Bishop's Castle Primary School

Working Scientifically Progression

Working Scientifically				
Strand	**EYFS**	**End of KS1 (Y2)**	**Mid KS2 (Y4)**	**End of KS2 (Y6)**
Vocabulary	Question, answer, observe, same, different, measure, test, record, plan	Observing, equipment, identify, predict, sort, group, compare, differences, similarities, describe, pattern, measurements, test, fair, results, record, diagram, chart	Explanation, conclusion, prediction, criteria, classify, changes, data, contrast, evidence, improve Secondary sources, guides, keys, construct, interpret, Identify, classify Research- relevant question Comparative and fair test, pattern seeking, observation over time Equipment, Standard units, record, datalogger, Drawings, labelled diagram, keys, bar charts, tables	Variables, accuracy, precision, repeat readings, predictions Systematic patterns, quantitative measurements, Scientific diagrams, classification keys, scatter graphs, line graph Conclusions, casual relationships Explanations, degree of trust Evidence, support refute, Biology, physics, chemistry
1 Asking Questions **recognising that they can be answered in different ways** What do you want to find out? How can you answer your question? What sort of enquiry should you use? What will you observe? What will you measure? What will you need? What will you use? How will you record it?	• Children are encouraged to be curious about the world around them through a hands-on approach to learning. • Following exploration they are encouraged to suggest ideas and try them out.	**Ask simple questions and recognise that they can be answered in different ways** • While exploring the world the children develop their ability to ask questions (e.g. What something is, how things are similar or different, how things change and how they happen) • The children answer questions developed with the teacher through a planned context or experience. e.g. a story, hands-on exploration • Children are involved in planning how to use resources provided to answer questions and begin to use and recognise there are different types of enquiry, to help answer them, including: observing over time, noticing patterns, grouping and classifying things, simple comparative tests finding things out using secondary sources of information • They are encouraged to think about what might happen based on their prior knowledge.	**Ask relevant questions and using different types of scientific enquiries to answer them** • They consider their prior knowledge when asking questions about the world around them. • They independently use a range of question stems • The children answer questions posed by themselves and the teacher. • Given a range of resources they decide for themselves how to gather evidence to answer the question. • They identify the type of enquiry that they have chosen to answer their question (see KS1)	**Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** • Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. • Given a wide range of resources they decide for themselves how to gather evidence to answer a scientific question. • They choose a type of enquiry to carry out and justify their choice.

Working Scientifically				
Strand	**EYFS**	**End of KS1 (Y2)**	**Mid KS2 (Y4)**	**End of KS2 (Y6)**
2 Secondary sources	They begin to recognise that some answers can be found in photos, diagrams and labels in secondary sources.	• They use simple secondary sources to find answers to their questions, looking at the pictures, photographs, labels, text for information, information sheets to name living things	• They begin to recognise when secondary sources can be used to answer questions that cannot be answered through practical work.	**Identifying scientific evidence that has been used to support or refute ideas or arguments** • They recognise how secondary sources can be used to answer questions that cannot be answered through practical work. • They recognise which secondary sources will be most useful to research their ideas and begin to separate fact from fiction • They talk about how scientific ideas have developed over time
3 Observations and measurements	They use their senses to observe the world around them They measure by comparison or non-standard measures using counting.	**Observing closely, using simple equipment** • They explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or pocket microscopes to make their observations. • They begin to take measurements initially by comparison, then using non-standard and beginning to use standard measures. Put a number on it to compare. • They plan what they will observe and how they will measure.	**Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** • They make systematic and careful observations • They use a range of equipment for measuring length, time, temperature and capacity. • They use standard units for their measurements • They help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used	**Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** • They select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter and decide the degree of accuracy/scale • During an enquiry they make decisions e.g. whether they need to take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time(; or check further secondary sources (researching); in order to get accurate data (closer to the true value
4 Practical enquiry Classify Compare simple fair tests observations over time pattern seeking	They are confident to find the resources they need to answer a question and look carefully/use their senses to describe what they see/hear/feel	**Perform simple tests** • They use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out tests **to classify, comparative tests, pattern seeking enquiries and make observations over time** • Begin to recognise when a test is not fair Note A **comparative test** is performed by changing a variable that is qualitative e.g. the type of material or shape of the parachute, this leads to a ranked outcome	**Setting up simple practical enquiries, comparative and fair tests** • They select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher. • They follow their plan to carry out: observations and tests to classify, comparative and **simple fair tests**; observations over time and pattern seeking Note A **fair test** is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.	**Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** • The children select from a range of practical resources to gather evidence to answer their questions. • They carry out fair tests recognising and **controlling variables.** They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample.

