

Disciplinary skills progression KS1, LKS2, UKS2

The table outlines the expected outcomes for each key stage. As children progress through the key stages, they will gradually develop and refine their skills. At the beginning of each key stage, learning will be highly supported with a structured, scaffolded approach. By the end of the first year, children will be working with more independence as teachers begin to reduce the level of support. At the start of the second year, children will have even greater independence, with minimal scaffolding, though they will still receive strong models. By the end of the second year, children will be working largely independently with only occasional support. Teachers will continue to be mindful of individual needs within the class, adjusting and scaffolding work as necessary to support all learners.

Assessment activity

Take place after the initial strong start input so the skills have been taught

Year 1 – pupils know

Year 2 – pupils know how to

	Methods to answer scientific questions		Apparatus and techniques, including measurement				Analysis, presentation and evaluation of scientific data to draw conclusion				Dev. of scientific knowledge	
KS1	Asking simple questions & using scientific enquiry to answer them	Identifying and classifying	Recording data	Observing closely using simple equipment e.g. hand lenses, egg timers	Observing changes over a period of time	Carrying out simple comparative tests	Gathering & recording data incl. drawing diagrams, making tables and charts	Noticing patterns, comparing and contrasting	Grouping and classifying things	Using observations and ideas to suggest answers to questions	Using secondary sources of information - books, photographs & videos	
	Pupils will know - Curiosity leads us to ask questions about the world - Scientific questions can be answered in different ways Pupils will be able to - Turn a statement into a question - Raise their own scientific questions - Suggest a suitable method for trying to find the answer to a given question	Pupils will know - Items can be grouped and classified according to common characteristics - A table is a clear way of recording groups of items Pupils will be able to - Use simple features to compare objects, materials and living things. - Decide how to group and classify items	Pupils will know: - There are different ways to find the answers to scientific questions Pupils will be able to - Measure accurately in centimetres	Pupils will know - Observing closely is an important skill needed by scientists - A magnifying glass helps us to examine things closely Pupils will be able to - Observe objects closely to make comparisons - Use a magnifying glass carefully	Pupils will know: Observing over time means watching something carefully to see how it changes little by little Children will be able to: Recognise and record changes over time	Pupils will know - Scientific enquiry often begins with a question - There are different ways to find the answers to scientific questions Pupils will be able to - Select suitable equipment to use - Carry out a simple test as directed	Pupils will know - A tally is a record of the number of items present - A diagonal line is drawn across four vertical tally marks to represent a group of five Pupils will be able to - Draw a tally chart - Count items and record the number of these accurately using tally marks	Pupils will know How to notice links between cause and effect. Pupils will be able to Begin to notice relationships and patterns. Start to draw simple conclusions.	Pupils will know - Items can be classified according to their shape. Pupils will be able to: - decide how to sort and classify objects into groups using simple features to compare objects.	Pupils will know - Careful observation of something can help answer questions about it. - Prior knowledge and experience of the world can help us to answer questions about it. Pupils will be able to - Observe something carefully - Use their observations to suggest answers to questions - Use their knowledge of the world around them to support their ideas and suggestions.	With support children can use a range of secondary sources, including books, websites, and video, to answer a question.	
	<u>Comparing and classifying (taught term 2)</u>		<u>Observation (taught term 1)</u>				<u>Gathering and recording data to help answer questions (taught term 5)</u>					
	Assessment activity YEAR 1 Pupils will know		Assessment activity YEAR 1 Pupils will know				Assessment activity YEAR 1 Pupils will know					
	- Present children with a table that has grouped objects by a certain feature. - Children explain what the table shows - Children are given headings for a new table to complete grouping objects by a characteristic		- Pupils answer the questions why do scientists observe objects - Pupils examine three objects with a magnifying glass and say/write what they observe				- Give children a tally chart that has classified items by shape - Children can answer questions about the tally chart.					
	Assessment activity YEAR 2 Pupils will know and pupils will be able to		Assessment activity YEAR 2 Pupils will know and pupils will be able to				Assessment activity YEAR 2 Pupils will know and pupils will be able to					
	- Pupils to be provided with a range of items to sort into two groups. - Pupils decide on two group names - Once complete write sentence. We have classified		- Provide pupils with three varieties of the same thing (something where all senses can be deployed. - Encourage pupils to observe the objects closely (magnifying glass) and identify the two that are the most similar or the two that are the most different - They should justify their reasoning considering size, shape, colour, texture and smell (Not taste).				Children to record a tally e.g. which is the most common material for... Children use the data collected to answer the question					
	<u>Asking simple questions and recognising they can be recorded in different ways (taught term 4)</u>		<u>Performing simple tests (taught term 3 after plants)</u>				<u>Using observations and ideas to suggest answers to questions (taught term 6)</u>					
	Assessment activity YEAR 1 Pupils will know		Assessment activity YEAR 1 Pupils will know				Assessment activity YEAR 1 Pupils will know					

