Progression in scientific skills

Skills	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Explore, Question and Generate ideas	• Using senses explore the world around them. • Asks appropriate questions. • With support talk about why things happen; how things work; ways to solve problems or questions	• Generates ideas from initial experiences. • SWS1.1Asks appropriate questions. • Begin to use questions to identify problems. • **SWS1.4 Use observation to find answers to simple questions.**	• Explore and evaluate in order to verbally communicate ideas. • **SWS2.1Ask 'scientific' questions using a range of sentence stems that lead to enquiry or extend/deepen initial ideas.** • Suggest ways to answer questions.	• **SWS3.8Ask relevant science-based questions and use different types of scientific enquiries to answer them.** • **SWS3.4Identify differences, similarities or changes related to ideas and processes.**	• **SWS4.8 Ask relevant questions and use different types of scientific enquiries to answer them.** • **SWS4.4 Identify differences, similarities or changes related to simple scientific ideas and processes.**	• Ask questions and offer own ideas for enquiries. • With support, improve questions to clarify purpose. • With support, use some primary and secondary resources in addition to own experiences and those of peers, to shape and inform their own ideas.	• Asks questions and offer own ideas for enquiry and improves question to clarify accurate response. • Use a range of primary and secondary resources in addition to their own experiences and those of their peers, to shape and inform their own ideas.
Reasoning	• Beginning to use more complex sentences to link thoughts (e.g. using ***and***, ***because***).	• Explaining their ideas and thinking using prior knowledge to answer simple questions given by adult.	• With support, give a reason that supports their thinking, using specific language where appropriate.	• Use prior knowledge that develops and supports thinking using specific language where appropriate.	• Explain choices, decisions, approaches and comments • Begin to be able to read and interpret line graphs with support.	• With support, justify why particular methods and approaches have been decided upon using technical/age appropriate language.	• Justify which methods and approaches have been decided upon using technical/age appropriate language.
Predict	• Make predictions based on observation or experiences	• Using prior knowledge make predictions that are appropriate to task.	• With support, predict outcomes to enquires by suggesting what might happen.	• Predict outcome to enquires.	• Predict outcomes and sometimes suggest reasons for predictions. • Make further predictions from results and in simple contexts.	• Predict outcomes and (with occasional support/guidance) suggest reasons for predictions. • **SWS5.4 With support, make predictions from results and uses these to test suggested patterns in the relationship studied.**	• Independently predict outcomes, the expected pattern of results. • Justify predictions using subject knowledge • Independently uses predictions to test suggested patterns relationships.
Plan, Test, Investigate	• Make decisions about how to approach a task, • Look closely at differences, patterns and change. • solve a problem and reach a goal	• Write or show through a sequence of diagrams or orally describe to another child/adult what they are going to do.	• Develop ideas through discussions, observations, drawings and modelling. • Plan by suggesting what to do next and how to progress as ideas develop. • Setting up comparative tests.	• With support, decide on an appropriate approach in their own investigation to answer questions. • **SWS3.3 Set up simple practical enquiries, comparative and fair tests.**	• **SWS4.3 Set up simple, practical enquiries and tests (comparative and fair).** • In a fair test identify controlled, independent and dependent variables. • Order and plan the main stages of investigation.	• **SWS5.1 Plan different types of scientific enquiries to answer questions.** • Set up a fair test knowing the controlled, independent and dependent variables. • Supported, considers whether to take repeat readings or plan other types of enquiry.	• Independently set up a fair test. • **SWS6.1 Plan the detail in other types of enquiry and with support consider plans if an approach will yield enough evidence for the task.**
Identifying and mitigating hazards	• Show understanding of safety with new challenges. Consider/manage some risks.	• Identify and talk about dangers/risk and be able to manage them.	• With support, can recognise hazards	• Recognise most hazards.	• Recognises hazards and, with support, plans how to control risks.	• Is able to assess most hazards and plan how to control risks.	• Assesses hazards and plans how to control risks Independently.
