Curriculum Skills and Progression Map
Science – Working Scientifically

Key Concepts:

Observing over time

Identifying, classifying and grouping

Comparative and fair testing

Pattern seeking

Research using secondary sources

Reception – Working scientifically	
Relevant ELG	**ELG: Listening, Attention and Understanding** - Make comments about what they have heard and ask questions to clarify their understanding. **ELG: Fine motor skills** - Use a range of small tools, including scissors, paint brushes and cutlery. **ELG: Building Relationships** Work and play cooperatively and take turns with others.
Vocabulary	Experiment, investigate, find out, changes, same, different, Question – What?, How?, Why? sort, group, order, explore, describe, look carefully, curiousity, perseverance
KS1 readiness objectives	To feel confident to answer simple questions about observable properties of objects and people, animals and plants around them To compare objects in their environment and talk about similarities and differences To ask questions about the world around them, and seek to find their own answers
Vocabulary	Experiment, investigate, find out, changes, same, different, Question – What?, How?, Why? sort, group, order, explore, describe, look carefully

Programmes of study **Year 1**	**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.	
Organisation	**Progressive objectives**	**Assessment opportunities**
Planning investigations	The child can, with prompting, ask simple questions that can be tested, e.g. about plants growing in their habitat. **The child can offer ways of gathering evidence to answer a question, e.g. by deciding on the best material to use for a particular application.**	Children can ask questions Children can plan an enquiry
Conducting experiments	The child can examine objects to note key features, e.g. observe growth of plants they have planted. **The child can, with support, conduct simple test, e.g. comparing the properties of different materials.**	Children can use equipment to take measures.
Record evidence	The child can, with prompting, identify what might be usefully recorded, e.g. drawing structures of plants or recording changing day length.	Children record work with diagrams and label.
Report findings	The child can identify key findings from an enquiry, e.g. noting how plants have changed over time.	Children process findings to develop conclusions and identify causal relationships.
Conclusion and predictions	The child can suggest answers to enquiry questions using data, e.g. describe how to group plants. **The child can collect data, e.g. comparing and contrasting familiar plants**.	Children can draw conclusions. Children can analyse data.
Vocabulary	As previous year plus: similar, plan, test, compare, explain, scientists, reason	

Programmes of study **Year 2**	**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.

Organisation	Progressive objectives	Assessment opportunities
Planning investigations	The child can ask simple questions that can be tested, e.g. about the local environment and how organisms depend on each other. **The child can suggest different ways of answering a question, e.g. testing the suitability of materials for different purposes.**	Children can plan an enquiry Children can ask questions
Conducting experiments	The child can examine carefully, e.g. using a hand lens. **The child can conduct simple tests, e.g. setting up comparative tests to show that plants need water and light.**	Children can use equipment to take measures.
Record evidence	The child can, with assistance, draw and label diagrams, e.g. recording plants changing over time, starting from seed or a bulb.	Children record work with diagrams and label them.
Report findings	The child can identify and group key outcomes from enquiry, e.g. describing conditions in different habitats and how these affect the numbers and types of organisms.	Children process findings to develop conclusions and identify causal relationships.
Conclusion and predictions	The child can collect data relevant to the answering of questions, e.g. seeing how the shapes of some materials can be changed.	Children can analyse data. Children can draw conclusions.

	The child can answer enquiry questions using data and ideas, e.g. to help decide how the properties of certain materials make them suitable for certain applications.	
Vocabulary	As previous year plus: enquiry types, cycle, fair test, prediction, observe, describe, name, identify, label, record, measure, table, results, bar chart, identify, classify	

Programmes of study **Year 3**	**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.	
Organisation	**Progressive objectives**	**Assessment opportunities**
Planning investigations	The child can, with support, develop relevant, testable questions, e.g. what happens to shadows when the light source moves. **The child can plan enquiry, such as comparative or fair test, e.g. comparing the effect of different factors on plant growth.** The child can set up a comparative test, e.g. how far things move on different surfaces.	Children can ask questions Children can plan an enquiry Children can use equipment to take measurements.
Conducting experiments	The child can use various equipment, as instructed, e.g. using a hand lens to examine rocks. The child can use standard measurements when taking measurements, e.g. measuring distances between a light source and object.	Children can use equipment to take measures. Children can explore how to improve the quality of data.

