

Science Progression of Knowledge and Skills

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

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.

Upper Key Stage 2 National Curriculum Working Scientifically

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.

EYFS	<p>Understanding the World ELG: The Natural World</p> <ul style="list-style-type: none"> • 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
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WORKING SCIENTIFICALLY						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Planning investigations						
<ul style="list-style-type: none"> • Ask questions • Plan an enquiry • Identify & manage variables 	<ul style="list-style-type: none"> • Ask simple questions when prompted • Suggest ways of answering a question • Conduct simple tests, with support 	<ul style="list-style-type: none"> • Ask simple questions • Recognise that questions can be answered in different ways 	<ul style="list-style-type: none"> • Ask relevant questions when prompted • Set up simple and practical enquiries, comparative and fair tests • Set up comparative tests 	<ul style="list-style-type: none"> • Ask relevant questions • Plan different types of scientific enquiries to answer questions • Set up simple and practical enquiries, comparative and fair tests 	<ul style="list-style-type: none"> • With prompting, plan different types of scientific enquiries to answer questions • With prompting, recognise and control variables where necessary • Select, with prompting, and use appropriate equipment to take readings 	<ul style="list-style-type: none"> • Plan different types of scientific enquiries to answer questions • Recognise and control variables where necessary
Conducting Experiments						
<ul style="list-style-type: none"> • Pupils can use equipment to take measurements • Pupils explore how to improve the quality of data • Pupils understand the role of repeat readings 	<ul style="list-style-type: none"> • Make relevant observations • Conduct simple tests, with support 	<ul style="list-style-type: none"> • Observe closely, using simple equipment • Perform simple tests 	<ul style="list-style-type: none"> • Make systematic observations, using simple equipment • Use standard units when taking measurements 	<ul style="list-style-type: none"> • Make systematic and careful observations using a range of equipment, including thermometers and data loggers • Take accurate measurements using standard units, where appropriate 	<ul style="list-style-type: none"> • Select, with prompting, and use appropriate equipment to take readings • Take precise measurements using standard unit • Take and process repeat readings 	<ul style="list-style-type: none"> • Take measurements using a range of scientific equipment • Take measurements with increasing accuracy and precision • Take repeat readings when appropriate
Recording evidence						
<ul style="list-style-type: none"> • Pupils record work with diagrams and label them • Pupils can display data using labelled diagrams, keys, tables and bar charts 	<ul style="list-style-type: none"> • With prompting, suggest how findings could be recorded 	<ul style="list-style-type: none"> • Record and communicate their findings in a range of ways and begin to use simple scientific language 	<ul style="list-style-type: none"> • Record findings in various ways • With prompting, suggest how findings may be tabulated • With prompting, use various ways of recording, grouping and displaying evidence 	<ul style="list-style-type: none"> • Record findings using simple scientific language, drawings and labelled diagrams • Record findings using keys, bar charts, and tables • Gather, record, classify and present data in a 	<ul style="list-style-type: none"> • Record data and results • Record data using labelled diagrams, keys, tables and charts • Use line graphs to record data 	<ul style="list-style-type: none"> • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar charts • Record data and results of increasing complexity using line graphs

<ul style="list-style-type: none"> Pupils can display data using line graphs 				variety of ways to help to answer questions		
Reporting findings						
<ul style="list-style-type: none"> Pupils process findings to develop conclusions and identify causal relationships Pupils use displays and presentations to report on findings Pupils explain confidence in findings 	<ul style="list-style-type: none"> Recognise findings 	<ul style="list-style-type: none"> Identify and classify 	<ul style="list-style-type: none"> With prompting, suggest conclusions from enquiries Suggest how findings could be reported 	<ul style="list-style-type: none"> Report on findings from enquiries, including oral and written explanations, of results and conclusions Report on findings from enquiries using displays or presentations 	<ul style="list-style-type: none"> Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships With support, present findings from enquiries orally and in writing With prompting, identify that not all results may be trustworthy 	<ul style="list-style-type: none"> Report and present findings from enquiries, including conclusions and causal relationships Report and presents findings from enquiries in oral and written forms such as displays and other presentation Report and present findings from enquiries, including explanations of, and degree of, trust in results
Conclusions and predictions						
<ul style="list-style-type: none"> Pupils can analyse data Pupils can draw conclusions Pupils can develop investigation further 	<ul style="list-style-type: none"> Gather and record data Use observations to suggest answers to questions 	<ul style="list-style-type: none"> Gather and record data to help answer questions Use their observations and ideas to suggest answers to questions 	<ul style="list-style-type: none"> Gather and record data about similarities, differences and changes With prompting, suggest conclusions that can be drawn from data Suggest possible improvements or further questions to investigate 	<ul style="list-style-type: none"> Identify differences, similarities or changes related to simple scientific ideas and processes Use straightforward scientific evidence to answer questions or to support their findings Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions 	<ul style="list-style-type: none"> Suggest how evidence can support conclusions Suggest further comparative or fair tests 	<ul style="list-style-type: none"> Identify scientific evidence that has been used to support or refute ideas or arguments Use test results to make predictions to set up further comparative and fair tests

