Springbank Primary School – Working scientifically knowledge organiser

Process	Sub-process	Reception The World	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Planning investigations	Ask simple questions	UOW:The World 30-50 M: Comments and asks questions about aspects of the familiar world Talks about why things happen and how things work.	With support pupils can ask simple questions that can be tested.	Pupils can ask simple questions that can be tested.	Pupils can, with support, develop relevant, testable questions.	Pupils can develop relevant, testable questions.	Pupils can develop relevant, testable questions.	Pupils can develop relevant, testable questions.
	Plan simple enquiries	N/A at this stage	Pupils can with prompting identify ways of gathering evidence to answer a question.	Pupil can identify different ways of gathering evidence to answer a question.	Pupils can begin to plan enquiries, such as comparative or fair testing and make observations.	Pupils can plan enquiries, such as comparative or fair testing and make observations.	Pupils can, with support, answer questions using evidence gathered from different types of scientific enquiries, comparative and fair tests, observe changes over time, surveys and secondary research.	Pupils can answer questions using evidence gathered from different types of scientific enquiries, comparative and fair tests, observe changes over time, surveys and secondary research.
	Identify and manage variables	N/A at this stage	N/A at this stage	N/A at this stage	Pupils can with support set up a comparative fair test and begin to identify which variable to measure (dependent variable) and which variable to change (independent variable).	Pupils can set up comparative and fair tests identifying which variable to measure (dependent variable) and which variable to change (independent variable).	Pupils can with support identify and manage variables identifying which variables to measure (dependent variable), change (independent variable) and keep the same (control variables).	Pupils can identify and manage variables identifying which variables to measure (dependent variable), change (independent variable) and keep the same (control variables)

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Conducting experiments	Using equipment to take measurements	Mathematics: Shape, space and measure ELG Children use everyday language to talk about size, weight, capacity and time to compare quantities and to solve problems. They recognise, create and describe patterns.	Pupils can make observations using simple equipment e.g. magnifying glasses. With support pupils can carry out simple tests e.g. comparing materials.	Pupils can examine carefully using equipment, e.g. a magnifying glass to make observations. Pupils can conduct simple comparative tests.	Pupils can, once demonstrated how to, use equipment to take measurements, e.g. a force meter.	Pupils can use equipment to take measurements, e.g. thermometers.	Pupils can, following a discussion, select the appropriate equipment to carry out an experiment, e.g. a force meter of the right scale to measure forces.	Pupils can use appropriate equipment, e.g. a light meter to take measure how the brightness of a bulb changes when more cells are added to a circuit.
	Explore how to improve the quality of data	N/A at this stage	N/A at this stage	N/A at this stage	Pupils can use standard units when taking measurements, e.g. measuring distance an object has travelled in cm.	Pupils can recognise the importance of measuring accurately using standard units, e.g. measuring temperature in °C when investigating which material is the best insulation for a cup.	Pupils can take measurements that are precise as well as accurate, e.g. measuring the force needed to move an object across different surfaces using a force meter.	Pupils can consider how by modifying Instrument, technique or measurements can be improved, e.g. using a data logger instead of a thermometer to record changes in temperature.
	Understand the role of repeat observations	N/A at this stage	N/A at this stage	N/A at this stage	N/A at this stage	N/A at this stage	Pupils begin to understand the importance of repeat readings to increase accuracy of results, e.g. when timing falling objects.	Pupils can explain how the importance of repeat readings and calculating averages improves the accuracy of results.

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Recording evidence	Record work with labelled diagrams	Literacy: Writing 40-60M Write own name and other things such as labels and captions.	With prompting pupils can identify what might be recorded e.g. taking weather readings or drawing and labelling plants.	Pupils with assistance can draw and label diagrams, e.g. recording the growth of plants over time.	Pupils can, with prompting, draw and label diagrams, e.g. to show how poles of magnets attract or repel each other.	Pupils can use words and diagrams to record findings, e.g. diagrams of different types of teeth in humans and animals.	Pupils can start to use labelled diagrams to show more complex outcomes, e.g. show different phases of the Moon as the Moon orbits the Earth.	Pupil can use labelled diagrams to show complex outcomes, e.g. relating specific adaptations of organisms to environmental factors.
	Display data using tables and keys	N/A at this stage	N/A at this stage	N/A at this stage	Pupils can, with prompting, use tables to record evidence, e.g. a table to compare the hardness of rocks when scratched by different objects.	Pupils can use various ways to record evidence including tables of results and classification keys to identify and group different kinds of animals.	Pupil can, with prompting, use various ways to record complex evidence, e.g. when investigating how gears and levers enable a small force to have a larger effect.	Pupil can use various ways, as appropriate, to record complex evidence, e.g. in the construction of a key to identify different types of animals.
	Display data using bar charts or line graphs	N/A at this stage	N/A at this stage	N/A at this stage	Pupils can, with support draw a simple bar graph to display data, e.g. the amount water absorbed by different types of soil.	Pupils can use various ways to record and display data, e.g. a line graph to show changes in temperature over time.	Pupil can use various ways to record and display data, e.g. a line graph the time taken for a parachute to fall compared to the surface area.	Pupil can use line graphs to display complex data, e.g. the average brightness of a bulb compared to the voltage of the cells in a circuit.

