



## St Uny Church of England Academy Working Scientifically: Skills Progression



# Questioning

N.C. Outcome		Year	Met	Mastery
Upper KS2	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables, where necessary	6	<b>Recognise scientific questions</b> to which they do not yet have definitive answers <b>using a range of scientific enquiries to explore possible answers</b>	Use observations/data gathered to construct a further testable or research question
		5	<b>Refine a scientific question</b> so that it can be investigated/tested, choosing an appropriate type of science enquiry to provide the best evidence	Recognise that some questions may not be answered by the investigation chosen and suggest changes to the question or investigation
Lower KS2	Ask relevant questions and use different types of scientific enquiries to answer them	4	<b>Ask relevant questions</b> that can be answered by the appropriate scientific enquiry, research or experiment/test	Refine the question asked so a test can give a more appropriate outcome
		3	Within a group <b>suggest relevant questions</b> that can be explored/investigated further <b>using different types of science enquiry</b>	Identify 'testable' questions and questions that are not testable in the primary classroom
KS1	Ask simple questions and recognise they can be answered in different ways	2	<b>Ask simple questions</b> about their experiences and observations of objects, living things or events and with help use these observations to suggest ways to discover an answer or solve a problem, <b>recognising that some can be answered in a variety of ways</b>	Within a group listen to others suggestions and make their own about how to discover an answer Answer questions/solve problems using their own experience or what they have found out Suggest an alternative way to answer questions/solve problems when appropriate
		1	<b>Ask simple questions</b> stimulated by their exploration of their world	Use what they see and their own ideas to offer answers to questions With help, identify evidence needed to answer a question

# Observing & Measuring

N.C. Outcome		Year	Met	Mastery
Upper KS2	Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	6	Decide whether it is appropriate <b>to repeat observations or measurements</b> and explain how this impacts on data collection  <b>Choose and use correctly appropriate equipment to support observation and data collection with increasing accuracy</b>	Recognise that data that can be collected may be unreliable and describe what they could do to make it more reliable
		5	<b>Take measurements using a range of scientific equipment with increasing accuracy and precision</b> identifying the ranges and intervals used  With help recognise that some measurements and observations may need to be repeated	Repeat sets of observations or measurements where appropriate selecting suitable ranges and intervals
Lower KS2	Make systematic and careful observations and where appropriate take accurate measurements using standard units, using a range of equipment including thermometers and data loggers.	4	<b>Take accurate measurements using more complex standard units</b> and parts of units  <b>Choose from a range</b> provided, <b>appropriate equipment</b> for measuring and observing <b>including thermometers and data loggers</b>  <b>Make systematic and careful observations of objects, living things and events</b>	Become accurate in using units of length, mass, volume, weight, time, heat Make appropriate choices of equipment to observe and measure and explain why they are appropriate to the task
		3	<b>Take simple accurate measurements and/or careful observations using</b> whole number <b>standard units</b> relevant to questions or ideas under investigation  <b>Use a range of equipment</b> for measuring and observing, <b>including thermometers and data loggers</b>	Use standard units over an increasing range Begin to make appropriate choices of equipment available for observing and measuring closely
KS1	Observe closely using simple equipment	2	Make measurements using non-standard and standard units of measure  <b>Use equipment</b> , provided for observation and measuring, <b>correctly</b>  <b>Observe closely</b>	Make increasingly accurate measurements Choose some equipment correctly and appropriately for the materials/events being observed/measured
		1	Make measurements using non-standard units of measure  <b>Observe</b> objects, living things, events and the world around them closely, <b>using</b> their senses and <b>simple equipment</b>	Use equipment with whole number scales With help discuss what they have seen or found out

