

Science: Enquiry skills progression document

Definition of Enquiry skills:



Asking Questions:

Asking questions that can be answered using a scientific enquiry.



Making Predictions:

Using prior knowledge to suggest what will happen in an enquiry.



Setting up Tests:

Deciding on the method and equipment to use to carry out an enquiry.



Observing and Measuring:

Using senses and measuring equipment to make observations about the enquiry.



Recording Data:

Using tables, drawing and other means to note observations and measurements.





Interpreting and Communicating Data:



Using information from the data to say what you found out.






Evaluating:

Reflecting on the success of the enquiry approach and identifying further questions for enquiry.

	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	KS3
ASKING QUESTIONS 	<p>Asks questions – what/ where/ why</p> <p>Answers why questions</p> <p>Uses sentences with 4 -6 words “I want to play with cars” including 4-6 word questions.</p> <p>Uses joined up words because/or/and when asking a question.</p>	<p>Asks questions to find out more</p> <p>Able to articulate ideas in well-formed sentences and to work out problems and organise thinking.</p>	<p>Ask questions based on observations. Have their questions answered by people around them.</p>	<p>Ask simple questions and recognise that they can be answered in different ways.</p> <p>Begin to use secondary sources to answer them.</p>	<p>Ask questions and use their observations to answer them. Use a variety of secondary sources to answer questions.</p>	<p>Ask questions and use different types of scientific enquiries and evidence (secondary sources) to answer them and support their findings.</p> <p>Using data collected, suggest new questions to ask.</p>	<p>Plan different types of scientific enquiries to answer questions.</p>	<p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables.</p> <p>Recognise which secondary sources will be most useful to research their ideas</p>	<p>Identify variables and start to make predictions using their scientific knowledge and understanding.</p> <p>Plan different types of questions and pupils to develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.</p>
MAKING PREDICTIONS 	<p>Cooperates with other children.</p>	<p>Able to articulate ideas in well-formed sentences and to work out problems and organise thinking</p>	<p>When questioned/ prompted or with support, verbally make predictions based on observations.</p>	<p>When questioned, independently make a prediction based on observations.</p>	<p>From observations, make predictions for the next set of results.</p>	<p>Using results make predictions for the next set of results.</p> <p>Use scientific vocabulary from the experiment when doing so.</p>	<p>Use test results to make more accurate predictions.</p> <p>Explain predictions with reasoning.</p>	<p>Use test results to make more accurate predictions, explaining with reasoning. Use results to set up a more accurate follow up test to test predictions.</p>	<p>Make predictions using scientific knowledge and understanding.</p> <p>Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate.</p> <p>Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.</p>

	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	KS3
SETTING UP TESTS 	<p>Develop manipulation and control. Explore different materials and tools.</p>	<p>Developing fine motor skills Using small and large equipment with skill</p>	<p>Using equipment already provided, perform simple tests which have been planned as a whole class.</p>	<p>Using equipment already provided, perform simple tests which have been planned as a whole class but children may make changes of their own / thinking of their own ideas, whilst performing the test.</p>	<p>With support and with equipment provided, recognise what a fair test is and suggest how to set up a simple, fair test tests before carrying it out.</p>	<p>Set up simple own practical enquiries, comparative (less control over variable) and fair tests.</p>	<p>Plan own and different types of scientific tests, sometimes deciding own equipment to use. Recognise variables and with support, decide how to control these variables.</p>	<p>Plan own and different types of scientific tests, deciding own equipment to use. Recognise variables and why they need controlling. Draw together other scientific enquiry skills to perform these tests, i.e the predictions they have made or previous observations they have made. They have decided to set up and perform this test for a reason.</p>	<p>Working safely in science, evaluate risks, identifying different scientific equipment's and how to use them safely in the lab. Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate</p>
OBSERVING AND MEASURING 	<p>Observe what they see and talk about it using newly learnt vocab</p>	<p>Able to explore the natural world – use senses, songs, close observation and drawings.</p>	<p>Observe changes over time. Describe observations to identify, compare and group, using simple equipment. With support, use observations to answer questions.</p>	<p>Use observations to identify, describe, compare, group and explain observations and reasoning for grouping. Observe and comment on patters and relationships. Use observations to answer questions.</p>	<p>Suggest what observations to make. Through observations, identify differences, similarities. After making careful observations using a range of equipment. Identify and classify differences, similarities and/or changes from observations.</p>	<p>Suggest what observations to make, how long to make them for and what equipment to use to make the observations. Through observations, identify differences, similarities and changes. Make careful and systematic observations using a range of equipment. Use these observations to identify and differences, similarities or changes related to simple scientific ideas and processes, i.e naturally occurring patterns and relationships.</p>	<p>Make own decisions about what observations to make, what measurements to take and what equipment to use to do this. Take measurements, using a range of scientific equipment, with increasing accuracy and precision.</p>	<p>Make own decisions about what observations to make, how long to make them, what measurements to take and whether to repeat them. Chose the most appropriate equipment and explain how to use it accurately. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p>	<p>Working scientifically, developing, scientific attitudes By paying attention to objectivity, accuracy, precision, repeatability and reproducibility. Observing and investigating in Science. Identify independent, dependent and control variables in an investigation. Describe the variables that will need to be controlled in an investigation to make it a fair test. Measurement, understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature.</p>