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
PLANTS	<ul style="list-style-type: none"> identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees. observe and describe how seeds grow into mature plants 	<ul style="list-style-type: none"> observe and describe how bulbs grow into mature plants 	<ul style="list-style-type: none"> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to 			

	<ul style="list-style-type: none"> find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 		<p>grow) and how they vary from plant to plant</p> <ul style="list-style-type: none"> investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 			
ANIMALS INCLUDING HUMANS	<ul style="list-style-type: none"> identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Say what part of the body is associated with each sense. 	<ul style="list-style-type: none"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise and hygiene. 	<ul style="list-style-type: none"> identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions 	<ul style="list-style-type: none"> identify that humans and some other animals have skeletons and muscles for support, protection and movement. construct and interpret a variety of food chains, identifying producers, predators and prey. 	<ul style="list-style-type: none"> describe the changes as humans develop to old age identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function 	<ul style="list-style-type: none"> describe the ways in which nutrients and water are transported within animals, including humans.
EVERYDAY MATERIALS	<ul style="list-style-type: none"> distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of 	<ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses find out how the shapes of solid objects made from some materials can be changed by 				

	their simple physical properties.	squashing, bending, twisting and stretching.				
SEASONAL CHANGES	<ul style="list-style-type: none"> observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies. 					
LIVING THINGS AND THEIR HABITATS		<ul style="list-style-type: none"> explore and compare the differences between things that are living, dead, and things that have never been alive identify and name a variety of plants and animals in their habitats, including microhabitats identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. 			<ul style="list-style-type: none"> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals. 	<ul style="list-style-type: none"> describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics.
ROCKS			<ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things 			

			<p>that have lived are trapped within rock</p> <ul style="list-style-type: none"> recognise that soils are made from rocks and organic matter. 			
LIGHT			<ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by a solid object find patterns in the way that the size of shadows change. 			<ul style="list-style-type: none"> recognise that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
STATES OF MATTER				<ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 		
SOUND				<ul style="list-style-type: none"> identify how sounds are made, associating some 		

				<p>of them with something vibrating</p> <ul style="list-style-type: none"> • recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases. 		
<p>FORCES AND MAGNETS</p>			<ul style="list-style-type: none"> • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing. 		<ul style="list-style-type: none"> • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect 	

ELECTRICITY				<ul style="list-style-type: none"> • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors. 		<ul style="list-style-type: none"> • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram.
PROPERTIES AND CHANGES OF MATERIALS					<ul style="list-style-type: none"> • compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through 	

					<ul style="list-style-type: none"> filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. 	
EARTH AND SPACE	<ul style="list-style-type: none"> • How the Earth spins on its axis to create night and day. • To recognise the sun (as a star), Earth and the moon To observe how the moon changes by looking at pictures 				<ul style="list-style-type: none"> • describe the movement of the Earth, and other planets, relative to the Sun in the solar system • describe the movement of the Moon relative to the Earth • describe the Sun, Earth and Moon as approximately spherical bodies • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. 	
EVOLUTION AND INHERITANCE					<ul style="list-style-type: none"> • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago 	

						<ul style="list-style-type: none">• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents• identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
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