# Planning & Performing Tests

N.C. Outcome		Year	Met	Mastery
Upper KS2	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables, where necessary	6	<p><b>Recognise significant variables</b> in investigations selecting the most suitable to investigate <b>controlling variables where appropriate</b></p> <p><b>Recognise which type of practical enquiry is most appropriate</b> to the question or idea being investigated, before planning and carrying out the enquiry</p>	<p>Explain why variables are significant in the context of the enquiry undertaken</p> <p>Justify the choice of practical enquiry made as being most appropriate</p>
		5	<p><b>Plan enquiries</b> deciding when it is appropriate to carry out a fair test or another type of practical enquiry from a range suggested</p> <p><b>Identify one or more control variables</b> in investigations when conducting a fair test</p>	<p>Clarify which are control, dependent and independent variables in a fair test which they conduct</p> <p>Decide which type of practical enquiry is most appropriate for the question or idea being investigated</p>
Lower KS2	Set up simple practical enquiries, comparative and fair tests	4	<p><b>Plan and carry out simple practical enquires, comparative and fair tests</b> relevant to the questions or ideas they are investigating</p> <p>Identify one or more control variables from those provided when conducting a fair test</p>	<p>Carry out a range of enquiries with increasing confidence</p> <p>Decide whether a fair test is the best way to investigate their question or idea</p>
		3	<p><b>Plan and carry out simple practical enquires, comparative and fair tests</b> relevant to the questions or ideas they are investigating, with support</p>	<p>Choose from a list at least one variable that needs to be kept the same when conducting a fair test</p> <p>Carry out simple enquires with a group of peers</p> <p>Begin to recognise when a test is not fair and suggest improvements</p>
KS1	Perform simple tests	2	<p>Identify things to measure or observe that are relevant to the questions or ideas they are investigating <b>using a simple test</b></p> <p>Suggest a practical way of how to find things out, or collect data to answer a question or idea they are investigating</p>	<p>Recognise that some ways of investigating a question or idea are more appropriate than others</p>
		1	<p><b>Perform simple tests</b> to explore a question or idea suggested to them, with support</p>	<p>With support, in their test say what to look for and what to measure</p>

# Identifying & Classifying

N.C. Outcome		Year	Met	Mastery
Upper KS2	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	6	Use tables, keys and data bases to <b>classify or identify</b> specific objects, living things or events by their characteristics  Begin to identify some positives and some limitations of specific forms of classification	Use a variety of secondary sources to support identification and classification Create more complex forms of tables, keys and data bases used for classification
		5	<b>Classify</b> objects, living things and events creating and using simple tables, keys or data bases with support	Use classification tables, keys and data bases independently
Lower KS2	Identify differences, similarities or changes related to simple scientific ideas and processes	4	<b>Identify differences, similarities or changes related to simple scientific ideas or processes</b> and more complex groups of objects, living things and events	Complete sorting diagrams or simple tables, keys or data bases to classify objects, living things or events
		3	<b>Identify and group</b> objects, living things, processes or events by linking them to the characteristics of known objects, living things, processes or events	Explain which characteristics have caused them to identify or classify objects, living things processes or events by indicating similarities or differences in components or properties
KS1	Identify and classify	2	Make comparison between basic features or components of objects, living things or events to support <b>identification and/or classification</b>  <b>Sort and group</b> objects, living things or events on the basis of their observations and explain why	Identify differences, similarities or changes within things to do with science Make drawings of things in the real world
		1	<b>Recognise</b> basic features, similarities and differences of objects or living things  Sort and group objects or living things in different ways	Sort everyday objects or living things into groups based on simple features e.g. colour

# Gathering & Recording Data

N.C. Outcome		Year	Met	Mastery
Upper KS2	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	6	Decide on the most appropriate formats to present sets of scientific data such as using line graphs for continuous variables  <b>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</b>	Explain what type of presentation is best for the data or task
		5	<b>Select appropriate ways of gathering and presenting scientific data</b> from models, writing, drawing, display, through ICT, tables or graphs (choosing appropriate ranges and intervals)  Use correct scientific symbols where appropriate in recording	Select the most useful ways of recording and presenting information
Lower KS2	Gather, record, classify and present data in a variety of ways to help in answering questions  Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables	4	<b>Gather and present simple scientific data in a variety of ways as Year 3</b> including tables and bar charts where intervals and ranges agreed through discussion, <b>to help in answering questions</b>	Select the most useful ways of presenting information given a range of choices
		3	<b>Gather and present evidence and data using simple scientific language and vocabulary</b> as writing, <b>drawing, labelled diagrams</b> , display, through ICT, <b>keys, bar charts or tables</b> (using ranges and intervals chosen for them) <b>to help in answering questions</b>	Make some independent choices about an appropriate way to record data
KS1	Gather and record data to help in answering questions	2	<b>Gather and record data</b> in appropriate ways with increasing independence <b>to help in answering questions</b>	Draw tables and bar charts
		1	<b>Present evidence they have collected</b> in simple templates provided for them <b>to help in answering questions</b>  Draw or photograph evidence and label with support	Present evidence with help using simple tables, charts or diagrams