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Reporting findings	Use findings to develop conclusions and identify casual relationships	UOW:The World 30-50M Can talk about things they have observed. UOW:The World 40-60M Looks closely at similarities, differences, patterns and change. UOW:The World ELG Explain why some things may occur, and talk about changes.	Pupils can identify key findings from enquiries, e.g. describe how something has changed over time.	Pupils can identify and group key outcomes from an enquiry, e.g. stages of growth of a plant.	Pupils can, with prompting, write a conclusion based on evidence, e.g. identify which type of magnet is the strongest.	Pupil can write a conclusion based on evidence, e.g. identify which materials are conductors or insulators of electricity.	Pupil can, with prompting, write a conclusion using evidence and identifying causal links, e.g. the larger the surface area of a parachute the longer the time taken to fall to the ground.	Pupil can write a conclusion using evidence and identifying causal links, e.g. relating brightness of bulb to voltage supplied by the number of cells.
	Use displays and presentations to report on findings	N/A at this stage	N/A at this stage	N/A at this stage	Pupils can indicate findings from an enquiry that could be reported.	Pupil can present findings either in writing or orally.	Pupil can, with support, display and present key findings from enquiries orally and in writing.	Pupil can display and present key findings from enquiries orally and in writing.
	Explain confidence in findings	N/A at this stage	N/A at this stage	N/A at this stage	N/A at this stage	N/A at this stage	Pupil can, with support, indicate why some results may not be entirely trustworthy, e.g. when timing a falling object.	Pupil can, in conclusions, indicate how trustworthy they are.

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Conclusions and predictions	Analyse data	UOW:The World 40-60M Looks closely at similarities, differences, patterns and change. UOW:The World ELG Explain why some things may occur, and talk about changes.	Pupils can collect data, e.g. weather readings.	Pupils can collect data relevant to the answering of questions.	Pupils can, with prompting, recognise patterns that relate to scientific ideas.	Pupil can recognise patterns in data that relate to scientific ideas, e.g. the further way from a sound source the quieter the volume.	Pupil can recognise patterns in data that relate to scientific ideas.	Pupil can recognise patterns in data that relate to scientific ideas.
	Draw conclusions	UOW:The World 30-50M Can talk about things they have observed. UOW:The World 40-60M Looks closely at similarities, differences, patterns and change. UOW:The World ELG Explain why some things may occur, and talk about changes.	Pupils can suggest answers to enquiry questions using data, e.g. say which day was the coldest/hottest/ rained the most etc.	Pupils can answer enquiry questions using data and ideas, e.g. measuring the absorbency of different materials and using this to suggest which is best to clean up a spillage.	Pupils can, with support, use evidence to produce a simple conclusion, e.g. identify witch type of rock is the hardest/softest after scratching with different objects.	Pupils can use evidence to produce a simple conclusion.	Pupil can show how evidence supports a conclusion and identify how an idea is supported or refuted by evidence, e.g. how the theories of Plato and Galileo on objects of different mass falling to the ground at different speeds/the same time.	Pupils can use evidence to produce a conclusion and identify how an idea is supported or refuted by evidence.
	Develop investigations further	N/A at this stage	N/A at this stage	N/A at this stage	Pupils can suggest how an investigation could be extended.	Pupil can use evidence to suggest further relevant investigations, e.g. making own instruments, using ideas about pitch and volume.	Pupil can suggest further relevant comparative or fair tests, e.g. would increasing the mass of the capsule affect the time taken for parachute to fall compared to the surface area.	Pupil can use evidence to suggest further comparative or fair tests and extrapolate results to make predictions, e.g. predict what the brightness of a bulb would be at 6V compared to 1.5V,

								3V and 4.5V.