	○ Show pictures related to seasons on the board ○ Children to come up with I wonder statements ○ Children turn I wonder statements into questions			○ Pose the question ‘do seeds need water to germinate?’ ○ Children to write three sentences about how they could observe, investigate and research this.		○ Children make observations about different items and why that material has been chosen. Thinking about what they already know ○ The umbrella is made out of plastic as plastic is waterproof.				
	Assessment activity YEAR 2 Pupils will know and pupils will be able to			Assessment activity YEAR 2 Pupils will know and pupils will be able to		Assessment activity YEAR 2 Pupils will know and pupils will be able to				
	○ Show pictures related to seasons on the board ○ Children to come up with I wonder statements ○ Children turn I wonder statements into questions ○ Children to be given observing, investigating and researching symbols and write a sentence about how they would get the answer.			○ Pose the question ‘do seeds need water to germinate?’ ○ Pupils to record. What they will observe and what equipment they will need (they do not need to do the test)		○ Children to be given an object and a question. (a plastic lunchbox, why is the lunchbox made of plastic? ○ Children to make an observation for example (plastic is light, strong and waterproof) ○ They then suggest an answer to the question. I think the lunchbox is made out of plastic as plastic is light, strong and waterproof. Lunchboxes need to be light for children to carry.				
	Methods to answer scientific questions			Apparatus and techniques, including measurement		Analysis, presentation and evaluation of scientific data to draw conclusion		Dev. of scientific knowledge		
LKS2 	Using different types of scientific enquiry to answer relevant questions	Making predictions	Setting up simple practical enquiries and comparative and fair tests	Taking accurate measurements using a range of equipment including thermometers and data loggers	Observing changes over time	Recording findings using bar charts, keys, tables, labelled diagrams	Noticing patterns, grouping and classifying things	Drawing and present results and conclusions (from enquiries and tests)	Make predictions for new values, suggest improvements & raise further questions	Use straightforward scientific evidence to support finding or answer questions
	Pupils will know: • There are different types of scientific enquiry • Some scientific questions can be answered in more than one way. Pupils will be able to: Select the most appropriate type(s) of enquiry to answer a scientific question.	Pupils will know: Pupils will be able to: make predictions based on what they know.	Pupils will know: • The independent variable is the variable that is changes in a comparative test. • The dependent variable is the variable that we measure to assess the effect of changing the independent variable. Pupils will be able to: start to make their own decisions about the best type of scientific enquiry to use. Identify the independent and dependent variable in a test. Work collaboratively to carry out a comparative test.	Pupils will know: • Observations and/ or measurements should be made systematically according to a plan • When selecting a measuring instrument, it is important to choose one with an appropriate scale. Pupils will be able to: • Identify what observations and/ or measurements are needed to try and answer a scientific question • Select an appropriate piece of equipment to use when measuring.	Pupils will know: In a pattern, the numbers change in a regular way. A trend is the general direction in which something is changing. Pupils will be able to: make systematic and careful observations. Ask questions about what they observe.	Pupils will know: There are different ways to record data and help to answer questions. The difference between a drawing and an annotated diagram Pupils will be able to: record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables Decide on an appropriate method to record data that will help them to answer a given question. Draw a table of information Draw an annotated diagram	Pupils will know: • Data can be gathered by observing, counting or measuring something Pupils will be able to: talk about criteria to classify, sort and group a range of objects/things. Children think about other questions raised by their results. They can talk and write about what they have found out with increasing confidence.	Pupils will know: There are different ways to record data and help to answer questions. Pupils will be able to: draw simple conclusions from their results. suggest improvements to an investigation. report these findings confidently orally or in written form.	Pupils will know: Children make predictions before and draw conclusions after an investigation Children use results to draw simple conclusions and make predictions for future tests. They suggest improvements and raise further questions.	Children make links between their own findings and other scientific evidence. Using this evidence to ask further questions or support their findings. They recognise similarities and differences between their own research/observations and other scientific evidence.
	<u>Comparative tests</u> <u>Taught in Term 5 (3) / Term 1 (4)</u>			<u>Gather data in a variety of ways to help answer questions</u> <u>Taught in Term 3 (3) / Term 5 (4)</u>		<u>How do scientists record their knowledge and understanding</u> <u>Taught in Term 1 (3) / Term 2 (4)</u>				
	Assessment activity Year 3 & 4: Provide pupils with a scientific question to answer by doing a comparative test. For example: Which leaf will fall to the ground in the shortest time? Explain how the test will be carried out Pupils are required to identify the independent and dependent variable (Year 3 – Matching activity. Year 4 No given options) Pupils work in small groups to set up and carry out the comparative test Encourage them to review the testing process, are their results valid?			Assessment activity Year 3 & 4 Using your previous science topic as context, create one(3) or two(4) scientific questions that require data to be collected to answer the question(s) Share the questions with the pupils Ask them to use the modelled process to rehearse deciding what data needs to be gathered and how they will be gathered and recorded to answer the given question (Ask a question > decide what data is needed > decide how to gather and record)		Assessment activity: Year 3 Provide class with some information to go into a table Children decide on the number of columns and rows Use a ruler to draw the table Add the headings and information into the table + Complete challenge activity			Assessment activity: Year 4 Draw an annotated diagram of a plant Add labels and describe the function of each part Provide class with some information to go into a table Children decide on the number of columns and rows Use a ruler to draw the table Add the headings and information into the table +Complete challenge activity	

