









Working Scientifically – Progression of Disciplinary Knowledge

Milestone 1 Key Stage 1	Milestone 2 Lower Key Stage 2	Milestone 3 Upper Key Stage 2
<u>National Curriculum - Working scientifically</u>		
<ul style="list-style-type: none"> • Ask simple questions. • Observe closely, using simple equipment. • Perform simple tests. • Identify and classify. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions. 	<ul style="list-style-type: none"> • Ask relevant questions. • Set up simple, practical enquiries and comparative and fair tests. • Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. • 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, bar charts and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. • Identify differences, similarities or changes related to simple, scientific ideas and processes. • Use straightforward, scientific evidence to answer questions or to support their findings. 	<ul style="list-style-type: none"> • Plan enquiries, including recognising and controlling variables where necessary. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations. • Use test results to make predictions to set up further comparative and fair tests. • Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.

Disciplinary knowledge	EYFS	Milestone 1 Key Stage 1	Milestone 2 Lower Key Stage 2	Milestone 3 Upper Key Stage 2
<p>Ask scientific questions</p> 	<p>Begin to ask questions about the world around them.</p> <p>Notice and ask questions about differences.</p> <p>Understand simple questions (who, what, where, why) and ask questions to find out more</p>	<p>Ask simple questions.</p> <p>Ask yes/no questions to aid sorting.</p> <p>Choose a question to undertake a fair test.</p> <p>Ask a question about what might happen over time or that is linked to finding patterns.</p> <p>Recognise that questions can be answered in different ways.</p> <p>Ask questions and use simple secondary sources to find out information.</p>	<p>Ask relevant questions.</p> <p>Ask a range of yes/no questions.</p> <p>Ask a range of questions to undertake a fair test.</p> <p>Ask a range of questions about what might happen over time or that is linked to finding patterns.</p>	<p>Ask relevant questions.</p> <p>Ask a range of yes/no questions to aid sorting and decide which ways of sorting will give useful information.</p> <p>Ask a range of questions recognizing that some can be answered through research and others may not.</p> <p>Ask a range of questions and identify the type of enquiry that will help to answer the questions.</p> <p>Ask further questions based on results.</p>
<p>To make predictions</p> 	<p>Begin to answer the question: "What do you think will happen?"</p>	<p>Start to discuss simple predictions.</p>	<p>Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.</p> <p>Make simple predictions.</p> <p>Use results from an investigation to make a prediction about a further result.</p>	<p>Use test results to make predictions for further comparative investigations and fair tests.</p> <p>Make predictions.</p> <p>Start to use scientific knowledge to support predictions.</p>
<p>Plan an enquiry/set up tests</p> 	<p>Make choices and explore different resources and materials</p>	<p>Perform simple tests.</p> <p>Identify headings for two classification groups (it is.... It is not...)</p> <p>Choose equipment to use and decide what to do and what to observe or measure in order to answer a question.</p>	<p>Set up simple, practical enquiries and comparative and fair tests.</p> <p>Put appropriate headings onto venn diagrams.</p> <p>Choose a research source from a range provided.</p>	<p>Plan enquiries, including recognising and controlling variables where necessary.</p> <p>Identify specific questions that will help to sort.</p> <p>Choose suitable sources to use.</p>

