



SCIENCE INTENT



INTENT

Science - Intent

At Barrow Primary School, we believe that 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, vocabulary and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims of the Science Curriculum

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.

Our Science curriculum is knowledge and vocabulary rich, ensuring children gain a deep understanding of fundamental scientific knowledge and concepts as well as embedding key science specific vocabulary and terminology (Tier 3 vocabulary). In addition, children are encouraged to develop their scientific curiosity and understanding by working scientifically.

Working Scientifically

Key Stage 1:

- Ask simple questions and recognise that they can be answered in different ways.
- Use simple equipment to observe closely.
- Perform simple tests.
- Identify and classify.
- Use his/her observations and ideas to suggest answers to questions.
- Gather and record data to help in answering questions.



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Lower Key Stage 2:

- 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:

- 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

Spaced Retrieval Practice Approach

Our curriculum is delivered in modules, rotating through each subject area in Science, History, Geography, Computing, French, Art & Design and Design & Technology. All Science modules are identified using green boxes on our curriculum maps. Below is how our curriculum delivers (introduces and revisits) the National Curriculum expectations within and across year groups.



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Early Years

In Early Years, children are encouraged and guided to use investigation and exploration to develop their understanding of the world. Our curriculum is designed to enable children to make sense of their physical world and their community.

Children are encouraged to be scientists, to:

- Show curiosity and interest in the features of objects and living things
- Describe and talk about what they see
- Show curiosity about why things happen and how things work
- Show understanding of cause-effect relations
- Notice and comment on patterns
- Show an awareness of change
- Explain own knowledge and understanding, and ask appropriate questions of others
- Investigate objects and materials by using all of their senses as appropriate
- Find out about, and identify, some features of living things, objects and events they observe
- Look closely at similarities, differences, patterns and change
- Ask questions about why things happen and how things work

We are an Early Year Adopter school and follow the new framework to ensure that children develop a good understanding of the natural world around them, by:

- 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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	Autumn	Spring	Summer
EYFS	Autumn/ bodies Winter	Materials Spring/floating and sinking Cooking- chemical changes	Mini beasts and habitats Summer/Reduce, reuse, recycle
Year 1	Seasonal changes and daily weather Introduce Plants - (trees) Animals, including humans	Everyday materials Revisit 1: Animals, including humans	Plants Revisit 2: Plants, Animals including humans
Year 2	Living things and their habitats Animals, including humans	Uses of everyday materials Revisit Living things and their habitats / materials	Plants Revisit Living things and their habitats / Animals, including humans
Year 3	Rocks Animals, including humans Revisit Rocks	Forces and magnets Plants	Plants continued... Light
Year 4	Living things and their habitats States of matter	Animals, including humans	Electricity Sound
Year 5	Properties and changes of materials Animals, including humans	Forces (Gravity and Galileo) Earth in space	Living things and their habitats Forces continued
Year 6	Electricity Animals including humans (circulatory system)	Animals including humans (water transport) Light	Living things and their habitats Evolution and inheritance



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AN EXAMPLE OF THE UNSEQUENCED LONG-TERM SEQUENCE FOR SCIENCE Year 1 – Year 6

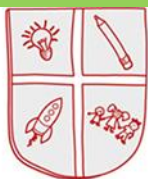
(This model shows conceptual sequence and references where the content may be taught:

	EYFS Understanding the world	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Biology (53% of Science content)	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.		Living things and their habitats (+ revisit modules)		Living things and their habitats	Living things and their habitats	Living things and their habitats
		Plants (AT / ST)	Plants (ST)	Plants (ST)			
		Animals, including humans (+ revisit modules)	Animals, including humans (+ revisit modules)	Animals, including humans	Animals, including humans	Animals, including humans	Animals, including humans
							Evolution and inheritance
Physics (29% of Science content)		Seasonal changes (+ revisit module)		Light			Light
				Forces and magnets		Forces	
					Electricity		Electricity
					Sound		
						Earth and space	
		Everyday materials	Use of everyday materials			Properties and change of materials	
Chemistry (18% of Science content)				Rocks (AT) (+ revisit module)			
					States of matter		