Working Scientifically				
Strand	**EYFS**	**End of KS1 (Y2)**	**Mid KS2 (Y4)**	**End of KS2 (Y6)**
5 Identifying, classifying, grouping, pattern seeking	With guidance, they begin to notice patterns and relationships in their results. They begin to group objects, living things and materials into groups.	**identifying and classifying** • They use their observations and testing to compare objects, materials, and living things. They sort and group these things, identifying their own criteria for sorting • They use simple secondary sources e.g. identification sheets to name living things. They describe the characteristics they used to identify a living thing. • They classify using simple prepared tables and sorting rings	**Identify differences, similarities or changes and patterns related to scientific ideas and processes** • They begin to identify naturally occurring patterns and causal relationships and decide what data to collect to identify them. • They talk about criteria for grouping, sorting and classifying; and use simple keys. • They begin to use classification keys to identify living things and begin to construct their own	• They use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. • They record classifications e.g. using Venn diagrams, Carroll diagrams and classification keys. • and identify patterns that might be found in the natural environment.
6 Recording and presenting evidence	They record their observations in photos, drawings annotated by the teacher. They record their measurements by drawing non-standard measurements or drawing comparisons	**Gathering and recording data to help in answering questions** • They record their observations using photographs, drawings, labelled diagrams or in writing • They record their measurements in prepared tables, pictograms, tally charts and block graphs e.g. human block graph, physical blocks • They can put a number on it to compare results. E.g. it rolls to the end of the table= 10, middle=5, beginning=0 • They classify using simple prepared tables and sorting rings	**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** • They begin to decide how to record and present evidence. • They record their observations e.g. using photos, videos, pictures, labelled diagrams, or writing • They record their measurements e.g. tables, tally charts (given templates, if required to which they add headings). • They record classifications e.g. using tables, Venn diagrams, Carroll diagrams. • They are supported to present the same data in different ways in order to help with answering the question.	**Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** • They decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. • They record measurements e.g. using tables tally charts, bar charts, line graphs and scatter graphs. • They record classifications e.g. using Venn diagrams, Carroll diagrams and classification keys. • They present the same data in different ways in order to help with answering the question

Working Scientifically				
Strand	**EYFS**	**End of KS1 (Y2)**	**Mid KS2 (Y4)**	**End of KS2 (Y6)**
7 Answering questions and concluding What is the answer to your question? What does your evidence mean? What did you find out? How can you tell? Is there anything odd? What could have caused this? Do you trust your results? How could you change what you did to make your evidence more reliable? What new questions do you have?	They begin to use what they have observed to explain why they think events have happened and suggest simple reasons. They may be able to relate this to information they already know.	**using their observations and ideas to suggest answers to questions** • They use their experiences to suggest appropriate answers to questions. • They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. • They recognise biggest and smallest, best and worst etc from their data	**Using straightforward scientific evidence to answer questions or to support their findings.** • They answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. Their answers are consistent with the evidence. **Identify differences, similarities or changes and patterns related to scientific ideas and processes** • Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships **Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** • They draw conclusions based on their evidence and current subject knowledge They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.	**identifying scientific evidence that has been used to support or refute ideas or arguments** • When answering questions based on their observations and measurements or from secondary sources, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answers. • They talk about how their scientific ideas change due to new evidence that they have gathered. • They talk about how new discoveries change scientific understanding. **Reporting and presenting 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** • In their conclusions, they identify causal relationships and patterns in the natural world form their evidence: identify results that do not fit the overall pattern; and explain their findings using their subject knowledge
8 Evaluating, raising further questions and predictions	Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary; - Offer explanations for why things might happen, making use of recently introduced vocabulary		**using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** • They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry. • They use their evidence to suggest values for different items using the same method e.g. the distance travelled by a car on an additional surface • Following a scientific experience, they ask further questions which can be answered by extending the same enquiry	**Using test results to make predictions to set up further comparative and fair tests** • They evaluate e.g. the choice of method used, the control variables, the precision and accuracy of the measurements and the credibility of secondary sources used. • They identify any limitations that reduce the trust they have in their data • They use scientific knowledge gained formed enquiry work to make predictions they can investigate in further comparative or fair tests

Working Scientifically				
Strand	**EYFS**	**End of KS1 (Y2)**	**Mid KS2 (Y4)**	**End of KS2 (Y6)**
9 Communicating findings	They are supported to present their findings in different ways e.g. a class song, reporting to peers or another class	**Communicating their findings** • They begin to use simple scientific language to • talk about what they did and what they have found out, referring back to the original question • They present their findings in different ways. E.g. a letter to a story character to tell them what they found out, class presentation	**Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** • They communicate their findings to an audience both orally and in writing using appropriate scientific vocabulary	**Reporting and presenting 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** • They communicate their findings to an audience using relevant scientific language and illustrations