Record evidence	The child can, with prompting, draw and label diagrams, e.g. to show how water travels in a plant. The child can, with prompting, use tables to record evidence, e.g. recording what happens when various rocks are rubbed together. The child can, with prompting, gather and display evidence in various ways, e.g. about the ways that magnets behave in relation to each other.	Children record work with diagrams and label them. Children can display data using labelled diagrams, keys, tables and bar charts Children can display data using line graphs.
Report findings	The child can, with prompting, write a conclusion based on evidence, e.g. exploring the strengths of different magnets. The child can indicate findings from an enquiry that could be reported, e.g. answering questions about how rocks are formed.	Children process findings to develop conclusions and identify causal relationships. Children can use displays and presentations to report on findings.
Conclusion and predictions	Children can analyse data. Children can draw conclusions. Children can develop investigation further.	The child can collect data relevant to the answering of questions, e.g. seeing how the shapes of some materials can be changed. The child can, with support, use evidence to produce a simple conclusion, e.g. the changes that occur when rocks are in water. The child can suggest how an investigation could be extended, e.g. suggesting creative uses for different magnets.
Vocabulary	As previous year plus: accurate, observations, research, conclusion, measurements, variables, evidence, units, chart, thermometers, data loggers.	

Programmes of study **Year 4**	**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.

Organisation	**Progressive objectives**	**Assessment opportunities**
Planning investigations	The child can develop relevant, testable questions, e.g. based on observations of animals. **The child can plan investigations using different types of scientific enquiry, e.g. exploring various materials by observing change over time, running comparative tests and conducting surveys.** The child can set up comparative and fair tests, e.g. finding patterns in the sounds made by elastic bands of different thicknesses.	Children can ask questions Children can plan an enquiry Children can identify and manage variables
Conducting experiments	The child can use various equipment, as instructed, repeatedly and with care, e.g. thermometers.	Children can use equipment to take measures Children explore how to improve the quality of data

	The child can recognise the importance of using standard units and measures accurately, e.g. measuring temperature when investigating its effect on washing drying.	
Record evidence	The child can use words and diagrams to record findings, e.g. how habitats change during the year. **The child can use various ways to record evidence, e.g. comparing the teeth of herbivores and carnivores.** The child can use various ways to record, group and display evidence, e.g. grouping and classifying various materials.	Children record work with diagrams and label them. Children can display data using labelled diagrams, keys, tables and bar charts Children can display data using line graphs
Report findings	The child can write a conclusion based on evidence, e.g. effect on brightness of bulbs if more cells are added. **The child can present findings either in writing or orally, e.g. relating to investigating which materials are conductors.**	Children process findings to develop conclusions and identify casual relationships. Children use displays and presentations to report on findings.
Conclusion and predictions	The child can recognise patterns that relate to scientific ideas, e.g. finding out which materials make better earmuffs. **The child can use evidence to produce a simple conclusion, e.g. the effect of temperature on various substances.** The child can use evidence to suggest further relevant investigations, e.g. making own instruments, using ideas about pitch and volume.	Children can analyse data. Children can draw conclusions. Children can develop investigation further
Vocabulary	As previous plus: similarities, differences, process, evaluate, rank, tally, increase, decrease, classification key, pattern	

Programmes of study **Year 5**	**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.