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Specific Area of Learning Understanding the World	ELG's	How this is achieved in EYFS	Science KS1	
			Year 1	Year 2
	ELG 2 Managing Self <ul style="list-style-type: none"> Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. ELG 14 The Natural World <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants 	<ul style="list-style-type: none"> Discussions at snack time of the importance of healthy food choices. During lunch time discussions. Through stories and circle time discussions. E.g The story – Now wash your hands and Funnybones. P.E lessons that encourage getting dressed and undressed independently. Naming body parts through songs – Heads, shoulders, knees and toes. RSE link – Correct naming of body parts. Talking about pets at home. Exploring minibeasts and recording our observations. 	Animals, including humans	
	ELG 14 The Natural World <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants. 	<ul style="list-style-type: none"> Going on walks to observe the local environment and to compare and learn about the seasons. Taking photos to compare seasons and discuss. Planting seeds and plants Looking after the EYFS garden. Creating bug hotels 	Plants	
			Seasonal changes	Living things and their habitats.
	ELG 14 The Natural World <ul style="list-style-type: none"> Understanding some important processes and changes in the natural world around them, including seasons and changing states of matter. 	<ul style="list-style-type: none"> Growing plants from bulbs and seeds. Making boats to explore best materials. Water tray activities to explore water, ice, and materials that float and sink. Testing the best material for a raincoat for Paddington bear. 	Everyday materials	Uses of everyday materials



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SCIENCE National Curriculum Expectations KS1	Year 1		
	Autumn	Spring	Summer
Plants <ul style="list-style-type: none">identify and name a variety of common wild and garden plants, including deciduous and evergreen treesidentify and describe the basic structure of a variety of common flowering plants, including trees.	Introduce	Revisit	Revisit
	Revisit		
Animals, including humans <ul style="list-style-type: none">identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammalsidentify and name a variety of common animals that are carnivores, herbivores and omnivoresdescribe 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.	Introduce	Introduce and Revisit	Revisit
Everyday materials <ul style="list-style-type: none">distinguish between an object and the material from which it is madeidentify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rockdescribe the simple physical properties of a variety of everyday materialscompare and group together a variety of everyday materials on the basis of their simple physical properties.			Introduce
Seasonal changes <ul style="list-style-type: none">observe changes across the four seasonsobserve and describe weather associated with the seasons and how day length varies.	Introduce		Revisit



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SCIENCE National Curriculum Expectations KS1	Year 2		
	Autumn	Spring	Summer
1. 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 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 micro- habitats 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. 	Introduce Revisit		Revisit
Plants <ul style="list-style-type: none"> 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. 		Introduce	Revisit
Animals, including humans <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, eating the right amounts of different types of food, and hygiene. 			Introduce
Uses of everyday materials <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 squashing, bending, twisting and stretching. 	Introduce Revisit		








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SCIENCE National Curriculum Expectations Year 3	Year 3		
	Autumn	Spring	Summer
3. 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 grow) 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, including pollination, seed formation and seed dispersal. 			 Introduce
Animals, including humans <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 identify that humans and some other animals have skeletons and muscles for support, protection and movement. 	 Introduce		
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 that have lived are trapped within rock recognise that soils are made from rocks and organic matter. 	 Introduce		
	Revisit		
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 an opaque object find patterns in the way that the size of shadows change. 		 Introduce	
Forces and magnets <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. 		 Introduce	

SCIENCE National Curriculum Expectations Year 4	Year 4		
	Autumn	Spring	Summer
4 Living things and their habitats <ul style="list-style-type: none"> 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 recognise that environments can change and that this can sometimes pose dangers to living things. 	 Introduce		
Animals, including humans <ul style="list-style-type: none"> 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 construct and interpret a variety of food chains, identifying producers, predators and prey. 		 Introduce	
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. 			 Introduce
Sound <ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating 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. 			 Introduce
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. 	 Introduce		








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SCIENCE National Curriculum Expectations Year 5	Year 5		
	Autumn	Spring	Summer
Living things and their habitats Pupils should be taught to: <ul style="list-style-type: none">describe the differences in the life cycles of a mammal, an amphibian, an insect and a birddescribe the life process of reproduction in some plants and animals	 Introduction Revisit		
Animals, including humans Pupils should be taught to: <ul style="list-style-type: none">describe the changes as humans develop to old age		 Introduce	
Properties and changes of materials Pupils should be taught to: <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 magnetsknow that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solutionuse knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporatinggive reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plasticdemonstrate that dissolving, mixing and changes of state are reversible changesexplain 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			 Introduce
Earth and space Pupils should be taught to: 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		 Introduce Revisit	
Forces Pupils should be taught to: <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 objectidentify the effects of air resistance, water resistance and friction, that act between moving surfacesrecognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect			 Introduce



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SCIENCE National Curriculum Expectations Year 6	Year 6		
	Autumn	Spring	Summer
Living things and their habitats Pupils should be taught to: <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 	 Introduce		
Animals including humans Pupils should be taught to: <ul style="list-style-type: none"> 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 (Summer) describe the ways in which nutrients and water are transported within animals, including humans (Summer) 		 Introduce	 Introduce water transport
Evolution and inheritance Pupils should be taught to: <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 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 			 Introduce
Light Pupils should be taught to: <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 	 Introduce		
Electricity Pupils should be taught to: <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 		 Introduce	