

St Sebastian's Science Process Knowledge Progression (Working Scientifically)

	Science Process Knowledge (Working Scientifically)
National Curriculum:	Key Stage 1 Pupils should be taught to: • Asking simple questions and recognising that they can be answered in different ways • Observing closely, using simple equipment • Performing simple tests • Identifying and classifying • Using their observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions •
	Lower Key Stage 2 Pupils should be taught to: • Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Identifying differences, similarities or changes related to simple scientific ideas and processes • Using straightforward scientific evidence to answer questions or to support their findings •
	Upper Key Stage 2 Pupils should be taught to: • Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs • Using test results to make predictions to set up further comparative and fair tests • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations • Identifying scientific evidence that has been used to support or refute ideas or arguments

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	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Ask Questions and Predict	Know how to answer some 'why' questions. Know how to ask questions to find out more	Know how to ask questions about the world. Know how to make predictions, with support	Know how to ask questions about the world and make predictions	Know how to ask relevant questions and answer them by setting up scientific enquiries Know how to make relevant predictions that will be tested in a scientific enquiry		Know how to use results from scientific enquiries to ask further questions and make further predictions.	
Use Comparative and Fair Testing	Know how to interact with tests that adults have set up.	Know that we can test our questions to see if they are true Know how to carry out simple tests with support	Know how to compare things to test a question, with support. Start to know what a fair test is by carrying one out with support	Know how to set up simple enquiries and tests. Know that a comparative test compares events or materials which give a different outcome Know that in a fair test: - only one thing is altered (independent variable) - one thing may change as a result so is measured (dependent variable) - while all other conditions are kept the same (controlled variables)	Know when to use a fair test and why it is necessary Know, with support, how to explain why they might use a particular method of scientific enquiry eg comparative or fair test	Know what type of enquiry to carry out, including whether to conduct a comparative or fair test Know how to choose appropriate equipment and variables to test a scientific question Know how to identify and control variables Know how to set up further tests after analysing the results of their first scientific enquiry	
Observe, Measure, use Equipment	Know how to make observations of the world Know how to choose equipment they want to use	Know when we observe the world to answer our questions, this is science. Know how to look for patterns eg how the trees change with the seasons Know that we can use magnifying glasses to observe objects closely Know a thermometer measures temperature	Know how to observe changes over time. Know how to look for patterns eg how offspring grow into adults Know how to make simple measurements using a ruler (cm) and thermometer	Know how to make careful and systematic observations Know how to use rulers and stopwatches to measure accurately	Know how to make decisions about what to observe or measure. Know how to use thermometers and data loggers (eg sound) to measure accurately	Know how to make decisions about what equipment to use to measure accurately Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers.	Know how to independently select equipment to use and make precise measurements. Know how to accurately measure using a protractor to 1 degree Know how and when to repeat measurements

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Identify, Group and Classify	Know how to recognise some similarities and differences	Know that objects can be identified or sorted into groups based on their observable properties	Know how to identify and group objects, foods and living things	Know how to describe criteria used for grouping materials and foods	Know how to draw and use a simple classification key	Know how to compare and group materials based on their properties: solubility, conductivity, transparency, response to magnets.	Know how to create a more complex classification key (arthropods)
Collect, Analyse and Communicate Data	Know how to verbally describe what they notice Know how to use talk to explain how things work and why they might happen	Know that we can write down numbers, words or draw pictures to record what we find – including colouring bars on a prepared bar chart	With support, know how to write a simple method Know how to draw a simple diagram with labels Know how to add numbers or words to a table. Know how to answer simple questions about data	Know – with structured guidance – how to write a simple scientific enquiry write-up including: a question ; a method (a list of equipment, a numbered method and sometimes a diagram); a prediction ; a detailing of results and a conclusion Know how to draw a bar chart. Know how to label a diagram using lines to connect information to the diagram Know how to use a coloured key eg to show where a shadow is Know how to draw a neat table and label it Know how to use results to draw simple conclusions Know how to suggest ways to improve a test e.g. by repeating measurements (within conclusion). Know how to use results to raise further questions and make further simple predictions (within conclusion) Know how to give a brief oral explanation of what was found in a scientific enquiry – this can be during the lesson, not in front of the class COVER ALL THIS KNOWLEDGE IN YEAR 3 AND AGAIN IN YEAR 4 SO THAT PUPILS CAN EMBED THE KNOWLEDGE IN YEAR 4 (So they are ready for even more independence in Year 5 and 6)	Know how to independently write a simple scientific enquiry write-up including: question, method (equipment/numbered steps/diagram), prediction, results (observation/diagram/chart/table/graph) and conclusion Know how to present data (results) in a variety of ways: diagrams, bar charts, keys, tables and line graphs (taught in Y5) Know how to identify conditions that were imperfectly controlled and explain how these might have affected results (within conclusion) Know how a test could be improved and when further observations or tests might be needed (within conclusion)	Know how to independently write a scientific enquiry Know how to present data in the most suitable way for the scientific enquiry Know how to recognize an outlier from a set of data because it varies from an identified pattern Know how to find an average of a set of measurements Know how to identify conditions that were imperfectly controlled and explain how these might have affected results, including why outliers may have occurred (within conclusion) Know how to use results to make further predictions (Within conclusion) Know how to <u>present</u> brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary	
Research	Know how to listen and talk about a non-fiction book to develop a deeper familiarity with new knowledge and vocabulary linked to science	Know how to gather data from non-fiction sources to answer a question		Know that they can draw conclusions from the findings of other scientists		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)	