Science

Working Scientifically Progression Map

Level Expected at the End of EYFS

We have selected the **most relevant** statements from Development Matters age ranges for Three and Four-Year-Olds and Reception as well as highlighting the statements within the ELGs **which feed into** the programme of study for Science.

For more detail about linked subject progression within the EYFS Framework, please refer to **these documents**.

Science		
Three and Four-Year-Olds	Communication and Language	• Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
	Personal, Social and Emotional Development	• Make healthy choices about food, drink, activity and toothbrushing.
	Understanding the World	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.

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Reception	Communication and Language	• Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts.
	Personal, Social and Emotional Development	• Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian
	Understanding the World	• Explore the natural world around them. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.

Science			
ELG	Communication and Language	Listening, Attention and Understanding	• Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Managing Self	• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
	Understanding the World	The Natural World	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

This PlanIt Progression Map has been written to support practitioners who have chosen to adopt the PlanIt scheme in part or in full. This curriculum progression map comprehensively shows the progression of working scientifically skills from year 1 to year 6. Please see the Editable Science Programme of Study and Vocabulary Progression Map provided in this pack for the progression of the programme of study national curriculum statements.

Key Stage 1 National Curriculum Working Scientifically

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.

Lower Key Stage 2 National Curriculum Working Scientifically	Upper Key Stage 2 National Curriculum Working Scientifically
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 a 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.

To see the PlanIt Science units mapped against the working scientifically and programme of study objectives in the national curriculum for each year group, please see the National Curriculum Links Subject Overview in this pack.

In line with the national curriculum aims for science, this progression map includes fair testing in the 'Asking Questions and Carrying Out Fair and Comparative Tests' section. When we talk about making tests fair in PlanIt resources, we are referring to any investigation when efforts are made to achieve more reliable data by changing the variable being tested and keeping all control variables the same. This interpretation of fair testing at primary level is consistent with the example given in the Standards and Testing Agency Science Teacher Assessment Exemplification for KS2.

Intent

It is our intention in PlanIt Science to develop in all young people a lifelong curiosity and interest in the sciences. When planning for the science curriculum, we intend for children to have the opportunity, wherever possible, to learn through varied systematic investigations, leading to them being equipped for life to ask and answer scientific questions about the world around them. As children progress through the year groups, they build on their skills in working scientifically, as well as on their scientific knowledge, as they develop greater independence in planning and carrying out fair and comparative tests to answer a range of scientific questions. Each PlanIt unit has an accompanying knowledge organiser which can be used to help reinforce the key knowledge for each unit as set out in the science national curriculum. The knowledge organisers help children to consolidate and retain the science knowledge they have learnt and also reinforce key scientific vocabulary from each unit. The PlanIt Science scheme of work ensures that children have a varied, progressive and well-mapped-out science curriculum that provides the opportunity for progression across the full breadth of the science national curriculum for KS1 and KS2.

Implementation

The acquisition of key scientific knowledge is an integral part of our science lessons. Linked knowledge organisers enable children to learn and retain the important, useful and powerful vocabulary and knowledge contained within each unit. The progression of skills for working scientifically are developed through the year groups and scientific enquiry skills are of key importance within lessons. The progression of these skills is set out in the PlanIt Science Progression Map. Each lesson has a clear focus. Scientific knowledge and enquiry skills are developed with increasing depth and challenge as children move through the year groups. They complete investigations and hands-on activities while gaining the scientific knowledge for each unit. Interwoven into the teaching sequence are key assessment questions, identified in green on lesson plans. These allow teachers to assess children's levels of understanding at various points in the lesson. They also enable opportunities to recap concepts where necessary. The sequence of lessons helps to embed scientific knowledge and skills, with each lesson building on previous learning. There is also the opportunity to regularly review and evaluate children's understanding. Activities are effectively differentiated so that all children have an appropriate level of support and challenge. Our detailed lesson plans include adult guidance to ensure that teachers are equipped with secure scientific subject knowledge, enabling them to deliver high-quality teaching and learning opportunities while making them aware of possible scientific misconceptions.

Impact

In PlanIt Science, progress is measured through a child's ability to know more, remember more and explain more. This can be measured in different ways in our units. The use of green key questions ensures opportunities are built into the lesson for ongoing assessment. Attainment and progress can be measured across the school using our assessment spreadsheets. The impact of using the full range of resources included in the science unit will also be seen across the school with an increase in the profile of science. The learning environment across the school will be more consistent with science technical vocabulary displayed, spoken and used by all learners. Whole-school and parental engagement will be improved through the use of science-specific home learning tasks and shared use of knowledge organisers. Children who feel confident in their science knowledge and enquiry skills will be excited about science, show that they are actively curious to learn more and will see the relevance of what they learn in science lessons to real-life situations and also the importance of science in the real world.