Organisation	Progressive objectives	Assessment opportunities
Planning investigations	The child, with support, can answer questions using evidence gathered from different types of scientific enquiry, e.g. comparing life cycles of different plants using change over time, surveys and secondary research. **The child can, with prompting, identify and manage variables, e.g. when exploring falling paper cones.**	Children can plan an enquiry Children can identify and manage variables
Conducting experiments	The child can, following discussion of alternatives, selects appropriate equipment, e.g. using a shadow stick and measuring length and angle of shadow. **The child can take measurements that are precise as well as accurate, e.g. measuring the force needed to pull different shapes of boat through the water.** The child can know how to process repeat readings, e.g. when timing falling objects.	Children can use equipment to take measures Children explore how to improve the quality of data Children understand the role of repeat readings

Record evidence	The child can start to use labelled diagrams to show more complex outcomes, e.g. comparing the time of day at different places on the earth. **The child can, with prompting, use various ways to record complex evidence, e.g. when investigating how gears and levers enable a small force to have a larger effect.** The child can use a line graph to record basic data, e.g. length and mass of a baby as it grows.	Children record work with diagrams and label them. Children can display data using labelled diagrams, keys, tables and bar charts Children can display data using line graphs
Report findings	The child can with prompting, write a conclusion using evidence and identifying causal links, e.g. investigating what makes a parachute fall quicker. **The child can with support, display and present key findings from enquiries orally and in writing, e.g. suggesting reasons for similarities and differences between various animals.** The child can, with support, indicate why some results may not be entirely trustworthy, e.g. when timing falling objects.	Children process findings to develop conclusions and identify casual relationships. Children use displays and presentations to report on findings. Children explain confidence in findings
Conclusion and predictions	The child can show how evidence supports a conclusion, e.g. researching gestation periods of various mammals and relating them to adult mass. **The child can suggest further relevant comparative or fair tests, e.g. when testing materials for various properties to determine their suitability for an application.**	Children can draw conclusions.
Vocabulary	As previous year plus: analyse, evaluate, interpret, pattern, independent variable, dependent variable controlled variable, precision, scatter graphs, line graphs, causal relationships, support/refute, repeat readings	

Programmes of study **Year 6**	**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.

Organisation	**Progressive objectives**	**Assessment opportunities**
Planning investigations	The child can answer questions using evidence gathered from different types of scientific enquiry, e.g. operation of circulatory system from experiment, survey and secondary research. **The child can identify and manage variables, e.g. distances and sizes in shadow formation.**	Children can plan an enquiry Children can identify and manage variables
Conducting experiments	The child can use appropriate equipment, such as meter rule, to take measurements, such as distance travelled by light. **The child can consider how by modifying instrument or technique, measurements can be improved, e.g. when recording route of light rays.** The child can identify situations in which taking repeat readings will improve the quality of evidence, e.g. investigating the behaviour of components in a circuit.	Children can use equipment to take measurements Children explore how to improve the quality of data Children understand the role of repeat readings

Record evidence	The child can use labelled diagrams to show complex outcomes, e.g. relating specific adaptations of organisms to environmental factors. **The child can use various ways, as appropriate, to record complex evidence, e.g. in the construction of a key to aid plant identification.** The child can use line graphs to display complex data, e.g. size of object in relation to the size of the shadow it casts.	Children record work with diagrams and label them. Children can display data using labelled diagrams, keys, tables and bar charts Children can display data using line graphs
Report findings	The child can write a conclusion using evidence and identifying causal links, e.g. in the design of a periscope. **The child can display and present key findings from enquiries orally and in writing, e.g. deciding how well** **classifications fit unfamiliar animals and plants.** The child can, in conclusions, indicate how trustworthy they are, e.g. in relating brightness of bulb to voltage supplied.	Children process findings to develop conclusions and identify casual relationships. Children use displays and presentations to report on findings. Children explain confidence in findings
Conclusion and predictions	The child can identify how an idea is supported or refuted by evidence, e.g. selective breeding to produce animals or plants with desirable characteristics. **The child can use evidence to suggest further comparative or fair tests that would develop the investigation, e.g. in the design of rear view mirrors for cars.**	Children can draw conclusions. Children can develop investigation further.
Vocabulary	As previous year plus: hypothesis, constants, categorise	