



Inspire • Challenge • Achieve

Progression for Science

Purpose of study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

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

Attainment Targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Early Years: Understanding the World.

EYFS Statutory Educational Programme: Understanding the world involves guiding children to make sense of their physical world (the natural world) and their community (history and geography). The frequency and range of children’s personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children’s vocabulary will support later reading comprehension.

Working Scientifically	3-4 year olds	Reception	Early Learning Goal
<ul style="list-style-type: none"> • Make observations of things through a variety of means, including magnifiers and photographs. • Ask simple questions about observations • Make suggestions to explain why and how using knowledge gained • Sort and classify objects and give explanations e.g. dinosaurs • Record using a variety of ways and different technology 	<ul style="list-style-type: none"> • 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. • 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. 	<ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them. 	<p>ELG The Natural World</p> <ul style="list-style-type: none"> • I can explore the natural world around them, making observations and drawing pictures of animals and plants; • I 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; • I understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

	<ul style="list-style-type: none">• Talk about the differences between materials and changes they notice.• Know that there are different countries in the world and talk about the differences they have experienced or seen in photos.		
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KS1 Program of study

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. ‘Working scientifically’ is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Key stage 1

Working Scientifically	Year 1	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.	I can ask simple scientific questions. I can use simple equipment to make observations I can carry out simple tests I can gather and record data to answer a simple question I can identify and classify things.	I can use my observations and ideas to suggest answers to questions. I can use simple data to answer questions and suggest what I have found out. I can recognise that questions can be answered in different ways.
UNITS OF WORK		
Biology	Chemistry	Physics
Animals Including humans • I can name a variety of animals including fish, amphibians, reptiles’ birds and mammals.	Everyday materials • I can distinguish between an object and the material it is made from.	Seasonal Changes • I can observe and comment on changes in the seasons.

<ul style="list-style-type: none"> • I can classify and name animals by what they eat (carnivore, herbivore and omnivore). • I can sort animals into categories (including fish, amphibians, reptiles, birds and mammals). • I can sort living and non-living things. • I can name the parts of the human body that I can see. • I can link the correct part of the human body to each sense <p>TAF: Describe and compare the observable features of animals from a range of groups. [year 1] Group animals according to what they eat. [year 1]</p> <ul style="list-style-type: none"> • I can explain the basic stages in a life cycle for animals, including humans. • I can describe what animals and humans need to survive. • I can describe why exercise, and a balanced diet and good hygiene are important for humans <p>TAF: -Describe the basic needs of animals for survival and the main changes as young animals including humans, grow into adults year 2] -Name and locate parts of the human body, including those related to the senses [year 1], and describe the importance of exercise, a balanced diet and hygiene for humans [year 2] -Describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships. [year 2]</p>	<ul style="list-style-type: none"> • I can explain the materials that an object is made from. • I can name wood, plastic, glass, metal, water and rock.. • I can group objects based on the materials they are made from. • I can describe the properties of everyday materials <ul style="list-style-type: none"> • I can identify and name a range of materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard. • I can suggest why a material might or might not be used for a specific job. • I can explore how shapes can be changed by squashing, bending, twisting and stretching. <p>TAF: Distinguish objects from materials, describe their properties, identify and group everyday materials. [year 1] and compare their suitability for different uses. [year 2]</p>	<ul style="list-style-type: none"> • I can name the seasons and suggest the type of weather in each season. <p>TAF: Describe seasonal changes. [year 1]I can name a variety of common wild and garden plants</p>
<p>Plants</p>		

<ul style="list-style-type: none"> • I can name a variety of common wild and garden plants. • I can name the petals, stem, leaf and root of a plant. • I can name the roots, trunk, branches and leaves of a tree. <ul style="list-style-type: none"> • I can describe how seeds and bulbs grow into plants. • I can describe what plants need in order to grow and stay healthy (water, light & suitable temperature). <p>TAF: describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants [year 2]</p>		
<p>Living things and their habitats</p> <ul style="list-style-type: none"> • I can identify things that are living, dead and never lived. • I can describe how a specific habitat provides for the basic needs of things living there (plants and animals). • I can identify and name plants and animals in a range of habitats. <ul style="list-style-type: none"> • I can match living things to their habitat. • I can describe how animals find their food. • I can name some different sources of food for animals. • I can explain a simple food chain. <p>TAF: Identify whether things are alive, dead or have never lived. [year 2]</p>		

KEY STAGE 2 Program of study

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. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

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. Pupils should read, spell and pronounce scientific vocabulary correctly.

Working scientifically	Year 3	Year 4	Year 5 *To add/remove recommendations from Bredon Hill on progression from 5-6
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<p>'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study.</p>	<p>I can ask relevant scientific questions. I can set up a simple enquiry to explore a scientific question. I can set up a test to compare two things. I can make careful and accurate observations, including the use of standard units. I can use equipment, including thermometers and data loggers to make measurements. I can use diagrams, keys, bar charts and tables; using scientific language. I can draw conclusions and suggest improvements.</p>	<p>I can use observations and knowledge to answer scientific questions. I can set up a fair test and explain why it is fair. I can gather, record, classify and present data in different ways to answer scientific questions. I can use findings to report in different ways, including oral and written explanations, presentation. I can make a prediction with a reason. I can identify differences, similarities and changes related to an enquiry.</p>	<p>I can plan different types of scientific enquiry. I can control variables in an enquiry. I can measure accurately and precisely using a range of equipment. I can record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. I can use the outcome of test results to make predictions and set up a further comparative fair test. I can report findings from enquiries in a range of ways. I can explain a conclusion from an enquiry. I can explain causal relationships in an enquiry. I can relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory. I can read, spell and pronounce scientific vocabulary accurately.</p>
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UNITS OF WORK

