

SHCPS Progression in Science: Working Scientifically

	EYFS	KS1	LKS2	UKS2
	Three and Four-Year-Olds Reception Early Learning Goals			
Asking Questions and Carrying Out Fair and Comparative Tests	Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" Use all their senses in hands-on exploration of natural materials. Explore how things work. Ask questions to find out more and to check what has been said to them. Make comments about what they have heard and ask questions to clarify their understanding.	Ask simple questions and recognise that they can be answered in different ways. Perform simple tests. Children can: - Explore the world around them, leading them to ask some simple scientific questions about how and why things happen; - Begin to recognise ways in which they might answer scientific questions; - Ask people questions and use simple secondary sources to find answers; - Carry out simple practical tests, using simple equipment; - Experience different types of scientific enquiries, including practical activities; - Talk about the aim of scientific tests they are working on.	Ask relevant questions and use different types of scientific enquiries to answer them. Set up simple practical enquiries, comparative and fair tests. Children can: - Start to raise their own relevant questions about the world around them in response to a range of scientific experiences; - Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; - Recognise when a fair test is necessary; - Help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used; - Set up and carry out simple comparative and fair tests.	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Using test results to make predictions to set up further comparative and fair tests. Children can: - With growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences; - With increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; - Explore and talk about their ideas, raising different kinds of scientific questions; - Ask their own questions about scientific phenomena; - Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; - Make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; - Plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary; - Use their test results to identify when

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				further tests and observations may be needed; Use test results to make predictions for further tests.
Observing and Measuring Changes	Use all their senses in hands-on exploration of natural materials. Explore how things work. Explore the natural world around them. Describe what they see, hear and feel while they are outside. Explore the natural world around them, making observations and drawing pictures of animals and plants. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Observe closely, using simple equipment. Children can: - Observe the natural and humanly constructed world around them; - Observe changes over time; - Use simple measurements and equipment; - Make careful observations, sometimes using equipment to help them observe carefully.	Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Children can: - Make systematic and careful observations; - Observe changes over time; - Use a range of equipment, including thermometers and data loggers; - Ask their own questions about what they observe; - Where appropriate, take accurate measurements using standard units using a range of equipment.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Children can: - Choose the most appropriate equipment to make measurements and explain how to use it accurately; - Take measurements using a range of scientific equipment with increasing accuracy and precision; - Make careful and focused observations; - Know the importance of taking repeat readings and take repeat readings where appropriate.

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Identifying, Classifying, Recording and Presenting Data	Explore collections of materials with similar and/or different properties. Explore how things work. Learn new vocabulary. Use new vocabulary in different contexts. Articulate their ideas and thoughts in well-formed sentences. Describe events in some detail. Make comments about what they have heard and ask questions to clarify their understanding.	Identify and classify. Gather and record data to help in answering questions. Children can: - Use simple features to compare objects, materials and living things; - Decide how to sort and classify objects into simple groups with some help; - Record and communicate findings in a range of ways with support; - Sort, group, gather and record data in a variety of ways to help in answering questions such as in simple sorting diagrams, pictograms, tally charts, block diagrams and simple tables.	Gather, record, classify and present data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Children can: - Talk about criteria for grouping, sorting and classifying; - Group and classify things; - Collect data from their own observations and measurements; - Present data in a variety of ways to help in answering questions; - Use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge; - Record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables.	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Children can: - Independently group, classify and describe living things and materials; - Use and develop keys and other information records to identify, classify and describe living things and materials; - Decide how to record data from a choice of familiar approaches; - Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.

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Drawing Conclusions, Noticing Patterns and Presenting Findings	Talk about what they see, using a wide vocabulary. Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. Use new vocabulary in different contexts. Make comments about what they have heard and ask questions to clarify their understanding. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.	Use their observations and ideas to suggest answers to questions. Children can: - Notice links between cause and effect with support; - Begin to notice patterns and relationships with support; - Begin to draw simple conclusions; - Identify and discuss differences between their results; - Use simple and scientific language; - Read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1; - Talk about their findings to a variety of audiences in a variety of ways.	Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Children can: - Draw simple conclusions from their results; - Make predictions; - Suggest improvements to investigations; - Raise further questions which could be investigated; - First talk about, and then go on to write about, what they have found out; - Report and present their results and conclusions to others in written and oral forms with increasing confidence.	Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Children can: - Notice patterns; - Draw conclusions based in their data and observations; - Use their scientific knowledge and understanding to explain their findings; - Read, spell and pronounce scientific vocabulary correctly; - Identify patterns that might be found in the natural environment; - Look for different causal relationships in their data; - Discuss the degree of trust they can have in a set of results; - Independently report and present their conclusions to others in oral and written forms.

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Using Scientific Evidence and Secondary Sources of Information			Identify differences, similarities or changes related to simple scientific ideas and processes. Use straightforward scientific evidence to answer questions or to support their findings. Children can: - Make links between their own science results and other scientific evidence; - Use straightforward scientific evidence to answer questions or support their findings; - Identify similarities, differences, patterns and changes relating to simple scientific ideas and processes; - Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.	Identify scientific evidence that has been used to support or refute ideas or arguments. Children can: - Use primary and secondary sources evidence to justify ideas; - Identify evidence that refutes or supports their ideas; - Recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact; - Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas; - Talk about how scientific ideas have developed over time.
Key Knowledge & Vocabulary		<u>Learning and vocabulary</u> <u>properties, observe, test, magnifying glass, object, record, equipment</u> - Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science; - Know that we can use magnifying glasses to observe objects closely; - Know that we can test our questions to see if they are true; - Know that objects can be identified or sorted into groups based on their	<u>Learning and vocabulary</u> <u>prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis</u> - Know that we can ask questions and answer them by setting up scientific enquiries; - Know how to make relevant predictions that will be tested in a scientific enquiry; - Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all	<u>Learning and vocabulary</u> <u>line graph, relationship, outlier</u> - Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth); - Know how to identify conditions that were imperfectly controlled and can explain how these might affect results ; - Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders

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		observable properties; Know that we can write down numbers and words or draw pictures to record what we find.	other conditions are kept the same; - Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches; - Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table; - Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion; - Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry; - Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true; - Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an	and beakers, recognizing the relative accuracy of each device; - Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement; - Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion; - Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary; - Know examples of instances where scientific evidence has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection).

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			enquiry; - Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc); - Know that they can draw conclusions from the findings of other scientists; - Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry.	