



Progression of Skills in Science

At Barrington, it is our aim to ensure the teaching of scientific knowledge, concepts and skills are part of a broad and balanced curriculum. The aim of science teaching is for our children to develop an understanding of the nature and processes involved in working scientifically and how science can help us to understand the natural world. Through hands on investigation, the study of science will help to develop an excitement and curiosity about the world around them and an appreciation of the role of science in the development of our modern world, along with its potential for future global development. This contributes to our school's overall aim of developing enquiring minds, a lifelong love of learning, respect for themselves, others and the environment so that they will have the skills, resilience and adaptability to thrive in a rapidly changing world.

INTENT							
Knowledge							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	<p>Pupils should be taught about:</p> <p>identify similarities and differences in relation to and living things.</p> <p>talk about the features of their own immediate environment and how environments might vary from one another.</p>	<p>Pupils should be taught to:</p> <p>identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>identify and describe the basic structure of a variety of common flowering plants, including trees</p>	<p>Pupils should be taught to:</p> <p>observe and describe how seeds and bulbs grow into mature plants</p> <p>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>Pupils should be taught to:</p> <p>identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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</p> <p>investigate the way in which water is transported within plants</p> <p>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>			
			Deciduous, evergreen, stem, root, shoot, bud, leaf, flowers, petal, seed, bulb, tree, branch, trunk, branch, fruit, vegetable	Water, light, suitable, temperature, germination, reproduction	Common wild plants garden plants photosynthesis		
Animals (including humans)	<p>identify similarities and differences in relation to living things.</p> <p>talk about the features of their own immediate environment and how environments might vary from one another.</p>	<p>Pupils should be taught to:</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 and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</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>Pupils should be taught to:</p> <p>notice that animals, including humans, have offspring which grow into adults</p> <p>find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<p>Pupils should be taught to:</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 that humans and some other animals have skeletons and muscles for support, protection and movement</p>	<p>Pupils should be taught to:</p> <p>describe the simple functions of the basic parts of the digestive system in humans</p> <p>identify the different types of teeth in humans and their simple functions</p> <p>construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<p>Pupils should be taught to:</p> <p>describe the changes as humans develop to old age</p>	<p>Pupils should be taught to:</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>recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>describe the ways in which nutrients and water are transported within animals, including humans</p>

		Omnivore, carnivore, herbivore, senses, hearing, touch sight, taste, smell, fish, amphibians, reptiles, birds, mammals	Offspring, grow, adults, nutrition, reproduce, survival, water, food, air, exercise, hygiene, egg, chick, chicken, frogspawn, tadpole frog, caterpillar, pupa, butterfly, lamb, sheep, baby, toddler, child, teenager, adult	nutrition nutrients carbohydrates protein fats fibre water vitamins minerals skeleton bones joints endoskeleton exoskeleton hydrostatic skeleton vertebrate invertebrate contract relax muscles ball joint socket joint hinge joint gliding joint	nutrition vitamins minerals fat protein carbohydrates fibre water skeletons support protection skull brain ribs heart lungs movement joint muscles pull contract relax diet	puberty life cycle gestation growth reproduce foetus fertilization old age life expectancy adolescence adulthood early adulthood middle adulthood late adulthood childhood	internal organs heart lungs liver kidney brain skeletal skeleton muscle muscular digest digestion digestive circulatory system heart blood vessels blood impact diet exercise drugs lifestyle nutrients water damage drugs alcohol substances
Living things and their habitats	<p>identify similarities and differences in relation to living things.</p> <p>talk about the features of their own immediate environment and how environments might vary from one another.</p> <p>know that the environment and living things are influenced by human activity.</p> <p>describe some actions which people in their own community do that help to maintain the area they live in.</p>			<p>Pupils should be taught to:</p> <p>explore and compare the difference between things that are living, dead, and things that have never been alive</p> <p>identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs of different kinds of animals and plants, and how they depend on each other</p> <p>identify and name a variety of plants and animals in their habitats, including micro-habitats</p> <p>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</p>	<p>Pupils should be taught to:</p> <p>recognise that living things can be grouped in a variety of ways</p> <p>explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>recognise that environments can change and that this can sometimes pose dangers to living things</p>	<p>Pupils should be taught to:</p> <p>describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>describe the life process of reproduction in some plants and animals</p>	<p>Pupils should be taught to:</p> <p>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</p> <p>give reasons for classifying plants and animals based on specific characteristics</p>
			Habitat, micro-habitat, living, dead, never alive, food, food chain, alive, healthy, shelter, seashore, woodland, ocean, rainforest, conditions, dry, damp, light, dark		<p>Environment flowering non-flowering plants animals vertebrate environment dangers!</p> <p>vertebrate fish amphibians reptiles birds mammals invertebrate snails slugs worms spiders insects plants, flowering plants (including grasses) non-flowering (including mosses and ferns)</p> <p>human impact</p> <p>positive - nature reserves, ecologically planned parks, garden ponds</p> <p>negative - population, development, litter, deforestation</p>	<p>Reproduction plants: sexual, asexual animals: sexual</p> <p>lifecycles around the world</p> <p>rainforest oceans desert prehistoric similarities differences</p> <p>life cycles mammal amphibian insect bird</p>	<p>classify compare Linnaean Carl Linnaeus classification domain kingdom phylum class order family genus species</p> <p>characteristics</p> <p>vertebrates invertebrates microorganisms organism flowering non-flowering</p>

