



Working Scientifically

	COMPONENTS of KNOWLEDGE				
	30-50	Reception	KS1	LKS2	UKS2
<b>Asking Questions</b>	Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world	Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world  Engage in open-ended activity Playing & Exploring	Asking simple questions and recognising that they can be answered in different ways	Ask relevant questions and use different types of scientific enquiries to answer them  Set up simple practical enquiries, comparative and fair tests	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
Key Vocab	Question	Question, answer, predict	Investigate, explore, test.	Conclusion, evaluate, evidence, investigation	Inquire, enquiry,
Key Indicators. As Scientists, our children can...	Can begin to ask questions	Can ask simple questions that show curiosity.  Can verbalise what they think will happen.	Can ask simple questions such as 'what if' or 'how'.  Can suggest a way to find out an answer.  Can give different ways to solve different problems such as to test something or to compare.	Can state a simple conclusion that aligns to the results obtained.  Can make predictions on what they believe an outcome will be and explain their reasoning for this using their existing knowledge and understanding.  Can ask questions to extend their inquiry.	Can raise their own questions to initiate or develop an inquiry such as 'how could I make that taller?' or 'Which material would be stronger?'  Can plan a fair investigation, including how they will record and share results, which answers the question raised.  Can recognise the discuss the variables they will keep the same and change to make it a fair test.



	30-50	Reception	KS1	LKS2	UKS2
<b>Observing and Measuring</b>	<p>Show curiosity about objects, events and people Playing &amp; Exploring Questions why things happen Speaking</p> <p>Closely observes what animals, people and vehicles do</p>	<p>Take a risk, engage in new experiences and learn by trial and error</p> <p>Use senses to explore the world around them</p> <p>Find ways to solve problems / find new ways to do things / test their ideas</p> <p>Know about similarities and differences in relation to places, objects, materials and living things</p> <p>Make observations of animals and plants and explain why some things occur, and talk about changes</p>	<p>Observe closely, using simple equipment</p> <p>Performing simple tests</p> <p>Identifying and classifying</p>	<p>Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, <b>using a range of equipment</b>, including thermometers and data loggers</p>	<p>Take measurements, <b>using a range of scientific equipment</b>, with increasing accuracy and precision, taking repeat readings when appropriate record data and results of increasing complexity.</p>
Key Vocab	Same, different	Observe, measure	Describe, equipment, measurement, observing, length, cm,	Accurate, thermometer, temperature, data logger, interval, millimeters, precision, table, Venn Diagram	Newton meter, volume, repeat recordings, Line graph, scatter graph,
Key Indicators. As Scientists, our children can...	Can begin to talk about things that are the same and things that are different	<p>Can use language such as bigger and smaller to compare and measure.</p> <p>Can accurately describe what they can see.</p>	<p>Can record simple observations that they see and can describe these.</p> <p>Can observe a simple measurement such as temperature.</p> <p>Can observe in different ways such as what they notice, using equipment or observing over a long period of time.</p>	<p>Can make observations across set time intervals such as every day or every 20 minutes.</p> <p>Can use thermometers and data loggers as a way of measuring.</p> <p>Can read measurements accurately such as the temperature on a thermometer or the ml on the side of a beaker.</p>	<p>Can set up equipment appropriate to collect information needed, such as using a newton meter for force.</p> <p>Can accurately and precisely take readings of measurements in a variety of measures, such as distance, volume, decibels.</p> <p>Can identify when an investigation would need repeat recordings and justify their reasoning.</p> <p>Can understand and accurately use a variety of means to record observation and measures, such as tables, diagrams, graphs.</p>



