

# Newton Hill Community School Working Scientifically Overview and Skills



Working Scientifically Overview			
EYFS	KS1	LKS2	UKS2
<ul style="list-style-type: none"> <li>• Know how to ask questions about the world through beginning to use my senses - feeling, hearing, seeing</li> <li>• Know some important processes and changes in the natural world around them, including the seasons and some changing states of matter.</li> <li>• Children will observe melting ice and know that ice is frozen water.</li> <li>• Know about aspects of my familiar world such as the natural world, beginning to make and discuss observations.</li> <li>• Children will be able to talk about the lifecycle of a caterpillar and observe the stages of the life cycles of a caterpillar.</li> <li>• Observe changes to plants over time and talk about their observations.</li> </ul>	<ul style="list-style-type: none"> <li>• Ask simple questions and recognising that they can be answered in different ways</li> <li>• Perform simple tests</li> <li>• Observing closely, using simple equipment</li> <li>• Gathering and recording data to help in answering questions</li> <li>• Identify and classify</li> <li>• Using their observations and ideas to suggest answers to questions</li> </ul>	<ul style="list-style-type: none"> <li>• Ask relevant questions and using different types of scientific enquiries to answer them</li> <li>• Set up simple practical enquiries, comparative and fair tests</li> <li>• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>• Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• Identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> </ul>	<ul style="list-style-type: none"> <li>• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</li> <li>• Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>• Identify scientific evidence that has been used to support or refute ideas or arguments</li> <li>• Use test results to make predictions to set up further comparative and fair tests</li> <li>• 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</li> </ul>

# Working Scientifically Skills Progression

KS1

	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather and record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
<b>Classifying</b>	Be able to ask a Yes/No questions to aid sorting	Identify the headings for the two groups (it is ....., it is not .....)	Be able to compare objects based on obvious, observable features e.g. size, shape, colour, texture etc.			Sort objects and living things into two group using a basic Venn diagram or simple table	Talk about the number of objects in each group i.e. which has more or less	Children in KS1 are not expected to draw conclusions. They are expected to make observations which will help them to answer questions. They do not have the subject knowledge to give reasons for what they observe so they cannot draw scientific conclusions	Children in KS1 are not expected to make scientific predictions as they do not have the subject knowledge to do this. That does not mean that you should not ask children what they think may happen, but this will be based on experience or may simply be a guess.	Children in KS1 are not expected to evaluate. However, children should be encouraged to consider their method and adapt this where necessary.
<b>Researching</b>	Ask one or two simple questions linked to a topic					Present what they have learnt verbally or using pictures	Be able to answer their questions using simple sentences			
<b>Comparative/fair testing</b>	Identify the question to investigate from a scenario or choose a question from a range provided	Choose equipment to use and decide what to do and what to observe or measure in order to answer the question	Make observations linked to answering the question	When appropriate, measure using standard units where all the numbers are marked on the scale	Record data in simple prepared tables, pictorially or by taking photographs	Present what they learnt verbally, using pictures or block diagrams	Answer their question in simple sentences using their observations or measurements			
<b>Observing over time</b>	Ask a question about what might happen in the future based on an observation									
<b>Pattern seeking</b>	Ask a question that is looking for a pattern based on observations				Record data in simple, prepared tables and tally charts	Present what they learnt verbally				

# Working Scientifically Skills Progression

LKS2

	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather and record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
<b>Classifying</b>	Be able to ask a range of Yes/No questions to aid sorting	Be able to put appropriate headings onto intersecting Venn and Carroll diagrams	Be able to compare objects based on more sophisticated, observable features. Present observations in labelled diagrams			Sort objects and living things into groups using intersecting Venn and Carroll diagrams	Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs	Draw simple conclusions, when appropriate, for patterns e.g. a flying insect with no legs might always crash land		
<b>Researching</b>	Ask a range of questions linked to a topic	Choose a source from a range provided				Present what they learnt verbally or using labelled diagrams	Be able to answer their questions using simple scientific language			Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation
<b>Comparative/fair testing</b>		Decide what to change and what to measure or observe	As for KS1	Measure using standard units where not all the numbers are marked on the scale, and take repeat readings where necessary	Prepare own tables to record data	Present data in bar charts	Refer directly to their evidence when answering their question	Where appropriate provide oral or written explanations for their findings	Use results from an investigation to make a prediction about a further result	Suggest improvements e.g. to method of taking Suggest new questions arising from the investigation
<b>Observing over time</b>		Decide what to measure or observe. Decide how often to take a measurement.	Make a range of relevant observations	Measure using standard units where not all the numbers are marked on the scale. Use dataloggers to measure over time		Present data in time graphs				
<b>Pattern seeking</b>		Decide what to measure or observe	As for KS1	Measure using standard units where not all the numbers are marked on the scale.		Use ICT package to present data as a scattergram				

## Working Scientifically Skills Progression

UKS2

	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather and record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
Classifying	Be able to ask a range of Yes/No questions to aid sorting	Be able to put appropriate headings onto intersecting Venn and Carroll diagrams	Be able to compare objects based on more sophisticated, observable features. Present observations in labelled diagrams			Sort objects and living things into groups using intersecting Venn and Carroll diagrams	Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs	Draw simple conclusions, when appropriate, for patterns e.g. a flying insect with no legs might always crash land		
Researching	Ask a range of questions linked to a topic	Choose a source from a range provided				Present what they learnt verbally or using labelled diagrams	Be able to answer their questions using simple scientific language			Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation
Comparative/fair testing		Decide what to change and what to measure or observe	As for KS1	Measure using standard units where not all the numbers are marked on the scale, and take repeat readings where necessary	Prepare own tables to record data	Present data in bar charts, scatter graphs and line graphs	Refer directly to their evidence when answering their question	Where appropriate provide oral or written explanations for their findings	Use results from an investigation to make a prediction about a further result	Suggest improvements e.g. to method of taking Suggest new questions arising from the investigation
Observing over time		Decide what to measure or observe. Decide how often to take a measurement.	Make a range of relevant observations	Measure using standard units where not all the numbers are marked on the scale. Use dataloggers to measure over time		Present data in time graphs				
Pattern seeking		Decide what to measure or observe	As for KS1	Measure using standard units where not all the numbers are marked on the scale.						

## Working Scientifically Skills Progression

### UKS2

	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather and record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
Classifying	Be able to ask a range of Yes/No questions to aid sorting and decide which ways of sorting will give useful information	Identify specific clear questions that will help to sort without ambiguity	Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry			Create branching databases (tree diagrams) and keys to enable others to name living things and objects	Be able to talk about the features that objects and living things share and do not share based on the information in the key etc.	Be able to use data to show that living things and materials that are grouped together have more things in common than with things in other groups		Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for
Researching	Ask a range of questions recognising that some can be answered through research and others may not	Choose suitable sources to use				Present what they learnt in a range of ways e.g. different graphic organisers	Be able to answer their questions using scientific evidence gained from a range of sources			Be able to talk about their degree of trust in the sources they used
Comparative/fair testing	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results	Recognise and control variables where necessary	As for KS1	Measure using standard units using equipment that has scales involving decimals	Prepare own tables to record data, including columns for taking repeat readings	Choose an appropriate form of presentation, including line graphs	Be able to answer their question, describing causal relationships	Provide oral or written explanations for their findings	Use test results to make predictions for further investigations	Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled, and accuracy of results
Observing over time							Be able to answer their questions, describing the change over time			
Pattern seeking							Be able to answer their questions identifying patterns			

