



# Working Scientifically (Disciplinary knowledge) – Progression of skills

## National Curriculum

The National Curriculum states that working scientifically should be ‘embedded within the content of biology, chemistry and physics’

**Ofsted research review:** There are four main content areas for disciplinary knowledge:

1. Knowledge of methods that scientists use to answer questions
2. Knowledge of apparatus and techniques, including measurement
3. Knowledge of data analysis
4. Knowledge of how science uses evidence to develop explanations

Nursery F1	Reception F2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<b>Questioning</b>							
<p>Know that a question is a phrase/sentence which asks for information.</p> <p>Know how to ask simple questions about the immediate environment.</p>	<p>Know that a question is a phrase/sentence which asks for information.</p> <p>Know how to ask relevant questions about the immediate environment.</p>	<p>Ask simple questions and recognize that they can be answered in different ways.</p> <p>Know that questions can be used to gather information to support understanding.</p>	<p>Know that there are scientific questions and that there is more than one way of finding the answer.</p> <p>Know how to ask simple questions and recognize that they can be answered in different ways.</p> <p>Know how to use their observations and ideas to suggest answers to questions.</p>	<p>Know that questions can be asked and answered by carrying out a scientific enquiry.</p>	<p>Know that relevant scientific questions need to be asked and answered through different types of scientific enquiries.</p>	<p>Know that questions can be or might need to be refined through the scientific process.</p>	<p>Know that precision is achieved through refinement of both questioning and by control of the variables in a scientific enquiry.</p>
<b>Observing and measuring (apparatus and techniques including measurements)</b>							
Nursery F1	Reception F2	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Know that looking carefully at something provides more information about it.</p> <p>Notice things about the local environment.</p>	<p>Know that looking carefully at something provides more information about it.</p> <p>Notice and comment on things in the local environment.</p>	<p>Know that an appropriate choice of simple equipment will make observations more effective in the gathering of information.</p>	<p>Know that an appropriate choice of simple equipment will make observations more effective in the gathering of information.</p>	<p>Know that careful observations can form part of scientific enquiry.</p> <p>Know that data can be collected from observations and measurements.</p>	<p>Know that the quality of systematic observations in scientific enquiry is affected by how accurately equipment is used to gather data.</p>	<p>Know that specialized equipment can be used to observe and measure more accurately.</p> <p>Know that repeating an observation or measurement may provide</p>	<p>Know that the level and accuracy and precision will determine the success of scientific enquiry.</p> <p>Know how to take measurements using a range of scientific</p>



# Working Scientifically (Disciplinary knowledge) – Progression of skills

		Know how to observe closely using simple equipment.	Know how to observe closely using simple equipment.	Know how to make accurate measurements using standard units.	Know how to use systematic and careful observations and take accurate measurements using standard units and a range of equipment, including thermometers and data loggers.	more accurate information.  Know how to take measurements using a range of scientific equipment with increasing accuracy and precision.	equipment with increasing accuracy and precision
<b>Testing (develop explanations)</b>							
<b>Nursery F1</b>	<b>Reception F2</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
Know that information needed to answer a question, sometimes needs to be checked to make sure it is correct.  Know that a test is a way of checking something.	Know that information needed to answer a question, sometimes needs to be checked to make sure it is correct.  Know that a test is a way of checking something.	Know that a test is a procedure which can be used to check the accuracy of the information used to answer questions.	Know that there are different ways to perform a test using simple equipment.  Know how to perform simple tests.	Know that the process used to carry out a scientific enquiry must be fair.  Know how to set up simple practical enquiries, comparative and fair tests.	Know that if the procedure used in the scientific enquiry is not fair then the information gathered is unreliable.  Know how to set up and use simple practical enquiries, comparative and fair tests.	Know that the outcome of a fair test can inform and shape further enquiries.  Know how to plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	Know that the outcomes from fair tests support factual understanding of a scientific enquiry which may differ from opinion.  Know how to plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
<b>Identifying and classifying (develop explanations)</b>							
<b>Nursery F1</b>	<b>Reception F2</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
Know that it is possible to recognise something by its features.	Know that it is possible to recognise something by its features.  Know how to classify and sort objects using own criteria.	Know that by comparing common features, it is possible to group and sort objects, materials or living things.	Know that sorting and grouping by features and characteristics can be refined to give more accurate and detailed information.	Know that information collected during a simple scientific enquiry can be used to inform identification and classification.	Know that accurate identification and classification can be used to answer questions in a scientific enquiry.	Know that identification and classification can involve the organisation of a substantial amount of information and there are agreed methods for doing this e.g. keys, identification tables, graphs.	Know that the success of more complex scientific enquiry requires appropriate selection of the most effective method of classifying information.
<b>Predicting (develop explanations)</b>							
<b>Nursery F1</b>	<b>Reception F2</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
Know that ideas can be put forward for thinking and talking about.	Know that ideas can be put forward for thinking and talking about.	Know that ideas can be used to predict possible outcomes to a scientific enquiry.	Know that a prediction can be informed by prior knowledge and experience.	Know that a prediction is a starting point for further scientific enquiry.	Know that a prediction can be refined as a result of scientific enquiry and used	Know that knowledge gained from previous scientific enquiries can be used to inform a more	Know that an efficient and effective scientific enquiry should be based on an



# Working Scientifically (Disciplinary knowledge) – Progression of skills

	Know how to make a simple prediction and talk about what happens.			Know how to make and record predictions before testing.  Know how to suggest improvements and predictions for further test.	to inform the next stage of the process.	accurate prediction/hypothesis at the outset of a new enquiry.	informed hypothesis/prediction.
<b>Data analysis</b>							
<b>Nursery F1</b>	<b>Reception F2</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>
Know that information can be collected and shared with others.	Know that information can be collected and shared with others.	Know that there are many ways to collect and record information and this can be used by others.  Know how to gather and record data to help in answering questions.  Know how to use their observations and ideas to suggest answers to questions.	Know that recorded data can be used to find answers to questions.  Know how to gather and record data to help in answering questions.  Know how to use their observations and ideas to suggest answers to questions.	Know that recorded data is an important part of a scientific enquiry as it can be used to draw conclusions.  Know how to gather, record, classify and present data in a variety of ways to help answer questions.  Know how to explain what they have found out and use their measures to say whether it helps to answer their questions.	Know that inaccurately recorded data can be misleading and result in incorrect conclusions.  Know how to gather, record, classify and present data in a variety of ways to help answer questions.  Know how to report on findings from enquiries, including oral and written explanations, and presentations of results and conclusions.	Know that filtering data is an important step when drawing conclusions so that the most relevant information is used.  Know how to use test results to set up further comparative and fair tests.  Know how to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs.  Know how to identify scientific evidence that has been used to support or refute ideas or arguments.	Know that accurate data can be a powerful tool when supporting or refuting scientific ideas/arguments.  Know how to use test results to set up further comparative and fair tests.  Know how to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs.  Know how to identify scientific evidence that has been used to support or refute ideas or arguments