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
Key Stage One Developing close observation	Be able to ask a yes/no questions to aid sorting	Identify the headings for the two groups (it is, it is not)		Be able to compare objects based on obvious, observable features e.g. size, shape, colour, texture etc.			Sort objects and living things into two group using a basic Venn diagram or simple table	Talk about the number of objects in each group i.e. which has more or less	Children in KS1 are not expected to draw conclusions. They are expected to make observations which will help them to answer questions. They do not have the subject knowledge to give reasons for what they observe so they cannot draw scientific conclusions.	
Lower Key Stage Two Developing a systematic approach	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. Present observations in labelled diagrams			Sort objects and living things into groups using intersecting Venn and Carroll diagrams	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 always crash land	Suggest improvement e.g. a wider range of objects – only looked a British trees. Suggest new questions arising from the investigation.
Upper Key Stage Two Developing independence	Be able to ask a range of yes/no questions to aid sorting and decide which ways 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 livings 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 livings things and materials that are grouped together have more things in common than with things in other groups	Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for

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
Key Stage One Developing close	Ask one or two simple questions linked to a topic						Present what they have learnt verbally or using pictures	Be able to answer their questions using in simple sentences		
Lower Key Stage Two Developing a systematic	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	Be able to answer their questions using simple scientific language		Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation.
Upper Key Stage Two Developing independence	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	Be able to answer their questions using scientific evidence gained from a range of sources		Be able to talk their degree of trust in the sources they used

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
Key Stage One Developing close observation	Identify the question to investigate from a scenario or choose a question from a range provided	Choose equipment to use, decide what to do and what to observe or measure in order to answer the question	Children in KS1 are not expected to make scientific predictions as they do not have the subject knowledge to do this. That does not mean that you should not ask children what they think may happen but this will be based on experience or may simply be a guess.	Make observations linked to answering the question	When appropriate, measure using standard units where all the numbers are marked on the scale	Record data in simple prepared tables, pictorially or by taking photographs	Present what they learnt verbally, using pictures or block diagrams	Answer their question in simple sentences using their observations or measurements		
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	Use results from an investigation to make a prediction about a further result	As for KS1	Measure using standard units where not all the numbers are marked on the scale, take repeat readings where necessary	Prepare own tables to record data	Present data in bar charts	Refer directly to their evidence when answering their question	Where appropriate provide oral or written explanations for their findings	Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.
Upper Key Stage Two Developing independence	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	As for KS1	Measure using standard units using equipment that has scales involving decimals	Prepare own tables to record data, including columns for taking repeat readings	Choose an appropriate form of presentation including line graphs	Be able to answer their question, describing causal relationships	Provide oral or written explanations for their findings	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

Working Scientifically – Progression of Skills for **Observation over time** To ask To plan an To make a To observe To measure To To present To interpret To draw To evaluate an scientific gather/record prediction closely precisely / results results conclusions enquiry enquiry results auestions accurately Ask a question Choose Children in KS1 are Make When Record data in Present what Answer their not expected to about what equipment to observations appropriate, simple they learnt question in make scientific Developing close observation might happen use, decide linked to verbally or simple measure using prepared predictions as they in the future what to do and answering the standard units tables, using pictures sentences do not have the Key Stage One subject knowledge using their based on an what to **question** where all the pictorially or to do this. That numbers are by taking observations observation observe or does not mean marked on the measure in photographs or that you should order to scale measurements not ask children what they think answer the may happen but question this will be based on experience or may simply be a guess. Ask a range of Decide what to Use results Make a range Measure using Prepare own Present data in Refer directly Where Suggest Lower Key Stage Two Developing a systematic tables to improvements relevant measure or from an of relevant standard units time graphs to their appropriate questions observe. observations where not all record data evidence when provide oral or e.g. need to make investigation Decide how to make a linked to the numbers answering written observations linked to a topic often to take a prediction answering the are marked on their question explanations more regularly. for their measurement about a further **question** the scale. Use Suggest new dataloggers to result findings questions arising from the measure over time investigation. As for LKS2 Provide oral or Ask a range of Recognise and Use test Make a range Measure using Choose an Be able to Explain their questions and control results to of relevant standard units appropriate answer their written degree of trust in Developing independence Upper Key Stage Two identify the variables observations form of explanations make using questions, their results e.g. type of enquiry for their where predictions for linked to equipment presentation describing the precision in taking that has scales that will help further answering the including line change over findings necessary measurements, to answer the investigations question involving graphs time variables that questions. Ask decimals may not have further been controlled and accuracy of auestions based on results results

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
Key Stage One Developing close observation	Ask a question that is looking for a pattern based on observations	Choose equipment to use, decide what to do and what to observe or measure in order to answer the question	Children in KS1 are not expected to make scientific predictions as they do not have the subject knowledge to do this. That does not mean that you should not ask children what they think may happen but this will be based on experience or may simply be a guess.	Make observations linked to answering the question	When appropriate, measure using standard units where all the numbers are marked on the scale	Record data in simple, prepared tables and tally charts	Present what they learnt verbally	Answer their question in simple sentences using their observations or measurements		
Lower Key Stage Two Developing a systematic approach	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	As for KS1	Measure using standard units where not all the numbers are marked on the scale.	Prepare own tables to record data	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 Developing independence	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	As for KS1	Measure using standard units using equipment that has scales involving decimals	As for LKS2	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	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

Working Scientifically – Progression of Vocabulary									
EYFS and Year 1	Year 2	Lower KS2	Upper KS2						
	(plus previous year group)	(plus previous year groups)	(plus previous year groups)						
Questions Answers Equipment Gather Measure Record Results Sort Group Test Explore Observe Compare Describe Similar/similarities Different/differences Egg timers Ruler Tape measure Metre stick Beaker Pipette syringe	Pictogram Tally chart Block diagram 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	Independent variable Dependent variable Accuracy Precision Degree of trust Classification keys Scatter graphs Line graphs Causal relationship Opinion/fact						

Poulton St Chad's CE Primary School / 2019-20 / Source: https://www.stem.org.uk