			Decide what to change and what to measure or observe. Decide how often to take measurements.	Recognize and independently control variables when necessary. Decide how often to take measurements.
 <p>To observe</p>	<p>Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>Observe changes linked to the seasons.</p> <p>Observe differences and similarities</p>	<p>Observe closely, using simple equipment, e.g. ruler, timer, magnifying glass.</p> <p>Use observations and ideas to suggest answers to questions.</p> <p>Compare objects based on obvious, observable features, e.g. size, shape colour.</p> <p>Make simple observations over time (e.g. plant growth)</p> <p>Make simple observations with guidance about patterns and relationships.</p>	<p>Compare objects on more sophisticated, observable features.</p> <p>Present observations in labelled diagrams.</p> <p>Make a range of relevant observations linked to questions.</p> <p>Make observations over time.</p>	<p>Compare not only physical properties, but also knowledge gained through previous enquiry.</p> <p>Make a range of relevant observations linked to questions.</p> <p>Make observations over time.</p>
 <p>To take measurements</p>	<p>Start to use sand timers, sieves, jugs when guided</p> <p>Make comparisons between objects relating to size, length, weight and capacity</p>	<p>Measure using standard units where the numbers are marked on the scale.</p>	<p>Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.</p> <p>Measure using equipment where not all the numbers are marked on the scale.</p> <p>Take repeated readings where necessary.</p>	<p>Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision.</p> <p>Measure using standard units and measure off scales involving decimals.</p> <p>Take repeated readings where necessary.</p> <p>Use dataloggers to measure over time.</p>
<p>To record and present</p>	<p>Record observations pictorially/photos.</p>	<p>Gather and record data to help in answering questions.</p>	<p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p>	<p>Record data and results of increasing complexity using scientific</p>

<p>results/data</p> 	<p>Names are the beginnings of classification, e.g. naming plants, animals, etc</p> <p>Start to make marks which may be used as simple counts, e.g. how many bugs did you see?</p> <p>Sort materials</p>	<p>Record data in simple prepared tables, tally charts, pictorially, or photos.</p> <p>Sort objects and living things into two groups using a basic venn diagram or simple table.</p> <p>Present what they have learnt verbally, using pictures or simple diagrams.</p>	<p>Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.</p> <p>Prepare own tables to record data.</p> <p>Sort objects and living things into groups using venn and carroll diagrams.</p> <p>Present what they have learnt verbally, using labelled pictures, diagrams, bar charts or time graphs.</p>	<p>diagrams and labels, classification keys, tables, bar and line graphs, and models.</p> <p>Present findings in written form, displays and other presentations.</p> <p>Prepare own tables to record data, including columns for taking repeated readings.</p> <p>Create branching databases (tree diagrams) and keys to enable others to name living things and objects.</p>
<p>To interpret and communicate results/to draw conclusions</p> 	<p>Respond to new experiences</p> <p>Notice patterns</p> <p>Realise that their actions have an effect on the world</p> <p>Begin to offer explanations for why things might happen</p>	<p>Use observations and ideas to suggest answers to questions.</p> <p>Identify and classify.</p> <p>Talk about the number of objects in each classification group (e.g. more than, less than)</p> <p>Use observations, measurements and ideas to suggest answers to questions.</p> <p>Offer explanations for why things might happen.</p>	<p>Report on findings from enquiries, including oral and written explanations, displays, presentations of results and conclusions.</p> <p>Identify differences, similarities or changes related to simple, scientific ideas and processes.</p> <p>Use straightforward, scientific evidence to answer questions or to support their findings.</p> <p>Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.</p> <p>Spot patterns in classification data, particularly two criteria with no examples, e.g. there are no living things with wings.</p>	<p>Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.</p> <p>Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Talk about the features that items share/do not share, based on information in a key.</p> <p>Answer questions using scientific evidence gained from sources.</p> <p>Describe causal relationships, change over time and identify patterns.</p> <p>Identify, classify and group results. Discuss what they have in common/differences.</p>

			<p>Answer questions using simple scientific language and refer directly to evidence when answering questions.</p> <p>Provide oral or written explanations of their findings.</p>	<p>Provide more detailed oral or written explanations of their findings.</p>
<p>To evaluate</p> 			<p>Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.</p> <p>Suggest improvements.</p> <p>Suggest new questions arising from the investigation.</p> <p>Suggest limitations to research.</p> <p>Research using secondary sources.</p>	<p>Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Explain using evidence that the database/classification key will only work for living things/materials it was created for.</p> <p>Research using secondary sources.</p> <p>Talk about the degree of trust in the sources.</p> <p>Explain the degree of trust in their results.</p>