Equipment (Selecting and using)	• Select equipment appropriate for task. • Shows understanding of how to use and store equipment safely.	• From a given selection of equipment selects and uses equipment appropriately • **SWS1.3Use science-related equipment for task/ experiment appropriately**	• Selects equipment form a range offered, appropriately. • **SWS2.3Use 'science' related equipment accurately** • Follows instructions for using equipment correctly and safely, usually working without adult support.	• Selects tools from a wider range with support • Uses basic equipment correctly and safely. • May refer to adult when equipment fails.	• Select appropriate equipment for investigation. • With support, considers the scale and the degree of accuracy required on some measuring equipment	• Selects equipment from a wider range (including digital scales, force meters & ipad apps) consider scales and the degree of accuracy required. • Uses a wide range of equipment correctly and safely, dealing with failures independently.	• Selects suitable equipment for a range of tasks. • Independently takes into account the scale and degree of accuracy on measuring equipment. • Uses a wide range of equipment correctly and safely dealing with equipment independently.
Diagrams	• To draw a simple representation of a finished product, idea or findings. • Record ways that child can interpret and explain	• To draw and label a simple representation of a finished diagram.	• Use drawings and labels to present evidence. • Creates charts. • Creates simple food chains	• **SWS3.5 Record findings in a range of ways: drawings, labelled diagrams, keys, bar charts and tables.**	• **SWS4.5 Collect information from a range of different sources and use to inform ideas in words, labelled sketches, diagrams and models, keeping in mind, fitness for purpose and the end user/viewer.**	• **SWS5.3Use various examples of information clarifying/sharing ideas through discussion, labelled sketches, cross-sectional diagrams and models, recognising that ideas have to meet a range of needs.**	• Develop detailed criteria for investigations aimed at individuals/ target audience/ questions. • Sharing results through a range of diagrams and representations, e.g: cross sectional, exploded diagrams prototypes and pattern pieces.

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Collect data (Recording results)	• Use what they have observed and discuss.	• Make basic but relevant observations of scientific activities • To begin to use tables as a means of recording data and describe what this might mean. • Use simple tables to record results (e.g. tally, number, pictorial)	• **SWS2.1Make relevant 'scientific' observations** • **SWS2.5With some accuracy collect and record data to help answer 'science' related questions.** • With support, order results where appropriate using simple tables.	• **SWS3.1 Make systematic observations taking measurements using standard units.** • **SWS3.2 Gather, record, classify and present data in a variety of ways to help in answering scientific questions.**	• **SWS4.1 Make systematic observations taking accurate measurements using standard units and range of equipment.** • **SWS4.2Gather, record, classify and present data in a variety of ways to answer scientific questions with support.**	• **SWS5.2Take measurements, using a range of scientific equipment, with increasing accuracy and precision; take repeat readings when appropriate.** • Records own data and results, choosing best way (with some support). • Begins to select appropriate ways to collect and present evidence.	• **SWS6.2Take measurements, using a range of scientific equipment, with increasing accuracy and precision; take repeat readings when appropriate.** • **SWS6.3 Record increasingly complex data and results. Selecting the most appropriate.** • Makes a series of detailed relevant observations.
Concluding and interpret data	• I can talk about what happened	• I can write and discuss what happened and whether it is what I expected using some scientific vocab.	• Describes what happens, making comparisons where appropriate. With support , orders results where appropriate	• **SWS.3.6 Report on findings from inquiries, presenting findings in oral and/or written form; give explanations and conclusions.** • **SWS3.9 Use straightforward scientific evidence to answer questions or to support findings.**	• **SWS4.9 Use straightforward scientific evidence to answer questions or to support findings.** • With support relates patterns in results to subject knowledge where appropriate.	• Sometimes relates patterns in results to subject knowledge where appropriate. • **SWS5.5 Begins to select appropriate ways to present evidence.** • Creates own bar charts and tables, including those for repeat reading.	• **SWS6.4 Use test results to make predictions; test these.** • **SWS6.5 Report and present findings from enquiries in oral and/or written forms; including conclusions, information about causal relationships and explanations of results (incl degree of trust in these).**
Evaluation reflection	• Can review how well the approach worked.	• To write simple sentences to say what happened, and whether that answers their question.	• **SWS2.4 Use observation to find answers to 'science' related questions. Evaluate ideas against given criteria.**	• **SWS3.7 Use results to consider the views of others to improve their work.**	• Suggest how the enquiry might be improved. • With support recognises some of the limitations of the evidence.	• **SWS5.6Identify scientific evidence that has been used to support or refute ideas or arguments.** • Suggest why similar enquiries yield different results. • Supported, considers the spread of repeated measurements / results. • With support recognises some of the limitations of their evidence.	• **SWS6.6 Identify scientific evidence that has been used to support or refute ideas or arguments. Identifies how much to trust results and justifies decision –recognising limitations.** • Suggests why similar inquires results differ and considers spread of repeated measurements/results.