Evolution and inheritance							<p>Pupils should be taught to:</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> <p>recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</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>evolution adaption inherited traits adaptive traits natural selection inheritance Charles Darwin Alfred Wallace DNA genes variation parent offspring fossil Environment habitat fossilisation</p>
Light and sound				<p>Pupils should be taught to:</p> <p>recognise that they need light in order to see things and that the 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 changes</p> <p>Pupils should be taught to:</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>			<p>Pupils should be taught to:</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>

				<p>light see dark reflect surface natural star Sun Moon shadow blocked solid artificial torch candle lamp sunlight dangerous protect eyes vibrate vibration vibrating air medium ear hear sound volume pitch faint fainter loud louder string percussion woodwind brass insulate</p>			<p>light travels straight reflect reflection light source object shadows mirrors periscope rainbow filters</p>
Forces and magnets	are familiar with basic scientific concepts such as floating, sinking and experimentation.			<p>Pupils should be taught to:</p> <p>compare how things move on different surfaces</p> <p>notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>observe how magnets attract or repel each other and attract some materials and not others</p> <p>compare and group together a variety of everyday materials on the basis on whether they are attracted to a magnet, and identify some magnetic materials</p> <p>describe magnets as having two poles</p> <p>predict whether two magnets will attract or repel each other, depending on which poles are facing</p>		<p>Pupils should be taught to:</p> <p>explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p>	
				<p>force push pull open surface magnet magnetic attract repel magnetic poles North South</p>		<p>Gravity air resistance water resistance friction surface force effect move accelerate decelerate change direction brake mechanism pulley gear spring theory of gravitation Galileo Galilei Isaac Newton</p>	

Electricity					<p>Pupils should be taught to:</p> <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 		<p>Pupils should be taught to:</p> <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
					<p>appliances electricity electrical circuit cell</p> <p>wire bulb buzzer danger</p> <p>electrical safety sign insulators</p> <p>wood rubber plastic glass</p> <p>conductors metal water switch</p> <p>open closed</p>		<p>voltage brightness volume</p> <p>switches danger series circuit</p> <p>working safely with electricity</p> <p>electrical safety sign</p> <p>circuit diagram switch</p> <p>bulb buzzer motor recognised symbols</p>
Seasonal change		<p>Pupils should be taught to:</p> <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 					
		<p>Season, summer, autumn, winter, spring, daytime, night-time, weather, sun, rain, fog, hail, snow, wind, sleet</p>					
Earth and space						<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> describe the movement of the Earth, and other planets, relative to the Sun 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 	

						<p>Earth Sun Moon moons planets stars</p> <p>solar system Mercury Venus Mars Jupiter</p> <p>Saturn Uranus Neptune Pluto rotate day night Aristotle Ptolemy Galileo</p> <p>Copernicus Brahe Alhazen orbit axis</p> <p>spherical heliocentric geocentric hemisphere season</p> <p>tilt</p>	
Materials	<p>know the properties of some materials and can suggest some of the purposes they are used for.</p>	<p>Everyday Materials</p> <p>Pupils should be taught to:</p> <p>distinguish between an object and the material from which it is made</p> <p>identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>describe the simple physical properties of a variety of everyday materials</p> <p>compare and group together a variety of everyday materials on the basis of their simple physical properties</p>	<p>Uses of Everyday Materials</p> <p>Pupils should be taught to:</p> <p>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</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>Rocks</p> <p>Pupils should be taught to:</p> <p>compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>recognise that soils are made from rocks and organic matter</p>		<p>Pupils should be taught to:</p> <p>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</p> <p>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</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>	

