaining data in relation to predictions and hypotheses
<b>Measurement</b>			
	Use standard measures and SI Units		Understand and use SI units and IUPACC chemical nomenclature
			Use and derive simple equations and carry out appropriate calculations
			Undertake basic data analysis including simple statistical techniques
<b>Skills and attributes of scientifically literate citizens</b>			
Talks about science, showing developing understanding of risks and benefits, and listens to the views of others. Demonstrates awareness of the importance of respecting living things and the environment and of managing the Earth's resources responsibly. Demonstrates a developing	Expresses informed views of scientific issues, both orally and in writing, and respects the views of others. Makes connections between science and their own health and wellbeing. Demonstrates awareness of their own impact on the world. Demonstrates awareness of how people use science in their	Presents a reasoned argument based on evidence, demonstrating understanding of underlying scientific concepts, and engages with the views of others. Demonstrates understanding of the relevance of science to their future lives and the role of science in an increasing range of careers and occupations.	Demonstrates understanding of the impact of science on society and debates and discusses the moral and ethical implications of some scientific developments, demonstrating respect for the views of others. - Expresses informed views about topical scientific issues, including those featured in the media, based on evidence and demonstrating

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<p>understanding of science in the world around them. Explores the ways in which people use science and science skills as part of their job</p>	<p>everyday lives and in a variety of jobs and careers. Discusses science topics in real-life contexts including those appearing in the media.</p>	<p>Demonstrates increased awareness of creativity and inventiveness in science, the use of technologies in the development of sciences and the impact of science on society. Expresses informed views about scientific and environmental issues based on evidence</p>	<p>understanding of underlying scientific concepts. - Demonstrates increased awareness of creativity and inventiveness in science and the use of technologies in the development of sciences. - Demonstrates understanding of the relevance of science to their future lives and the role of science in an increasing range of careers and occupations, including science, technology, engineering and mathematics (STEM) careers</p>
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