Progression in Scientific Approaches							
Pattern seeking	• Look closely at differences, patterns and change and talk about what has been noticed.	• Can begin to identify and discuss different patterns noticed. What is different, what is the same.	• With support, identifies and describe simple causal relationships and say whether the relationship was what was expected.	• Increasingly independently identifies and describe simple causal relationships and say whether the relationship was what was expected.	• Independently discuss simple patterns using topic/knowledge specific language.	• With support, recognise the significance of relationships between sets of data. • With support, discuss cause and effect patterns using scientific knowledge and understanding.	• Independently recognises the significance of relationships between sets of data. • Discuss cause and effect patterns using scientific knowledge and understanding.
Research	• Know that information can be retrieved from books/ICT. Talk about what has been observed.	• With help make suggestions about how to find things out. • With support can use books and electronic media to research. • Use scientific language to talk about what I found out. • I give an opinion about research	• With help make suggestions about how to find things out. • Use books and electronic media research. • Use scientific language to talk about what was found out. • Give an opinion about research.	• Increasingly use secondary sources to find information. • Use someone else's data. • Talk about research using scientific language. • Suggest ways to improve how to find out and use information.	• With support, uses relevant information and data from a range of secondary sources. • Begin to recognise how data is obtained and when it is biased. • Discuss and explain independent research using scientific knowledge.	• Use a range of secondary resources to help answer questions and apply to own work. • Talk about and explain research using scientific knowledge and understanding. • Evaluate how well research has answered my question.	• Use relevant information and data from a range of secondary sources. • Recognise how data has been obtained - noticing when biased. • Independently discuss and explain independent research using scientific knowledge and understanding.
Observation over time	• Develop an understanding of growth, decay and changes over time.	• Observe and describe changes/what's stayed the same to another child or adult. • SWS1.2 Make basic but relevant observations of scientific activities.	• Make relevant observations. • Take non-standard measurements. • Observing through video or first hand. • Record observations	• Make relevant observations. • Use standard measuring equipment for quantities such as temperature and volume	• Begins to recognise and comment on the significance of change over time. • Supported, begins to discuss and explain changes over time using scientific knowledge, vocabulary and understanding.	• With support recognise and comment on the significance of change over time • With support discuss and explain changes over time drawing on scientific knowledge, vocabulary and understanding.	• Independently recognising and commenting on the significance of change over time • Discuss and explain changes over time drawing on scientific knowledge, vocabulary and understanding.
Identifying/Classifying	• Look at similarities and differences and begin to give names and reasons for sorted groups. (With Support)	• Give appropriate names to a group of objects, materials or living things. • Describe how they do this.	• Give appropriate names to a group of objects, materials or living things.	• Use scientific names to groups of objects, materials or living things.	• Independently discuss the similarities and differences using appropriate topic specific and scientific language.	• With support recognise the significance of sorting and classifying. • With support, discuss and explain decisions using scientific knowledge and language.	• Independently recognise the significance of sorting and classifying. • Independently discuss and explain decisions using scientific knowledge and language.

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Comparing and sorting	• Show curiosity in similarities and differences and begin to sort and categorise.	• Identify common features and similarities in order to group and sort objects, materials and living things.	• Explore and compare, sort or classify objects, living things or events. EG: make simple comparisons and groupings that relate to differences and similarities	• Talk about what criteria to use to sort and classify objects. • Use Carroll & Venn diagrams to sort. • Use simple keys and branching databases to identify things.	• Explain criteria used to sort and classify. • Use Carroll, Venn diagrams • Use/create simple keys and branching databases to identify variables differences.	• Use a series of tests to sort and classify materials. • Use secondary sources to identify and classify. • Make own keys and branch databases with four or more items.	• Use a series of tests to sort and classify materials. • Use secondary sources to identify and classify. • Make own keys and branch databases with four or more items.