

## Science – Progression of Working Scientifically Skills

The skills for working scientifically are split into KS1, LKS2 and UPS2.

There are 10 areas for working scientifically, listed below.

There are 5 different Scientific Enquiry types, which are separate to the 10 different working scientifically skills.



Identifying and classifying

Comparative and fair testing

Pattern seeking

### Working scientifically skills

To ask scientific questions

To plan an enquiry

To observe closely

To measure accurately

To gather/record results

To present results

To interpret results

To draw conclusions

To make a prediction

To evaluate an enquiry

Researching

Observing over time

Skill	KS1 (Hedgehogs)	LKS2 (Badgers)	UKS2 (Owls)
To ask scientific questions	<p>NC statement Asking simple questions and recognising that they can be answered in different ways.</p> <p>Ensure these are questions, not statements.</p> <p>Questions could be linked to what something is, how something works, which is better, how things change.</p> <p>Children can use different enquiries where appropriate to answer the questions that they come up with.</p> <p>Questions could be developed through the teacher providing them with a given problem or scenario.</p> <p>Children to think about what resources they need to answer the question.</p>	<p>NC Statement Asking relevant questions and using different types of scientific enquiry to answer them.</p> <p>Children are forming questions more accurately, but not always linked to the topic itself. Guide children to ask questions linked to the topic.</p> <p>Children to be supported to choose an appropriate enquiry to answer the questions asked.</p>	<p>NC statement Planning different types of scientific enquiry to answer questions, including recognising and controlling variables where necessary.</p> <p>Children are more reliably asking questions linked to the topic. Encourage children to always ask questions that they do not know the answers to already.</p> <p>Children to plan own enquiry to answer questions.</p> <p>Children will form further questions after completing one enquiry. Children need to decide how to use resources to carry out own enquiry to find out the answer.</p>

Skill	KS1 (Hedgehogs)	LKS2 (Badgers)	UKS2 (Owls)
To plan an enquiry	<p>NC statement Perform simple tests</p> <p>Use practical resources provided for them. Discuss and decide how to use these. Answer questions using the resources which they have come up with themselves or which have been given to them by the teacher. They carry out a range of tests:</p> <ul style="list-style-type: none"> <li>- Tests to classify</li> <li>- Comparative tests</li> <li>- Pattern seeking enquiries</li> <li>- Observations over time.</li> </ul>	<p>NC statement Setting up simple practical enquiries, comparative and fair tests.</p> <p>Children to answer questions thought of by themselves or given to them by the teacher. Children to select resources that they need to carry out the test. Children to follow their plans to carry out a range of scientific enquiry, including observing, classifying, comparative and fair tests and pattern seeking.</p>	<p>NC Statement Planning different types of scientific enquiry to answer questions, including recognising and controlling variables where necessary.</p> <p>Children work more independently with the resources they have available to plan how they are going to carry out a scientific enquiry to find the answers to questions. They recognise and control variables in fair tests, observe over time and look for patterns.</p>

Skill	KS1 (Hedgehogs)	LKS2 (Badgers)	UKS2 (Owls)
To observe closely	<p>NC statement Observe closely, using simple equipment</p> <p>Children observe changes in the world around them over time. Children use their senses to support them to spot and identify changes. Children could use magnifiers or microscopes to help them observe changes more closely. Children can use measurements to observe changes over time, initially making comparisons of bigger or smaller, then moving on to non-standard units of measure.</p>	<p>NC Statement Making systematic and careful observations ...</p> <p>Children observe things systematically. For instance, knowing they need to observe hourly, daily and knowing that they need to observe the same things each time.</p>	<p>NC Statement Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Children to use their careful observations over time to answer questions, using the evidence from these observations to back up their arguments.</p>

	KS1 (Hedgehogs)	LKS2 (Badgers)	UKS2 (Owls)
To measure accurately	<p>NC Statement Observing closely, using simple equipment.</p> <p>Children initially record measurements using bigger or smaller comparisons. As children progress, they begin to measure using non-standard units for measure. For instance, they could measure a distance using cubes.</p>	<p>NC Statement Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Children are measuring using standard units of measure, using rulers or metre sticks for distance, grams or kilograms for weight. They can read different scales on thermometers.</p>	<p>NC Statement Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat reading when appropriate.</p> <p>Children continue to develop their confidence using the range of equipment used in LKS2. Children are now beginning to think about how accurate their measurements are and begin to take multiple readings where necessary to find a mean.</p>

