Disciplinary Knowledge Progression (Opportunities to Learn the Concept and Revisit)					
Threshold Concepts		**EYFS**	**KS1**	**KS2**	
Knowledge of methods that scientists use to answer questions.	**Questioning**	To understand that a question is something we ask to find out about the world	To know that there are different ways to answer questions. To know that we can test our questions to find out for ourselves.	To know that some questions are relevant and some can be answered using different types of experiment To have been introduced to independent, dependent and control variables.	To be able to generate questions and plan different types of scientific enquiry to answer them.
	Research		To conduct class research together using the smart board and books to answer questions and find out information.	To conduct some class research and some individual research using the web and books to answer questions and find out information.	To use books and the internet to conduct research to answer questions and find out current substantive knowledge.
	Observation over time	To know that some things change over time. To know that we can observe changes over time	To know that some things happen quickly but others take time and we can observe these changes.	To be able to observe changes over varying lengths of time. To be able to use different recording methods to report changes over time, e.g. diagrams, photos, measurements	
	Pattern Seeking & Correlations		To notice patterns from observations and in data, for example, patterns in	To notice and describe more complex patterns in experimental data and these	To notice and describe more complex patterns in experimental data and

			seasonal weather, and this can be used to answer questions. To notice simple patterns from experimental data and this can be used to answer questions, for example increasing and decreasing over time.	can be used to answer questions, for example, an initial increase followed by staying the same.	these can be used to answer questions. To use graphs to visibly show patterns and correlations in experimental data
	Identifying, Grouping and Classifying	To be able to group items together by a given characteristic	To be able to group items together based on given and chosen characteristics. To be able to use identification charts/keys to identify local plants/wildlife. To be able to use technology to identify plants/wildlife, for example, apps or the Internet. To know that the animal kingdom is split into broad groups which share similar characteristics, e.g. mammals, birds, reptiles, fish, amphibians etc.	To know what classification is and how living things have been classified into broad groups. To be able to spot some characteristics by which certain groups have been classified by. To be able to create a simple classification key	To know that broad groups are further grouped until a species is identified. To be able to create more complex classification keys.
	Comparative Testing		To know that we need to keep some things the same in experiments in order for them to be fair.	To be able to carry out a comparative test with guidance. To be able to identify the variable which is changed by us (independent variable) To be able to identify the variable which may then change and will be measured by us.	To know that a comparative test identifies the effect of changing one variable on another variable. To know that a comparative test To be able to plan a comparative test and use the correct vocabulary for variables.

				To be able to identify some variables which will need to be controlled to make the test fair.	
	Predicting	To guess what the outcome of an experiment might be	To know that a prediction is a type of guessing the outcome of an experiment. To be able to make predictions.	To be able to make informed predictions about experiments	To be able to make increasingly accurate predictions using logic and knowledge.
	Models		To be able to create models to represent other things and this can help us to understand how things work, for example, cactus sponge experiment.	To know that models can be used to demonstrate scientific concepts. To be able to create models to help explain scientific concepts, for example, tendons, lungs	To be able to create more complex models to explain scientific concepts, for example, tendons, lungs
	Chemical Synthesis		To know that everything is made of atoms. To know that mixing some things together makes new products. To know that plants make their own food using the sunlight (and carbon dioxide and water)	To know that the world is made of elements in the periodic table and they can be combined in different ways to create everything in the world. To know that elements have symbols and name some, e.g. oxygen (O_2) and carbon dioxide (CO_2)	To be able to use chemical equations to explain phenomena, for example, the reaction of iron and oxygen to make rust (iron oxide) and photosynthesis.
	Description		To be able to verbally describe scientific phenomena.	To be able to write simple descriptions of scientific phenomena.	To be able to select appropriate methods to accurately describe scientific phenomena.

				To be able to use diagrams to help to describe scientific phenomena.	
Knowledge of apparatus and techniques, including measurement.	**Apparatus**		To be introduced to and use the following apparatus: Pipettes, stop watches, measuring cylinders, beakers, stirrers, sieves	To be introduced to and use the following apparatus: Thermometers, decibel meters, light meters, digital rulers (callipers), rulers, test tubes, filter paper, data recorders, scales.	To select and use appropriate apparatus for a practical science experiment
	Techniques & Measurement		To use non-arbitrary units to measure length and distance. To know some arbitrary units which are used to measure things, e.g. cm, grams. To be able to start, stop and reset a stopwatch and measure in minutes and second.	To be able to use a ruler to measure in metres, centimetres, millimetres. To be able to use weighing scales correctly. To be able to select and use appropriate equipment to separate mixtures, e.g. filter paper, sieves, magnets. To use measuring cylinders to measure a given volume of water using the bottom of the meniscus. To be able to use both digital and traditional thermometers to measure heat. To know how to use data loggers.	To practise using various techniques and equipment to improve their accuracy.

	Safety		To know that scientists must know how to keep themselves safe when doing experiments. To know that there is special safety equipment that scientists wear to protect themselves, e.g. goggles, gloves. To know that we never eat in a science lab unless told to by a science teacher.	To be able to use safety goggles and gloves. To know that some chemicals can harm us or be dangerous. To know some of the safety symbols e.g. flammable, irritant, corrosive. To know what the fire triangle is and that we can prevent/reduce fire by removing/reducing the elements in the triangle.	
	Recording		To experience group recording as a class in a table. To be able to add their own results to class tables. To be able to tally on a chart. To be able to read others' results from a group table. To draw representations of observed experiments.	To be able to record their own results on a pre-drawn table. To be able to copy a table using a pencil and ruler and fill it in with their results. To be able to draw scientific diagrams to represent apparatus and observations of experiments.	To be able to generate their own charts for recording results which are easy to understand.
	Repeat Recording		To know that science can give us results which we didn't expect and, to find out if we carried out the experiment correctly, we can do it again to see if we get the same results.	To know that scientists carry out repeat recording to check their accuracy. To know that we sometimes get results which don't "fit" with our other results.	To know what an anomalous result is and that repeat recording helps us to identify these. To know that we can find the averages of repeated results to give us more reliable results.
Knowledge of data analysis.	**Communication**		To be able to articulate various stages of a scientific experiment.	To begin to use the written word to communicate a science experiment, for	To be able to write, in sentences, the components of a scientific report.

				example writing a method in chronological steps.	
	Tables and Graphs		To be introduced to graphs as representation of data.	To be able to add bars to a set of axes to represent their results as a bar graph.	To be able to draw bar graphs, scatter graphs and pictograms.
	Correlations			To know what different correlations look like when represented on a graph.	
Knowledge of how science uses evidence to develop explanations.	**Evidence**		To know that scientists find evidence to support what they are saying.	To know that scientists collect evidence to help prove their theories. To know that evidence supports explanations.	To know that scientific theories can be disproved by new evidence. To know that science is constantly searching for the truth.
	Conclusions & Explanations		To be able to, orally, come to simple conclusions about the results they have recorded.	To be able to draw conclusions.	To be able to draw conclusions using their results. To know that correlation doesn't necessarily mean causation.
	Science and technology over time		To understand that in order to prove something we need to test it. To know that we have become better at testing things over the years.	To know that science has changed over time and will continue to change as new information is obtained and new methods/technologies are developed. To know what peer reviewing is and that in the	To give examples of how science and technology has changed over time, for example modern medicine. To know that the development in technology has improved peer reviewing of science

				classroom when we conduct the same experiments we are peer reviewing each other.	experiments and that the more people who review experiments improves their reliability.