Science ~ Long Term Disciplinary Knowledge Map

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
NC Requirements		During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions		During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • 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 • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings •		During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting 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 • identifying scientific evidence that has been used to support or refute ideas or arguments	
Questioning	Know that a question is	Know that questions can	Know that specifically	Know that questions	Know that relevant	Know that questions	Know that precision is

	a phrase/sentence which asks for information. EYFS -Know a range of question words – who, where, when, what, why, how? EYFS - Ask questions to clarify understanding	be asked to gather information to support understanding.	there are scientific questions and that there is more than one way of finding the answer.	can be asked and answered by carrying out a scientific enquiry.	scientific questions need to be asked and answered through different types of scientific enquiries.	can be or might need to be refined through the scientific process.	achieved through refinement of both questioning and of control of the variables in a scientific enquiry.
		Ask a yes/no questions to aid sorting. • Ask a question about what might happen over time.	• Ask one/two simple research questions linked to a topic. • Choose a question to undertake a test. • Ask a question that is looking for a pattern.	• Ask a range of Yes/No questions to aid sorting • Ask a range of research questions linked to a topic. • Ask a range of question to undertake a fair test. • Ask a range of question about what might happen over time or that is looking for a pattern.		• Ask a range of Yes/No questions to aid sorting and decide which ways of sorting will give useful information. • Ask a range of questions recognising that some can be answered through research and others may not • Ask a range of questions and identify the type of enquiry that will help to answer the questions. • Ask further questions based on results.	
Observing and Measuring	Know that looking carefully at something provides more information about it.	Know that there are different ways to observe things closely.	Know that an appropriate choice of simple equipment will make observations more effective in the gathering of information.	Know that careful observations can form part of scientific enquiry Know that data can be collected from observations and measurements	Know that the quality of systematic observations in scientific enquiry is affected by how accurately equipment is used to gather data.	Know that specialised equipment can be used to observe and measure more accurately. Know that repeating an observation or measurement may provide more accurate information.	Know that the level of accuracy and precision will determine the success of scientific enquiry.

		• Compare objects based on obvious, observable features e.g. size, shape, colour, texture etc. • Make observations linked to answering the question.		• Compare objects based on more sophisticated, observable features and present observations in labelled diagrams. • Make a range of relevant observations linked to the question.		• Compare not only based on physical properties but also on knowledge gained through previous enquiry. • Make a range of relevant observations linked to the question.	
		• When appropriate, measure using standard units where all the numbers are marked on the scale. Pupils may use simple equipment such as rulers, magnifying glasses and simple timers.		• Measure using standard units (according to age-related mathematics) where not all the numbers are marked on the scale, and take repeat readings where necessary • Use dataloggers to measure over time. Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers		• Measure using standard units using equipment that has scales involving decimals (according to age-related mathematics), and take repeat readings where necessary. • Use dataloggers to measure over time. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. Pupils take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. They will use thermometers, stop clocks, measuring jugs and cylinders with precision. They will	

						recognise anomalies in results and repeat readings.	
Testing	Know that the information needed to answer a question, sometimes needs to be checked to make sure it is correct. Know that a test is a way used to check something.	Know that a test is a procedure which can be used to check the accuracy of the information used to answer questions.	Know that there are different ways to perform a test including the use of simple equipment.	Know that the process used to carry out a scientific enquiry must be fair.	Know that if the procedure used in the scientific enquiry is not fair then the information gathered is unreliable.	Know that the outcome of a fair test can inform and shape further scientific enquiries.	Know that the outcomes from fair tests supports factual understanding off a scientific enquiry which may differ from opinion.
		• Choose equipment to use and decide what to do and what to observe or measure in order to answer the question.		• Choose a research source from a range provided • Decide what to change and what to measure or observe • Decide how often to take a measurement		• Identify specific clear questions that will help to sort without ambiguity • Choose suitable sources to use • Recognise and independently control variables where necessary. • Decide how often to take a measurement.	
Identifying (& Classifying)	Know that it is possible to recognise something by its features.	Know that by comparing common features, it is possible to group and sort objects, materials or living things.	Know that sorting and grouping by features and characteristics can be refined to give more accurate and detailed identification (for example, tree/oak tree/deciduous)	Know that information collected during a simple scientific enquiry can be used to inform identification and classification.	Know that accurate identification and classification can be used to answer questions in a simple scientific enquiry.	Know that identification and classification can involve the organisation of a substantial amount of information and there are agreed methods for doing this. (e.g. key, graphs)	Know that the success of more complex scientific enquiries requires appropriate selection of the most effective method of classifying information.
		• Identify the headings for the two classification groups (it is ...., it is not ....) • Sort objects and living		• Put appropriate headings onto intersecting Venn and Carroll diagrams. • Sort objects and living		• Create branching databases (tree diagrams) and keys to enable others to name livings things and objects	

