

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

Working Scientifically – Progression of Skills for Classification										
	To ask scientific questions	To plan an enquiry	To make a prediction	To observe closely	To measure precisely / accurately	To gather / record results	To present results	To interpret results	To draw conclusions	To evaluate an enquiry
Lower Key Stage Two <i>Developing a systematic approach</i>	Be able to ask a range of yes/no questions to aid sorting.	Be able to put appropriate headings onto intersecting Venn and Carroll Diagrams		Be able to compare objects based on more sophisticated, observable features. Use the language of comparison. Present observations in labelled diagrams.			Sort objects and living things into groups using intersecting Venn and Carroll diagrams. <i>Year 3 children may have templates provided for them.</i> <i>Year 4 children to draw their own diagrams.</i>	Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs.	Draw simple conclusions when appropriate for patterns e.g. a flying insect with no legs might injure itself when landing.	Suggest improvement e.g. a wider range of objects – only looked at British trees. Suggest new questions arising from the investigation.
Upper Key Stage Two <i>Developing independence</i>	Be able to ask a range of yes/no questions to aid sorting and decide which way of sorting will give useful information.	Identify specific clear questions that will help to sort without ambiguity.		Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry.			Create branching databases (tree-diagrams) and keys to enable others to name living things and objects.	Be able to talk about the features that objects and living things share and do not share based on the information in the key, etc.	Be able to use data to show that living things and materials that are grouped together have more things in common than things with other groups.	Be able to explain using evidence that branching database or classification key will only work for living things or materials it was created for.

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

[illegible]

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

Working Scientifically – Progression of Skills for Research										
	To ask Scientific questions	To plan an enquiry	To make a prediction	To observe closely	To measure precisely/accurately	To gather/record results	To present results	To interpret results	To draw conclusions	To evaluate an enquiry
Lower Key Stage Two <i>Developing a systematic approach</i>	Ask a range of questions linked to a topic	Choose a source from a range provided					Present what they learnt verbally or using labelled diagrams Year 3 children may have labels provided for them.	Be able to answer their questions using simple scientific language Year 3 to discuss anomalies in results, and through modelled speech talk about these as being 'unexpected'. Year 4 children to understand that unexpected results are not 'wrong', to say that these results are not what was expected.		Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation.
Upper Key Stage Two <i>Developing independence</i>	Ask a range of questions recognising that some can be answered through research and others may not	Choose suitable sources to use					Present what they learnt in a range of ways e.g. different graphic organisers (flow diagram/spider diagram) Year 6 children se	Be able to answer their questions using scientific evidence gained from a range of sources Year 5 children to explain why unexpected results are not what was expected.		Be able to talk their degree of trust in the sources they used

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

Working Scientifically – Progression of Skills for Comparative / Fair Tests										
	To ask scientific questions	To plan an enquiry	To make a prediction	To observe closely	To measure precisely / accurately	To gather/ record results	To present results	To interpret results	To draw conclusions	To evaluate an enquiry
Lower Key Stage Two Developing a systematic approach	Ask a range of relevant questions linked to a topic	Decide what to change and what to measure or observe Year 3 children, through discussion, to suggest variables and what can be measured, and through discussion form a question to investigate. Year 4, as for year 3, but children to form own question, following discussion.	Use results from an investigation, or what is already known, to make a prediction about a further result. Year 3 children to say what they think will happen. Year 4 children to offer justification for the prediction that they have made.	KS1: Make observations linked to answering the question	Year 3 to measure to the nearest labelled division. Year 4 to measure using standard units where not all the numbers are marked on the scale.	Prepare own tables to record data Year 3 may copy a table that has been suggested. Year 4 should draw their own table.	Present data in bar charts Year 3 may have the axis provided. Year 4 should draw their own graph.	Refer directly to their evidence when answering their question. Year 3 to discuss anomalies in results, and through modelled speech talk about these as being 'unexpected'. Year 4 children to understand that unexpected results are not 'wrong', to say that these results are not what was expected.	Where appropriate provide oral or written explanations for their findings By year 4 children to be able to explain the difference between results and a conclusion.	Suggest improvements e.g. to method of taking measurements. Through discussion, suggest new questions arising from the investigation.

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

Upper Key Stage Two <i>Developing independence</i>	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results.	Recognise and control variables where necessary. Year 5 children to suggest variables and what could be measured, and select which variable is to be changed and what is to be measured, to form own question. Year 6, with increased independence, and understanding of likely variables that are worthy of investigation.	Use test results to make predictions for further investigations. Year 5 and 6, where appropriate, make links to previous investigations or knowledge.	KS1: Make observations linked to answering the question Year 5 and 6 children to understand the need to repeat an investigation and calculate average to increase reliability	Measure using standard units using equipment that has scales involving decimals	Prepare own tables to record data, including columns for taking repeat readings. Year 5 and 6 children to draw multiple column tables independently	Choose, and use, an appropriate form of presentation including line graphs. Year 5 children to select from a range of suggested graph types, and justify, with support, reasons for the choices they have made. Year 6 children should choose their own graph type to use, justifying the choice they have made.	Be able to answer their question, describing causal relationship. Year 5 children to explain why unexpected results are not what was expected.	Provide written explanations for their findings. Year 5 to expand on their conclusion, making generalisation, with support. Year 6 children to expand on their conclusions, making generalisations.	Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results.
---	---	---	--	--	---	--	--	---	---	--