		Materials, plastic, wood, fabric, glass, metal, rock, paper, foil, properties, bendy, shiny, dull, absorbent, rough, smooth, waterproof, stiff, dull, hard, soft	Squashing, bending, twisting, stretching,	appearance physical properties hard/soft shiny/dull rough/smooth absorbent/not absorbent fossils sedimentary rock soils organic matter buildings gravestones grains crystals		properties hardness solubility transparency electrical conductor thermal conductor response to magnets dissolve solution separate separating solids liquids gases evaporating reversible changes dissolving mixing evaporation filtering sieving melting irreversible new material burning rusting magnetism electricity chemists quantitative measurements conductivity insulation chemical solid solidify iron ice melt freeze liquid evaporate condense gas container changing state heated heat cooled cool degrees Celsius °C thermometer water cycle evaporation condensation temperature melting warm/cool water vapour	
Skills	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Asking question, ideas and evidence	Show curiosity about objects, places and people. Question why things happen. Comments, asks and answer questions about their experiences and aspects of their familiar world	Pupils should be taught to: ☑ ask simple questions and recognise that they can be answered in different ways	Explore the world around them and raise their own simple questions Being to recognise the different ways in which they might answer scientific questions	Raise their own relevant questions about the world around them use pictures, writing, diagrams and tables as directed by their teacher use simple texts, directed by the teacher, to find information	select information from a range of sources provided for them recognise how and when secondary sources might help them to answer questions that cannot be answered through practical investigations	Use their science experiences to explore and raise different kinds of questions. select a range of appropriate sources of information including books, internet and CD Rom	Recognise which secondary sources will be most useful to research their ideas and begin to state opinion from fact Talk about how scientific ideas have developed over time
Planning and setting up different types of enquiries (including	Learn by trial and error. Suggest what might happen	identify key features ask questions Suggest what might happen and ways to test ideas	suggest how to find things out identify key features ask questions	Be given a range of scientific experiences, including different types of scientific enquiry to answer questions	Start to make decisions about the most appropriate type of scientific enquiry they might use to answer a question Set up simple practical enquiries, comparative and fair tests Recognise when a fair test is necessary and help to set it up		Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.

Performing tests (Using equipment)	Engage in open ended play. Find ways to solve problems/ find new ways to do things/ test their ideas.	Experience different types of scientific enquiries Carry out simple tests test ideas suggested to them say what they think will happen use first hand experiences to answer questions begin to compare some living things	use simple equipment provided to aid observation compare objects, living things or events make observations relevant to their task begin to recognise when a test or comparison is unfair use first hand experiences to answer questions	put forward own ideas about how to find the answers to questions recognise the need to collect data to answer questions carry out a fair test with support recognise and explain why it is a fair test with help, pupils begin to realise that scientific ideas are based on evidence	with help, pupils begin to realise that scientific ideas are based on evidence show in the way they perform their tasks how to vary one factor while keeping others the same decide on an appropriate approach in their own investigations to answer questions describe which factors they are varying and which will remain the same and say why	use previous knowledge and experience combined with experimental evidence to provide scientific explanations recognise the key factors to be considered in carrying out a fair test	describe evidence for a scientific idea use scientific knowledge to identify an approach for an investigation explain how the interpretation leads to new ideas
Observing and measuring	Make observations of plants and animals and explain why some things occur and talk about changes.	make observations using appropriate senses record observations communicate observations orally, in drawing, labelling, simple writing and using ICT	respond to questions asked by the teacher ask questions collect and record data (supported by the teacher) suggest how they could collect data to answer questions begin to select equipment from a limited with help, observe changes over time.	make relevant observations measure using given equipment select equipment from a limited range	Make systematic observations Help to make decisions about what observations to make, how long to make them for and what type of equipment to use. carry out measurement accurately make a series of observations, comparisons and measurements select and use suitable equipment make a series of observations and measurements adequate for the task take accurate measurement using standard units learn how to use a range of equipment (eg data loggers and thermometers) appropriately and accurately.	make a series of observations, comparisons and measurements with increasing precision select apparatus for a range of tasks plan to use apparatus effectively begin to make repeat observations and measurements	Make their own decisions about what observations to make, what measurements to use and how long to make them for measure quantities with increasing precision using fine – scale divisions and explain how to use equipment accurately. select and use information effectively make enough measurements or observations for the required task take repeat measurements where appropriate
Identifying and classifying	Develop ideas of grouping, sequences, cause and effect. Know about similarities and differences in relation to places, objects materials and living things. Make links and notice patterns.	Make simple comparisons and groupings	Use simple features to compare objects, living things and materials and with help decide how to group and sort them Begin to notice patterns and relationships	Talk about the criteria for classifying and grouping	Talk about the criteria for classifying and grouping and use simple keys		Use and develop simple keys and other information records to identify, classify and describe living things and materials and identify patterns that might be found in the natural environment.

