

Progression in Science

We use Developmental Matters as Non-statutory curriculum guidance for the Early Years Foundation Stage.

3- and 4-year olds will be learning to:

use all their senses in hands-on exploration of natural materials
explore collections of materials with similar or different properties
talk about what they see, using a wide vocabulary
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

Children in reception will be learning to:

explore the natural world around them
describe what they see, hear and feel whilst outside
recognise some environments that are different from the one in which they live
understand the effect of changing seasons on the natural world around them

The EYFS profile is a statutory assessment of children's attainment. At the end of the Early Years Foundation Stage children should be able to:

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.

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Key stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

Lower Key Stage 2

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

Upper Key Stage 2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings

As a small school and with classes taught across key stages and year groups children will access all areas of the science curriculum over a two- or three-year cycle.

Science is broken down into the three substantive areas: Biology, Chemistry and Physics. Children investigate each of these areas through the disciplinary knowledge of working scientifically.

Biology

Pupils should be taught to:	Early Years		Key Stage 1		Lower Key Stage 2		Upper Key Stage 2	
	Class One		Class Two		Class Three			
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	talk about what they see, using a wide vocabulary.	Explore the natural world around them, making observations and drawing pictures of animals and plants.	Identify, compare, group and sort 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.	Describe the basic life cycles of some familiar plants Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	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 and how they vary from plant to plant Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants,			
Living things and their habitats	Describe what a familiar animal or pet eats.	Match animals to the foods that they eat.		Explore and compare the differences between things that are living, dead, and things that have never been alive. 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 Identify and name a variety of plants and animals in their habitats, including microhabitats. 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.	Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Construct and interpret a variety of food chains, identifying producers, predators and prey.	Describe, using their knowledge of food chains and webs, what could happen if a habitat had a living thing removed or introduced Describe the life process of reproduction in some plants and animals. Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	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	

<p>Animals including humans</p>	<p>Name a variety of domestic and wild animals.</p>	<p>Match animals to their young.</p>	<p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p>	<p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>Find out about and describe the basic needs of animals, including humans, for survival</p> <p>Notice that animals, including humans, have offspring which grow into adults.</p>	<p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p> <p>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.</p>	<p>Identify the different types of teeth in humans and their simple functions.</p> <p>Describe the simple functions of the basic parts of the digestive system in humans.</p>	<p>Describe the changes as humans develop to old age.</p>	<p>Describe the ways in which nutrients and water are transported within animals, including humans.</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p>
<p>Evolution and Inheritance</p>						<p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <p>Identify that living things produce offspring of the same kind, although the offspring are not identical to either parent</p> <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p>		

Chemistry

Pupils should be taught to:	Early Years		Key Stage 1		Lower Key Stage 2		Upper Key Stage 2	
	Class One		Class Two			Class Three		
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Rocks				Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter. Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties				
States of Matter	Explore and sort everyday items, with support, into groups of the same material.	Sort and group materials and resources and talk about how they are similar or different.				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.	Compare and group everyday materials by their properties, including hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism. Identify, demonstrate and compare reversible and irreversible changes. Describe the water cycle using words or diagrams and explain the part played by evaporation and condensation.	investigate and identify good thermal insulators, describing their common features. Identify, demonstrate and compare reversible and irreversible changes. Describe the water cycle using words or diagrams and explain the part played by evaporation and condensation.
Materials and their properties	Explore and sort everyday items, with support, into groups of the same material.	Sort and group materials and resources and talk about how they are similar or different.	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. Compare and group together a variety of	Observe what happens when a range of everyday materials, including foods, are heated and cooled, sorting and grouping them based on their observations. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.		Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnet 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 filtering, sieving and evaporating.		

		<p>everyday materials on the basis of their simple physical properties</p> <p>Describe the simple physical properties of a variety of everyday materials.</p>	<p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p>	<p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>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.</p>
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Physics

Pupils should be taught to:	Early Years		Key Stage 1		Lower Key Stage 2		Upper Key Stage 2	
	Class One		Class Two			Class Three		
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seasonal changes & Earth and Space	Talk about the weather as being warm or cold.	Notice and begin to describe patterns of weather in summer and winter.	Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.			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.		
Forces and Magnets				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.		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	Play with and explore battery-powered toys and models.	Explore and describe electrical and non-electrical light sources.	Describe, following exploration, what simple electrical circuits can do.	Make working models with simple mechanisms or electrical circuits.		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,	Use recognised symbols when representing a simple circuit in a diagram.	Create circuits using a range of components and record diagrammatically using the recognised symbols for electrical components. Associate the brightness of a lamp or the volume of a buzzer with the number and