	30-50	Reception	KS1	LKS2	UKS2
<b>Communicatin g and Reporting</b>		<i>Plan. How might you test an idea. (This may be a playful or imaginary idea.)</i>	Gathering and recording data to help in answering questions	Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables gather, record, classify and present data in a variety of ways to help in answering questions	Using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Key Vocab		<i>Plan, more than/less than, faster/slower, hotter/ colder etc</i>	<i>Results, data, diagram, label, gather, conclude</i>	<i>Variables, methods, bar chart, tally table, fair test,</i>	<i>Justification, reasoned explanation, enquiry, inquire, independent, controlled, dependent, systematic</i>
Key Indicators. As Scientists, our children can...		<i>Can suggest a way to answer a question or idea which is related and logical, although not necessarily realistic for them to do, such as asking which rocket would go faster to the moon and then suggesting launching them in a race</i>	<p><i>Can carry out an investigation that provides them with a result.</i></p> <p><i>Can record what they observed in the form of a diagram with simple labels.</i></p> <p><i>Can record simple data such as temperatures in a table, placing the results in the correct place.</i></p> <p><i>Can use their results to draw simple conclusions to answer the inquiry question.</i></p>	<p><i>Can plan a simple inquiry recognising the variables they will keep the same, and the one they will change to test.</i></p> <p><i>Can explain verbally how they are making their inquiry a fair test.</i></p> <p><i>Can undertake a range of different inquiries with different methods, such as through observation or through recording measures.</i></p> <p><i>Can present data in an appropriate way, such as comparative data in a bar chart.</i></p> <p><i>Can demonstrate using a range of different ways to record data such as tallies, graphs and diagrams.</i></p> <p><i>Can use the results gathered to draw conclusions and to answer an inquiry question.</i></p>	<p><i>Can use results to make predictions which they can justify with a reasoned explanation, such as discovering some materials can be changed and then predicting other examples based on sharing similar properties.</i></p> <p><i>Can independently plan and carry out their own inquiry to answer questions and test predictions.</i></p>



	30-50	Reception	KS1	LKS2	UKS2
<b>Concluding and Analysing</b>	Builds up vocabulary that reflects the breadth of their experience	<p>Make links and notice patterns in their experience</p> <p>Asking how and why questions about experiences</p> <p>Develop their own narratives and explanations by connecting ideas or events</p>	Using their observations and ideas to suggest answers to questions	<p>Use results to draw simple conclusions</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>Use straightforward scientific evidence to answer questions or to support their findings</p>	<p>Identify scientific evidence that has been used to support or refute ideas or arguments</p> <p>report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p>
<i>Key Vocab</i>	<i>Same, different, colours</i>	<i>Sort, group, same, different, bigger/ smaller, wide/ thin (any simple comparative words)</i>	<i>similar , different, conclude,, size, colour, weight, properties</i>	<i>Evidence, fair test, compare, identify, classify, Venn Diagram, appearance</i>	<i>Classification key, refute, support, prove/disprove,</i>
<i>Key Indicators. As Scientists, our children can...</i>	<i>Can begin to compare</i>	<i>Can sort and group items using simple comparisons and properties such as colour or size.</i>	<p><i>Can identify and recognise common patterns or features, such as the shared properties in materials.</i></p> <p><i>Can classify and group things giving reason for how they have done this.</i></p> <p><i>Can use what they have identified to help them answer questions such as "which plants have flowers?"</i></p>	<p><i>Identify similarities and differences between individual and grouped items.</i></p> <p><i>Can identify changes that have occurred and begin to suggest ideas as to why this has happened.</i></p> <p><i>Can use venn diagrams to compare.</i></p> <p><i>Can classify items based on similarities and differences.</i></p>	<p><i>Can identify how results can prove or disprove a point.</i></p> <p><i>Can use scientific evidence to support or refute an argument.</i></p> <p><i>Can provide examples of famous scientific evidence that has supported or refuted key scientific ideas.</i></p>



	30-50	Reception	KS1	LKS2	UKS2
<b>Evaluating</b>				Make predictions for new values, suggest improvements and raise further questions	Use test results to make predictions to set up further comparative and fair test
<i>Key Vocab</i>				<i>Repeat, human error, evaluate</i>	<i>Accuracy, reliability</i>
<i>Key Indicators. As Scientists, our children can...</i>				<i>Can identify an improvement to their method.  Can use results to identify another question.</i>	<i>Can apply test results to further investigations and predictions.  Can identify improvements to investigations for better accuracy and reliability,</i>