		things into two group using a basic Venn diagram or simple table,		things into groups using intersecting Venn and Carroll diagrams			
Hypothesising	Know that ideas can be put forward for thinking and talking about.	Know that ideas can be used to predict possible outcomes to a scientific enquiry.	Know that a prediction can be informed by prior knowledge and experience.	Know that a hypothesis is a starting point for further scientific enquiry.	Know that a hypothesis can be refined as a result of scientific enquiry and used to inform the next stage of the process.	Know that knowledge gained from previous scientific enquiries can be used to inform a more accurate hypothesis at the outset of a new enquiry.	Know that an efficient and effective scientific enquiry should be based on an informed hypothesis.
		• Use previous knowledge to make a simple prediction about what will happen		• Use results from an investigation to make a prediction about a further result.		• Use test results to make predictions for further investigations	
Interpreting and Recording Data	Know that information can be collected and shared with others. EYFS – Use talk to explain their thinking and offer explanations	Know that there are many ways to collect and record information and that this can be used by others.	Know that recorded data can be used to find answers to questions.	Know that recorded data is an important part of a scientific enquiry as it can be used draw conclusions.	Know that inaccurately recorded data can mislead and lead to incorrect conclusions.	Know that filtering data is an important step when drawing conclusions so that only the most relevant information is used.	Know that accurate data can be a powerful tool when supporting or refuting scientific ideas/arguments.
		• Record data in simple prepared tables, tally charts, pictorially or by taking photographs. • Present what they have learnt verbally, using pictures or block diagrams • Talk about the number of objects in each classification group i.e. which has more or less. • Answer their questions using simple sentences using their observations or measurements.		• Prepare own tables to record data. • Present what they learnt verbally or using labelled diagrams, bar charts, or time graphs • Spot patterns in the classification data, particularly two criteria with no examples – e.g. there are no living things with wings and no legs. • Answer questions using simple scientific language and refer directly to their evidence when answering their question. • Draw simple		• Prepare own tables to record data, including columns for taking repeat readings • Present what they learnt in a range of ways e.g. different graphic organisers, line graphs and scatter graphs. • Talk about the features that items share and do not share based on the information in the key etc. • Answer questions using scientific evidence gained	

				conclusions, when appropriate, for patterns - e.g. a flying insect with no legs might always crash land. • Where appropriate provide oral or written explanations for their findings.		from a range of sources. Describe causal relationships, change over time and identify patterns. • Use data to show that items grouped together have more things in common than with things in other groups • Provide detailed oral or written explanations for their findings	
To evaluate an enquiry				• Suggest improvement (e.g. a wider range of objects) and suggest new questions arising from the investigation. • Suggest limitations to research (e.g. only had one book) and suggest new questions arising from the investigation. • Suggest improvements (e.g. measurement method) and suggest new questions arising from the investigation.		• Explain using evidence that the branching database or classification key will only work for the living things or materials it was created for. • Talk about their degree of trust in the sources they used. • Explain their degree of trust in their results (e.g. precision in measurements, variables that may not have been controlled, and accuracy of results.	