					<p>based on whether or not the lamp is part of a complete loop with a battery.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p>	<p>voltage of cells used in the circuit.</p> <p>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.</p>
Light	<p>Notice and begin to describe natural phenomena, such as weather, rainbows and clouds.</p>	<p>Name and describe natural phenomena, such as the size of shadows, the colours of a rainbow, the speed of clouds moving across the sky and the strength of a wave.</p>	<p>Explain in simple terms how shadows are formed.</p>	<p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by a solid object.</p> <p>Find patterns in the way that the size of shadows change.</p>	<p>Recognise that light appears to travel in straight lines.</p> <p>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.</p> <p>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.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>	
Sound	<p>Listen to sounds</p> <p>Make sounds</p>	<p>Know that the harder we hit something the louder sound it makes</p>			<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as the distance from the sound source increases.</p>	

Working Scientifically; plan, do, record and review

Pupils should be taught to:	Early Years		Key Stage 1		Lower Key Stage 2		Upper Key Stage 2	
	Class One		Class Two		Class Three			
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Asking Questions	Make comments about what they have heard and ask questions to clarify their understanding.	Ask a relevant scientific question to find out more, explain how things work and why they might happen.	Ask simple scientific questions.	Ask and answer scientific questions about the world around them.	Ask relevant questions and using different types of scientific enquiries to answer them.	Ask relevant scientific questions, independently, about the world around them and begin to identify how they can answer them.	Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	Ask and answer deeper and broader scientific questions about the local and wider world that build on and extend their own and others' experiences and knowledge.
Investigation	Test their ideas	Observe how activities are going and adapt their ideas if necessary.	With support, follow instructions to perform simple tests and begin to talk about what they might do or what might happen.	Follow a set of instructions to perform a range of simple tests, making simple predictions for what might happen and suggesting ways to answer their questions.	Set up and carry out some simple, comparative and fair tests, making predictions for what might happen.	Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately.	Plan and carry out a range of enquiries, including writing methods, identifying variables and making predictions based on prior knowledge and understanding. OK	Plan and carry out a range of enquiries, including writing methods, identifying and controlling variables, deciding on equipment and data to collect and making predictions based on prior knowledge and understanding.
Measurement	Make observations about the world around them.	With support, use simple equipment, such as timers, rulers and containers, to measure length, height, capacity and time	Observe closely, using simple equipment.	Use simple equipment to measure and make observations.	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.	Take accurate measurements in standard units, using a range of equipment.	Take increasingly accurate measurements in standard units, using a range of chosen equipment	Take accurate, precise and repeated measurements in standard units, using a range of chosen equipment.
Observation	Talk about some of the things that they have observed using simple scientific vocabulary.	With support, observe, record and talk about materials and living things.	Observe objects, materials, living things and changes over time, sorting and grouping them based on their features	Identify and classify.	Make increasingly careful observations, identifying similarities, differences and changes and making simple connections	Begin to choose which observations to make and for how long and make systematic, careful observations and comparisons, identifying changes and connections.	Within a group, decide which observations to make, when and for how long, and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect	independently decide which observations to make, when and for how long and make systematic and careful observations, using them to make comparisons, identify changes, classify and make links between cause and effect.

Gather and Record Data	Begin to offer simple explanations for why things happen.	Record data in simple tables and pictograms.	With support, gather and record simple data in a range of ways (data tables, diagrams, Venn diagrams).	Use a range of methods (tables, charts, diagrams and Venn diagrams) to gather and record simple data with some accuracy.	Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy.	Gather, record, classify and present observations and measurements in a variety of ways (pictorial representations, timelines, diagrams, keys, tables, charts and graphs).	Gather and record data and results of increasing complexity, selecting from a range of methods (scientific diagrams, labels, classification keys, tables, graphs and models).	Choose an appropriate approach to recording accurate results, including scientific diagrams, labels, timelines, classification keys, tables, models and graphs (bar, line and scatter), linking to mathematical knowledge.
Report and Conclude	Begin to offer simple explanations for why things happen.	Explore the natural world around them, making observations and drawing pictures of animals and plants.	Use their observations and ideas to suggest answers to questions.	Use their observations and ideas to suggest answers to questions.	Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Use straightforward scientific evidence to answer questions or to support their findings.	Use test results to make predictions to set up further comparative and fair tests. Report and present 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. Identify scientific evidence that has been used to support or refute ideas or arguments.	Report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.