# Drawing Conclusions & Reporting

N.C. Outcome	Year	Met	Mastery
<p>Upper KS2</p> <p>Use test results to make predictions to set up further comparative and fair tests</p> <p>Report and present 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</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments</p>	6	<p><b>Identify scientific evidence that has been used to support or refute ideas or arguments</b></p> <p>Recognise scientific questions that do not yet have definitive answers</p> <p>Provide straightforward explanations for differences in repeated measurements or observations</p> <p><b>Use test results to make predictions for setting up further comparative and fair tests</b></p> <p>Compare their results with others and give reasons why they may be different</p> <p><b>Report and present findings from enquiries, including conclusions, causal relationships and explanations of results in oral and written form such as displays and other presentations</b></p>	<p>Describe evidence which supports or disproves accepted or developing scientific ideas</p> <p>Suggest reasons for limitations or inconsistencies in results and decide whether they impact on the conclusions drawn</p> <p>Make increasingly appropriate choices about effective recording and reporting of findings using scientific language, understanding and vocabulary confidently</p>
	5	<p><b>Recognise when scientific evidence is for or against an argument</b></p> <p><b>Recognise when scientific evidence supports an idea or not</b> and use this to support predictions</p> <p><b>Use test results to draw conclusions</b>, recognising that the test may need improvements to improve reliability</p> <p><b>Use test results</b> to prompt <b>new questions</b> and <b>make predictions for setting up further tests</b></p> <p><b>Present findings in written form, displays and other presentations</b> including orally, <b>explaining results and conclusions drawn from results</b></p> <p>Identify causal relationships in reporting outcomes where appropriate</p>	<p>Comment on how reliable their data is in supporting their conclusion</p> <p>Recognise the need for repeat measurements and observations to produce reliable data</p> <p>Draw conclusions from and consider improvements to a range of enquiries including and beyond fair tests</p> <p>Recognise and explain why results are reliable or not</p> <p>Explain findings reported and recorded using scientific language and understanding</p>

Lower KS2	<p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Use straightforward scientific evidence to answer questions or to support their findings</p>	<b>4</b>	<p><b>Use straightforward scientific evidence to support their findings</b>, make further predictions and explain their findings</p> <p>Identify scientific evidence they have used in drawing conclusions</p> <p><b>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</b></p> <p><b>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</b></p> <p><b>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables</b></p>	<p>Use scientific language to describe processes and observations Use scientific facts when describing processes and observations</p> <p>Identify when repeated results may be appropriate</p> <p>Display increasing independence in choices of how to report on or record findings Use more complex scientific language in reporting and recording findings</p>
		<b>3</b>	<p><b>Use straightforward scientific evidence to answer questions</b> and make predictions</p> <p>Say whether what happened was what they expected, acknowledging any unexpected outcomes</p> <p><b>Use results</b> of enquiries to consider whether they meet predictions and explain why</p> <p>With help <b>use results</b>, observations or own experience <b>to prompt new questions and predictions for a further test</b></p> <p><b>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</b> with support/as a group</p> <p><b>Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables</b> with support/as a group</p>	<p>Support what they have found out using their own experience and evidence Recognise a result that seems odd compared with other results</p> <p>Recognise the connection between the original question, enquiry results and whether they answer the question Consider if further results can be predicted from present data</p> <p>Participate actively in reporting on findings as part of a group Make suggestions on appropriate ways to record findings either as a group or individually</p>

KS1	Use observations and ideas to suggest answers to questions	<b>2</b>	<p><b>Use their observations and ideas to suggest answers to questions</b> and to make predictions</p> <p>Respond to suggestions to identify some evidence needed to answer a question</p> <p>Use understanding of what has been observed or own experience to predict outcomes of further actions or observations</p> <p><b>Report on and record findings</b> as drawings, photographs, labelled diagrams, orally, as displays, or in simple prepared tables or charts</p>	<p>Use scientific evidence and ideas to answer questions</p> <p>Recognise when results meet predictions or not</p> <p>Ask a new question based on observations or own experience, which may be testable</p> <p>Use appropriate simple scientific vocabulary when reporting or recording findings</p>
		<b>1</b>	<p><b>Use their ideas to suggest answers</b> to questions</p> <p>Say what has changed when observing objects, living things or events</p> <p>Respond to suggestions to connect what has been observed with possible further actions or observations</p> <p><b>Present findings</b> in simple templates provided for them or orally</p> <p>Draw or photograph evidence and label with support</p>	<p>Begin to recognise links between observations and answers to questions</p> <p>Make suggestions to connect what has been observed with possible further actions or observations</p> <p>Make some choices about how to present findings from a range offered to them</p>