	KS1 (Hedgehogs)	LKS2 (Badgers)	UKS2 (Owls)
To gather/record results To present results.	<p>NC statement</p> <p>Gathering and recording data to help in answering questions</p> <p>Children record observations through: Photographs, labels, drawings, labelled diagrams or in writing.</p> <p>Record results using pre drawn tables, pictograms, tally charts and block graphs</p> <p>Classifying carried out through pre prepared tables and sorting rings.</p>	<p>NC Statement</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.</p> <p>Children record their results in a variety of tally charts, bar charts and tables. Where appropriate, children to fill in pre prepared tables, but filling in the headings for the tables and charts themselves. Some children to begin to draw own tables and charts.</p> <p>Classifications can be recorded using tables, Venn diagrams and Carroll diagrams.</p>	<p>NC Statement</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Children decide how to present their results and which graph or chart is most relevant.</p> <p>Children can record their results using: tables, tally charts, bar charts, line graphs and scatter graphs.</p> <p>Children record classifications using: classification keys, tables, Venn diagrams and Carroll diagrams.</p> <p>Children to draw and label their own tables, keys, charts and graphs.</p>

	KS1 (Hedgehogs)	LKS2 (Badgers)	UKS2 (Owls)
To interpret results To draw conclusions	<p>NC statement Using their observations and ideas to suggest answers to questions.</p> <p>Children look at the information they have found out and consider what they have learned through carrying out the enquiry.</p>	<p>NC statements Using straightforward scientific evidence to answer questions or to support their findings. Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Children to come up with simple comparative statements based on the information and results that they have gathered.</p>	<p>NC statements Identifying scientific evidence that has been used to support or refute ideas or arguments. Reporting and presenting 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 presentations.</p> <p>Children explain what they have found out using their subject knowledge and key vocabulary. Children are able to question their results, suggesting when results do not look accurate. Children can look for patterns in results and find links in the natural world.</p>

	KS1 (Hedgehogs)	LKS2 (Badgers)	UKS2 (Owls)
To make a prediction	<p>KS2 only No NC statement</p> <p>Although children are not formally assessed in making predictions in KS1, it would be worth discussing with the children what they think might happen before carrying out a test. Why do they think this? Discussion should be based on experiences in their life. E.g. which material is most waterproof? Child might say the rubber, as I have rubber wellies, which I wear when it is raining.</p>	<p>NC statement Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Children to use their results and other information they have found out to make predictions based on evidence. For instance, if we have measured how far a toy car travels on a range of different surfaces, we could make a prediction based on these values for how far a toy car would travel on a similar surface before testing.</p>	<p>NC Statement Using test results to make predictions to set up further comparative and fair tests.</p> <p>Using the knowledge, they have found out from comparative and fair tests, children set up their own predictions to then find out by carrying out another test. E.g. We have found out that larger objects produce more air resistance. Now using the same size and shape piece of material, which thickness of material produces the most air resistance?</p>

	KS1 (Hedgehogs)	LKS2 (Badgers)	UKS2 (Owls)
TO evaluate an enquiry	<p>KS2 only No NC statement</p> <p>Although not assessed, the teacher throughout a scientific enquiry should question children, to find out what they are doing and why they are carrying out the test in the way they are. Children may need to be questioned to guide them if needed if the teacher can see that they are making a mistake, or not carrying out a fair test. This is the start of the children being able to evaluate what they are doing for themselves in LKS2.</p>	<p>NC statement Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Children are able to think about problems occurring with their chosen method and are able to adapt as they are carrying out an enquiry. Children could reflect on what would need to change when carrying out the enquiry if they were to do this again.</p>	<p>NC statement Recording and presenting 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>Children can evaluate any problems while carrying out the enquiry, which may have caused problems with the accuracy of the results. For instance, accuracy in reading measurements, accuracy in controlling the variables, and how reliable secondary sources of information are.</p> <p>They are able to identify any problems which can reduce the trust and accuracy in the data they have collected.</p>

How do you know which type of chart or graph to use to present your findings?

What I change	What I measure	Type of graph
Words	Words	No graph
Numbers	Words	No graph
Words	Numbers	Bar chart
Discreet numbers	Numbers	Bar chart
Numbers	Numbers	Line graph/Scatter graph