Biology	Chemistry	Physics
<p>Animals Including humans I can explain the importance of a nutritious, balanced diet I can explain how nutrients, water and oxygen are transported within animals and humans. I can describe and explain the skeletal system of a human.</p>	<p>Rocks I can compare and group rocks based on their appearance and physical properties, giving a reason. I can describe how fossils are formed. I can describe how soil is made. I can describe and explain the difference between sedimentary and igneous rock.</p>	<p>Light I can describe what dark is (the absence of light). I can explain that light is needed in order to see. I can explain that light is reflected from a surface. I can explain and demonstrate how a shadow is formed. I can explore shadow size and explain.</p>

<p>I can describe and explain the muscular system of a human.</p> <p>I can describe the purpose of the skeleton in humans and animals.</p> <p>I can identify and name the parts of the human digestive system.</p> <p>I can identify and name the parts of the human digestive system.</p> <p>I can describe the functions of the organs in the human digestive system.</p> <p>I can identify and describe the different types of teeth in humans.</p> <p>I can describe the functions of different human teeth.</p> <p>I can use food chains to identify producers, predators and prey.</p> <p>I can construct food chains to identify producers, predators and prey.</p> <p>I can create a timeline to indicate stages of growth in humans</p>		<p>I can explain the danger of direct sunlight and describe how to keep protected.</p>
<p>Plants</p> <p>I can describe the function of different parts of flowering plants and trees.</p> <p>I can explore and describe the needs of different plants for survival.</p> <p>I can explore and describe how water is transported within plants.</p> <p>I can describe the plant life cycle, especially the importance of flowers.</p>	<p>States of matter</p> <p>I can group materials based on their state of matter (solid, liquid, gas).</p> <p>I can describe how some materials can change state.</p> <p>I can explore how materials change state.</p> <p>I can measure the temperature at which materials change state.</p> <p>I can describe the water cycle.</p> <p>I can explain the part played by evaporation and condensation in the water cycle.</p>	<p>Forces and magnets</p> <p>I can explore and describe how objects move on different surfaces.</p> <p>I can explain how some forces require contact and some do not, giving examples.</p> <p>I can explore and explain how objects attract and repel in relation to objects and other magnets.</p> <p>I can predict whether objects will be magnetic and carry out an enquiry to test this out.</p> <p>I can describe how magnets work.</p> <p>I can predict whether magnets will attract or repel and give a reason.</p> <p>Forces</p>

		<p>I can explain what gravity is and its impact on our lives.</p> <p>I can identify and explain the effect of air resistance.</p> <p>I can identify and explain the effect of water resistance.</p> <p>I can identify and explain the effect of friction.</p> <p>I can explain how levers, pulleys and gears allow a smaller force to have a greater effect.</p>
<p>Living things and their habitats</p> <p>I can group living things in different ways.</p> <p>I can use classification keys to group, identify and name living things.</p> <p>I can create classification keys to group, identify and name living things (for others to use).</p> <p>I can describe how changes to an environment could endanger living things.</p> <p>I can describe the life cycle of different living things, e.g. mammal, amphibian, insect bird.</p> <p>I can describe the differences between different life cycles.</p> <p>I can describe the process of reproduction in plants.</p> <p>I can describe the process of reproduction in animals.</p>	<p>Properties and changes of materials</p> <p>I can compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets).</p> <p>I can describe how a material dissolves to form a solution; explaining the process of dissolving.</p> <p>I can describe and show how to recover a substance from a solution.</p> <p>I can describe how some materials can be separated.</p> <p>I can demonstrate how materials can be separated (e.g. through filtering, sieving and evaporating).</p> <p>I know and can demonstrate that some changes are reversible and some are not.</p> <p>I can explain how some changes result in the formation of a new material and that this is usually irreversible.</p> <p>I can discuss reversible and irreversible changes.</p> <p>I can give evidenced reasons why materials should be used for specific purposes.</p>	<p>Sound</p> <p>I can describe how sound is made.</p> <p>I can explain how sound travels from a source to our ears.</p> <p>I can explain the place of vibration in hearing.</p> <p>I can explore the correlation between pitch and the object producing a sound.</p> <p>I can explore the correlation between the volume of a sound and the strength of the vibrations that produced it.</p> <p>I can describe what happens to a sound as it travels away from its source.</p>
		<p>Electricity</p> <p>I can identify and name appliances that require electricity to function.</p> <p>I can construct a series circuit.</p> <p>I can identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers).</p>

		<p>I can draw a circuit diagram.</p> <p>I can predict and test whether a lamp will light within a circuit.</p> <p>I can describe the function of a switch in a circuit.</p> <p>I can describe the difference between a conductor and insulators; giving examples of each.</p>
		<p>Earth and space</p> <p>I can describe and explain the movement of the Earth and other planets relative to the Sun.</p> <p>I can describe and explain the movement of the Moon relative to the Earth.</p> <p>I can explain and demonstrate how night and day are created.</p> <p>I can describe the Sun, Earth and Moon (using the term spherical).</p>