	KS1	LKS2	UKS2
Plan	**KS1 Science National Curriculum** Asking simple questions and recognising that they can be answered in different ways. Children can: a explore the world around them, leading them to ask some simple scientific questions about how and why things happen; b begin to recognise ways in which they might answer scientific questions; c ask people questions and use simple secondary sources to find answers.	**Lower KS2 Science National Curriculum** Asking relevant questions and using different types of scientific enquiries to answer them. Children can: a start to raise their own relevant questions about the world around them in response to a range of scientific experiences; b start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; c recognise when a fair test is necessary; d help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.	**Upper KS2 Science National Curriculum** Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Children can: a with growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences; b with increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; c explore and talk about their ideas, raising different kinds of scientific questions; d ask their own questions about scientific phenomena; e select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; f 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; g plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary.

	KS1	LKS2	UKS2
Do	**KS1 Science National Curriculum** Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. Children can: a observe the natural and humanly-constructed world around them; b observe changes over time; c use simple measurements and equipment; d make careful observations, sometimes using equipment to help them observe carefully; e carry out simple practical tests, using simple equipment; f experience different types of scientific enquiries, including practical activities; g talk about the aim of scientific tests they are working on; h use simple features to compare objects, materials and living things; i decide how to sort and classify objects into simple groups with some help.	**Lower KS2 Science National Curriculum** Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Setting up simple practical enquiries, comparative and fair tests. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Children can: a make systematic and careful observations; b observe changes over time; c use a range of equipment, including thermometers and data loggers; d ask their own questions about what they observe; e where appropriate, take accurate measurements using standard units using a range of equipment; f set up and carry out simple comparative and fair tests; g talk about criteria for grouping, sorting and classifying; h group and classify things.	**Upper KS2 Science National Curriculum** 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. Children can: a choose the most appropriate equipment to make measurements and explain how to use it accurately; b take measurements using a range of scientific equipment with increasing accuracy and precision; c make careful and focused observations; d know the importance of taking repeat readings and take repeat readings where appropriate; e independently group, classify and describe living things and materials; f use and develop keys and other information records to identify, classify and describe living things and materials.

	KS1	LKS2	UKS2
Record	**KS1 Science National Curriculum** Gathering and recording data to help in answering questions. Children can: a record and communicate findings in a range of ways with support; b sort, group, gather and record data in a variety of ways to help in answering questions, such as in simple sorting diagrams, pictograms, tally charts, block diagrams and simple tables.	**Lower KS2 Science National Curriculum** 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. Children can: a collect data from their own observations and measurements; b present data in a variety of ways to help in answering questions; c use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge; d record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables.	**Upper KS2 Science National Curriculum** Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Children can: a decide how to record data from a choice of familiar approaches; b record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.

	KS1	LKS2	UKS2
Review	**KS1 Science National Curriculum** Using their observations and ideas to suggest answers to questions. Children can: a notice links between cause and effect with support; b begin to notice patterns and relationships with support; c begin to draw simple conclusions; d identify and discuss differences between their results; e use simple and scientific language; f read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1; g talk about their findings to a variety of audiences in a variety of ways.	**Lower KS2 Science National Curriculum** Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Children can: a draw simple conclusions from their results; b make predictions; c suggest improvements to investigations; d raise further questions which could be investigated; e first talk about, and then go on to write about, what they have found out; f report and present their results and conclusions to others in written and oral forms with increasing confidence; g make links between their own science results and other scientific evidence; h identify similarities, differences, patterns and changes relating to simple scientific ideas and processes; i use straightforward scientific evidence to answer questions or support their findings; j recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.	**Upper KS2 Science National Curriculum** Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Using test results to make predictions to set up further comparative and fair tests. Identifying scientific evidence that has been used to support or refute ideas or arguments. Children can: a notice patterns; b draw conclusions based in their data and observations; c use their scientific knowledge and understanding to explain their findings; d read, spell and pronounce scientific vocabulary correctly; e identify patterns that might be found in the natural environment; f look for different causal relationships in their data; g discuss the degree of trust they can have in a set of results; h independently report and present their conclusions to others in oral and written forms; i use their test results to identify when further tests and observations may be needed; j use test results to make predictions for further tests; k use primary and secondary sources evidence to justify ideas; l identify evidence that refutes or supports their ideas; m recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact; n use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas; o talk about how scientific ideas have developed over time.

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Progression of Vocabulary - Working Scientifically

KS1	LKS2	UKS2
aim	accurate	accuracy and precision
answers	bar chart	bar graphs
block diagrams	chart	causal relationship
changes	classify	degree of trust
compare	comparative test	dependent variable
describe	conclusion (What have we found out?)	independent variable
difference	criteria	justify
different	data	line graphs
enquiry	develop	refute
equipment	diagram	repeat results
experience	evaluate	scatter graphs
explore	evidence	support
findings	explanation	variables (what do we change, what do we keep the same, how and what are we measuring?)
gather	key	
group	making a test fair	
identify (name)	method	
investigate	observations	
measure	plan (What will we do?)	
notice	practical enquiry	
observe	prediction (What do you think will happen?)	
patterns	primary sources	
pictograms	questioning	
questions	reasoning	
record	relationships	
same	results (What happened?)	
similarity	secondary sources	
simple tables	standard units	
sort	table	
sorting diagrams	What do we change, what do we keep the same, what are we measuring?	
tally charts		
test		
What will we do? (plan)		
What do you think will happen? (prediction)		
What happened? (results)		
What have we found out? (conclusion)		