



Science Knowledge, Skills and Vocabulary Routeway

National Curriculum Requirements

The national curriculum for science aims to ensure that all pupils:

By the end of Key Stage 1

Working scientifically

The pupil can, using appropriate scientific language from the national curriculum:

- ask their own questions about what they notice
- use different types of scientific enquiry to gather and record data, using simple equipment where appropriate, to answer questions:
 - observing changes over time
 - noticing patterns
 - grouping and classifying things
 - carrying out simple comparative tests
 - finding things out using secondary sources of information
- communicate their ideas, what they do and what they find out in a variety of ways.

By the end of Key Stage 2

Working scientifically

The pupil can, using appropriate scientific language from the national curriculum:

- describe and evaluate their own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources
- ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources)
- use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate
- record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways
- raise further questions that could be investigated, based on their data and observations.

	Phase	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather/record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
Classifying	KS1	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			
	LKS2	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		Suggest improvement e.g. a wider range of objects – only looked at British trees. Suggest new questions arising from the investigation.
	UKS2	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	KS1	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			
	LKS2	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.
	UKS2	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	KS1	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			
	LKS2	Ask a range of questions linked to a topic	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 measurements. Suggest new questions arising from the investigation.
	UKS2	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	As for LKS2	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	KS1	Ask a question about what might happen in the future based on an observation	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 or using pictures	Answer their question in simple sentences using their observations or measurements			
	LKS2	Ask a range of questions linked to a topic	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.	Prepare own tables to record data	Present data in time 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 measurements. Suggest new questions arising from the investigation.
	UKS2	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	As for LKS2	Choose an appropriate form of presentation, including line graphs	Be able to answer their questions, describing the change over time	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
Pattern seeking	KS1	Ask a question that is looking for a pattern based on observations	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 and tally charts	Present what they learnt verbally	Answer their question in simple sentences using their observations or measurements			
	LKS2	Ask a range of questions linked to a topic	Decide what to measure or observe	As for KS1	Measure using standard units where not all the numbers are marked on the scale.	Prepare own tables to record data	Use ICT package to present data as a scattergram	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 measurements. Suggest new questions arising from the investigation.
	UKS2	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	As for LKS2	Choose an appropriate form of presentation, including scatter graphs	Be able to answer their questions identifying patterns	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