Gathering and recording, Reporting, presenting and communicating findings	<p>Pupils describe or respond appropriately to simple features of objects, living things and events they observe, communicating their findings in simple ways <i>for example, talking about their work, through drawings, simple charts</i> talk about what they see and do</p> <p>Pupils develop their own narratives and explanations by connecting ideas or events.</p>	<p>talk about what they see and do Collect evidence and try and answer questions Communicate findings in simple ways</p> <p>draw simple pictures</p> <p>use simple charts to communicate findings talk about what they have found out and how they found it.</p>	<p>describe their observations using some scientific vocabulary use a range of simple texts to find information</p> <p>use their observations to suggest answers to questions</p>	<p>record their observations in written, pictorial and diagrammatic forms</p>	<p>record observations, comparisons and measurements using tables and bar charts begin to plot points to form a simple graph</p> <p>use graphs to point out and interpret patterns in their data</p>	<p>record observations systematically</p> <p>use appropriate scientific language and conventions to communicate quantitative and qualitative data</p>	<p>Decide how to record data and results from a range of familiar approaches (scientific diagrams, labels, classification keys, tables, scatter graphs, bar and line graphs) choose scales for graphs which show data and features effectively</p> <p>identify measurements and observations which do not fit into the main pattern</p> <p>begin to explain anomalous data use appropriate ways to communicate quantitative data using scientific language</p>
Considering and evaluating		<p>make simple comparisons and groupings</p> <p>say what has happened</p> <p>say whether what has happened was what they expected</p>	<p>say what has happened</p> <p>say what their observations show and whether it was what they expected</p> <p>begin to draw simple conclusions and explain what they did</p> <p>begin to suggest improvements in their work</p>	<p>begin to offer explanations for what they see and communicate in a scientific way what they have found out</p> <p>begin to identify patterns in recorded measurements</p> <p>suggest improvements in their work</p> <p>evaluate their findings</p>	<p>predict outcomes using previous experience and knowledge and compare with actual results</p> <p>begin to relate their conclusions to scientific knowledge and understanding</p> <p>suggest improvements in their work, giving reasons with support identify new questions arising from the data</p>	<p>make predictions based on their scientific knowledge and understanding</p> <p>draw conclusions that are consistent with the evidence</p> <p>relate evidence to scientific knowledge and understanding</p> <p>offer simple explanations for any differences in their results</p> <p>make practical suggestions about how their working methods could be improved</p>	<p>make reasoned suggestions on how to improve working methods</p> <p>show how interpretation of evidence leads to new ideas</p> <p>explain conclusions, showing understanding of scientific ideas</p> <p>Look for causal relationships in their data and identify evidence that either supports or refutes their ideas.</p> <p>Use their results to make predictions and identify when further observations, comparative and fair tests might be needed.</p>
Sc 1 Vocabulary		<p>question answer observe observing group record oral explanations</p> <p>Diagram equipment identify classify sort careful observation record drawings chart map data compare contrast describe biology chemistry physics oral and written explanations</p>	<p>research relevant questions scientific enquiry plan</p> <p>fair test systematic accurate measurements equipment thermometer data logger data gather record classify present labelled diagrams keys bar charts tables predictions differences similarities changes comparative and fair test systematic evidence improve conclusion secondary sources guides construct interpret</p>	<p>variables measurements accuracy precision repeat readings record data scientific diagrams, labels, classification keys, tables, scatter graphs, bar graph and line graphs predictions further comparative and fair test report and present conclusions, , oral and written display and presentation causal relationships, explanations, degree of trust evidence support, refute ideas or arguments identify, classify and describe patterns systematic quantitative measurements</p>			

IMPLEMENTATION

**Focused
enquiries**

IMPACT

**Assessment
opportunities**