	<u>Identify suitable types of enquiry to answer scientific questions</u> <u>Taught in Term 2 (3) / Term 4 (4)</u>			<u>Making systematic and careful observations and measurements deciding on the most appropriate equipment to use.</u> <u>Taught in Term 4 (3) / Term 3 (4)</u>		<u>Use data to draw simple conclusions</u> <u>Taught in Term 6</u>			
	<u>Assessment activity Year 3</u> For each question, decide what types of enquiry you would use to try and find the answer. Explain your reasoning. 1. Do seeds need water to grow? 2. How can we sort these foods into groups? 3. What are vertebrates? Challenge activity	<u>Assessment activity Year 4</u> For each question, decide what types of enquiry you would use to try and find the answer. Explain your reasoning. 1. Do seeds need water to grow? 2. How can we sort these animals into groups? 3. What are food chains? Challenge activity	<u>Assessment activity Year 3</u> Complete the table to show what you would measure or observe to find out the answer to this question. Which material wrapped around a container keeps the water cold for the longest?	<u>Assessment activity Year 4</u> Complete the table to show what you would measure or observe to find out the answer to this question. On which surface will a toy car take the least amount of time to travel from top to bottom of a ramp?	<u>Assessment activity Year 3</u> Look at the table of information. Look at some given conclusions. Which conclusion best answers the data given?		<u>Assessment activity Year 4</u> Considering the table of information, write a conclusion based on the data given.		
	Methods to answer scientific questions			Apparatus and techniques, including measurement		Analysis, presentation and evaluation of scientific data to draw conclusion			Dev. of scientific knowledge
UKS2 	Planning different types of scientific enquiry to answer relevant questions	Recognising and controlling variables	Understanding the nature and use of models	Taking accurate measurements using a range of equipment with increasing accuracy and precision	Repeat readings for reliability	Recording findings using bar charts, keys, tables, labelled diagrams, scatter graphs, line graphs, causal relationships	Using test results to make predictions to set up further comparative or fair tests	Reporting and presenting findings incl. conclusions, causal relationships & degrees of trust	Identifying scientific evidence to support or refute ideas or arguments
	<u>Pupils will know:</u> <u>Pupils will be able to:</u> - Use and develop keys and other information records to identify, classify and describe living things and materials, and - Raise their own relevant questions about the world around them - Make their own decisions about the best use of scientific enquiry to answer questions.	<u>Pupils will know:</u> - The independent variable is the variable that is changed in a fair test. - The dependent variable is the variable that we measure in a fair test to assess the effect of changing the independent variable - Variables that are kept the same in a fair test are called constants. <u>Pupils will be able to:</u> - Identify the independent variable and the dependent variable in a fair test - Identify the variables that need to be kept the same in a fair test (the constants) - Plan and carry out a fair test.	<u>Pupils will know:</u> - The scales measuring instruments are subdivided into regular increments - The meniscus is the curved surface at the top of the liquid formed in response to the container - The volume of a liquid should be measured when at eye level with the top of the liquid. <u>Pupils will be able to:</u> - Work out the value of increments on scales - Read scales accurately - Measure the volume of a liquid accurately - choose the most appropriate equipment to make measurements and explain how to use it accurately	<u>Pupils will know:</u> - Scientists need to trust their data before using them to draw conclusions - Data that are inconsistent or inaccurate are called rogue data. - Repeating measurements reduces the likelihood of inaccuracies and invalid conclusions. <u>Pupils will be able to:</u> - Identify rogue data in a set of results - Suggest possible reasons for anomalies in data - Repeat readings to improve the reliability of data.	<u>Pupils will know:</u> - The type of data informs the style of graph used to represent it - Discrete data are best represented as a bar graph - Line graphs represent continuous data and show changes and trends over time - Scatter graphs show whether there is a correlation between two variables <u>Pupils will be able to:</u> - Distinguish between discrete data and continuous data. - Decide on the most appropriate type of graph to represent a given set of data. - Construct a line graph accurately - Plot and interpret a scatter graph.	<u>Pupils will know:</u> - Observations and results from a scientific test can lead to a further question - A hypothesis is an idea that is based on a few known facts but has not yet been proved to be correct - Prior knowledge should be used to inform a prediction. <u>Pupils will be able to:</u> - Raise a further question to investigate from their observations or from a set of data. - Form a hypothesis - Make a prediction informed by prior knowledge	<u>Pupils will know:</u> - A conclusion should be supported by evidence - A conclusion should be explained using scientific knowledge and understanding - A conclusion should be concise <u>Pupils will be able to:</u> - Identify patterns and trends in data - Draw a simple conclusion that is consistent with the given data - Explain a conclusion drawing on scientific knowledge and understanding.	Children raise their own relevant questions about the world around them and link their ideas for testing to their scientific knowledge Children use evidence from primary and secondary sources to justify ideas. They identify evidence that supports or refutes their ideas Children begin to separate opinion from fact. They can also talk about how scientific ideas have developed overtime.	