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

Working Scientifically – Progression of Skills for **Observation over time**

	To ask scientific questions	To plan an enquiry	To make a prediction	To observe closely	To measure precisely / accurately	To gather/ record results	To present results	To interpret results	To draw conclusions	To evaluate an enquiry
Lower Key Stage Two <i>Developing a systematic approach</i>	Ask a range of relevant questions linked to a topic	Decide what to measure or observe. Decide how often to take a measurement	Use results from an investigation to make a prediction about a further result Year 3 children to say what they think will happen. Year 4 children to offer justification for the prediction that they have made.	Make a range of relevant observations linked to answering the question	Measure using standard units where not all the numbers are marked on the scale. Use dataloggers to measure over time Year 3 children to read to the nearest labelled division Year 4 to read scales that are in multiples of 10	Prepare own tables to record data Year 3 children to adapt/use table suggested by teacher. Year 4 children to draw their own simple table.	Present data in time graphs Year 3 may have the axis provided. Year 4 should draw their own graph.	Refer directly to their evidence when answering their question	Where appropriate provide oral or written explanations for their findings By year 4 children to be able to explain the difference between results and a conclusion.	Suggest improvements e.g. need to make observations more regularly. Suggest new questions arising from the investigation.
Upper Key Stage Two <i>Developing independence</i>	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results	Recognise and control variables where necessary	Use test results to make predictions for further investigations Year 5 and 6, where appropriate, make links to previous investigations or knowledge.	Make a range of relevant observations linked to answering the question Year 5 and 6 children to understand the need to make repeated observations to increase reliability	Measure using standard units using equipment that has scales involving decimals	As for LKS2 Year 5 and 6 children to draw multiple column tables independently	Choose an appropriate form of presentation including line graphs Year 5 children to select from a range of suggested graph types, and justify, with support, reasons for the choices they have made. Year 6 children should choose their own graph	Be able to answer their questions, describing the change over time Year 5 children to explain why unexpected results are not what was expected. Year 5 children to explain why unexpected results are not what was expected.	Provide oral or written explanations for their findings Year 5 to expand on their conclusion, making generalisation, with support. Year 6 children to expand on their conclusions, making generalisations	Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

							type to use, justifying the choice they have made.			
--	--	--	--	--	--	--	---	--	--	--

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

Working Scientifically – Progression of Skills for Pattern Seeking										
	To ask scientific questions	To plan an enquiry	To make a prediction	To observe closely	To measure precisely/accurately	To gather/record results	To present results	To interpret results	To draw conclusions	To evaluate an enquiry
Lower Key Stage Two <i>Developing a systematic approach</i>	Ask a range of relevant questions linked to a topic	Decide what to measure or observe	Use results from an investigation to make a prediction about a further result <i>Year 3 children to say what they think will happen.</i> <i>Year 4 children to offer justification for the prediction that they have made.</i>	As for KS1	Measure using standard units where not all the numbers are marked on the scale. <i>Year 3 children to read to the nearest labelled division</i> <i>Year 4 to read scales that are in multiples of 10</i>	Prepare own tables to record data <i>Year 3 children to adapt/use table suggested by teacher.</i> <i>Year 4 children to draw their own simple table.</i>	Use ICT package to present data as a scattergram	Refer directly to their evidence when answering their question	Where appropriate provide oral or written explanations for their findings	Suggest improvements e.g. needed a bigger sample/wider range. Suggest new questions arising from the investigation.
Upper Key Stage Two <i>Developing independence</i>	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results	Recognise and control variables where necessary	Use test results to make predictions for further investigations <i>Year 5 and 6, where appropriate, make links to previous investigations or knowledge</i>	As for KS1	Measure using standard units using equipment that has scales involving decimals	As for LKS2 <i>Year 5 and 6 children to draw multiple column tables independently</i>	Choose an appropriate form of presentation including scatter graphs	Be able to answer their questions identifying patterns	Provide oral or written explanations for their findings <i>Year 5 to expand on their conclusion, making generalisation, with support.</i> <i>Year 6 children to expand on their conclusions, making generalisations</i>	Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results

Brookland Junior School – Working Scientifically – Progression of Skills (March 2021)

Working Scientifically – Progression of Vocabulary		
Year 2 <i>(plus previous year group)</i>	Lower KS2 <i>(plus previous year groups)</i>	Upper KS2 <i>(plus previous year groups)</i>
Pictogram Tally chart Block graph Venn diagram Table Chart Order Observe changes over time Notice patterns Link Secondary sources Hand lenses Stop watch	Variables Control variable Types of scientific enquiry Identify Classify Order/rank Comparative tests Fair tests Careful/systematic Accurate Observations Evidence Present Data/evidence/results Keys Bar charts Conclusions Prediction Support/not support/ refute Thermometers Data loggers Magnifying glass Microscope Increase Decrease Appearance	Independent variable Dependent variable Accuracy Precision Degree of trust Classification keys Scatter graphs Line graphs Causal relationship Opinion/fact