	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	KS3
RECORDING DATA 	Explore natural materials and their own environment	Able to make collections of natural objects they are interested in	Record simple data to answer questions.	With help, record data in different ways to answer questions.	With support, make decisions about how to record data. Record data using notes tables and diagrams. Begin to use standard units of measurements when recording data.	Make decisions about how to record data using notes, tables drawings, labelled diagrams, keys, bar charts, and tables. Record using standard units of measurements.	Be given familiar modelled options of how to record data of e.g. tables, charts diagrams, labels, classification keys.	Decide how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	Use and derive simple equations and carry out appropriate calculations. Undertake basic data analysis including simple statistical techniques. Select a suitable scale for constructing graph form given data. Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusion.
INTERPRETING AND COMMUNICATING RESULTS 	Listen to simple stories and understand what is happening.	Using new vocabulary, hold a back and forth conversation.	Talk about what they have found out and how they found it out. Begin to use scientific language when talking about their results.	Present what they have learnt and how they found it out. With help, communicate this in a variety of ways, including orally or written and use scientific language when communicating their results.	Use results to draw simple conclusions and report on these findings including oral conclusions and a simple written explanation. Pupils should begin to use relevant scientific language to discuss their ideas and communicate their findings.	Use the results to draw simple conclusions report this in a variety of ways, using a detailed written or oral explanation. Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.	Report and present findings from enquiries including conclusions, causal relationships (when one variable causes a change in another variable) in oral and written forms. They should use relevant scientific language and illustrations to discuss and communicate their findings.	Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results. Present this in a variety of ways. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time	Develop the numeracy and literacy skills throughout the unit, for example drawing graphs, recording and analysing data and drawing conclusions. Present observations and data using appropriate methods, including tables and graphs

	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	KS3
EVALUATING 	Begins to make sense of own life story	Describes events in detail and uses connectives	Check their results make sense using peer and self-assessment. Ask pupils the questions 'Do you now know the answer to the question from the beginning of the test?'	Check their results make sense and their results answer the question they asked or were asked in the first instance. Ask pupils the questions 'Do you now know the answer to the question from the beginning of the test?' If pupils answer no, follow up with 'What other questions can we ask to find and answer?'	Help make decision about how to analyse the data. With support, improve what they have already done.	Make decisions about how to analyse the data. Suggest improvements and raise further questions.	Set up further comparative (when one variable causes a change in another variable) and fair tests based on previous test results.	Set up further comparative (when one variable causes a change in another variable) and fair tests based on previous test results. Identify and use scientific evidence to support or refute ideas or arguments. Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.	Evaluate scientific explanations to phenomena in the world around us and start to use modelling and abstract ideas to develop and evaluate explanations. Present reasoned explanations, including explaining data in relation to predictions and hypotheses. Evaluate data, showing awareness of potential sources of random and systematic error. identify further questions arising from their results.