<u>Recognising and controlling variables</u> <u>Taught in term 3 (5&6)</u>	<u>Measuring accurately</u> <u>Taught in Term 2 (5) and Term 6 (6)</u>	<u>Recording Data and Results using different graphs</u> <u>Taught in Term 1 (5 & 6)</u>	
<u>Assessment activity</u> Provide pupils with a scientific question to answer by doing a fair test. This can be linked from a previous unit. e.g. how does the angle of the slope affect the time taken for a toy car to travel down it? Decide on how you might carry out the investigation and identify the Independent and dependent variable and the constants. Pupils can work in small groups to set up and carry out the investigation.	<u>Assessment activity</u> Add some water to a container. Crouch down to identify the meniscus Read the volume at the lowest point of the curve of the meniscus Explain how to measure the volume of liquid accurately.	<u>Assessment activity (5) :</u> Construct a line graph using the given data to show the change over time.	<u>Assessment activity (6) :</u> Construct a line graph using pupils' own data to show the change in something over time.
<u>Using test results to raise questions and make predictions to set up further comparative and fair tests</u> <u>Taught in term 5 (5) and Term 5 (6)</u>	<u>Identifying and explaining anomalies in data</u> <u>Taught in Term 4 (year 5)</u>	<u>Drawing and explaining conclusions</u> <u>Term in term 2 (Year 6) and Term 6 (5)</u>	
<u>Assessment activity</u> Using the data, create a new question by changing one of the constants. Make an observation, ask a question, form a hypothesis, make a prediction. Ideally, pupils should use data from a previous investigation. If not available, use the data provided.	<u>Assessment activity</u> Use the 'attempt task' as an independent assessment. Provide pupils with the data 1. Can you identify the anomalies? 2. What might have caused the anomalies? 3. What would you do to make sure the data was reliable?	<u>Assessment activity Year 5</u> Apply 1 Look at the table of results from a test to find out on which surface a toy car takes the least time to travel. Is this a fair or comparative test? Write a conclusion consistent with the data.	<u>Assessment activity year 6</u> Apply 2 Write a conclusion consistent with the data provided from a test to find out how the angle of a ramp affects the distance travelled by a toy car.