

Westbury-on-Severn CE Primary School Progression Map : Science



At Westbury-on-Severn CE Primary, our science teaching promotes intrigue and knowledge through an engaging curriculum. It is our intention, in science, to develop in all young people a lifelong curiosity and interest in the sciences. Our science curriculum is designed to ensure pupils build upon prior learning, supporting all learners in making rich connections in knowledge, underpinned by scientific vocabulary and secure language development.

Teaching encourages children to explore concepts and develop the necessary substantive and disciplinary knowledge to break down ideas, promoting resilience in finding solutions and recording learning showing their understanding. Science investigations are designed to capture enthusiasm and support knowledge acquisition. Working scientifically through the five lines of enquiry: observation overtime; pattern seeking; identifying, classifying and grouping; comparative and fair testing and research using secondary sources, as well as promoting problem solving skills, is taught alongside subject learning.


Our pupils are motivated to work together and independently to continually question, discuss, engage and reflect throughout knowledge and enquiry learning. In Early Years, our children are encouraged to explore science through different resources using a variety of natural materials found in school and at home, fostering a 'sticky' knowledge approach. This time is used to develop a broad scientific vocabulary introducing experiences of phenomena our children will learn about in later year groups. Staff use demonstration, practical work, explanation and assessment opportunities at the start, throughout and the end of each unit of science to address misconceptions, support the transfer of learning from one context to another and provide our children with constructive feedback to support their working memory for next steps in learning. Science capital is based around real-life experiences and supports curriculum learning retention. We utilise the school environment, particularly Forest School, to promote aspirational views of science and what can be achieved.


Theme content

Our children are taught in mixed year age group and therefore some of our classes have a two-year content cycle, another a three-year cycle. The theme overview is as follows:

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year R/1 Year A	Knowing me, knowing you Animals including humans Y1 DIVERSITY	Down on the farm Animals, including humans Y1 Plants Y1 Seasonal changes SUSTAINABILITY	Dinosaurs Animals including humans. EXCELLENCE	People who help us EXCELLENCE	Once upon a time Everyday materials Y1 EXCELLENCE	Happy holidays Animals, including humans Y1 SUSTAINABILITY
Year R/ 1 Year B	Amazing animals Animals, including humans SUSTAINABILITY	Blast Off! Everyday materials Y1 EXCELLENCE	The Bear Necessities Animals, including humans Plants SUSTAINABILITY	Super Heroes EXCELLENCE	Castles EXCELLENCE	Off we go! EXCELLENCE
Year 2/3 Year A	Into the woods Plants Y2 (ongoing through the year) Living things and their habitat Y2 EXCELLENCE / SUSTAINABILITY		Rock of Ages Forces and magnets Y3 EXCELLENCE/ SUSTAINABILITY		The Great Fire Of London- Uses of everyday materials Y2 EXCELLENCE	
Year 2/3 Year B	Funny bones Animals, including humans Y2 Animals, including humans Y3 DIVERSITY		Eureka! Light Y3 Rocks Y3 EXCELLENCE/ DIVERSITY		Egypt v Romans Plants Y3 EXCELLENCE	
Year 4/5/6 Year A	Chocolate States of matter Y4 Solutions and mixtures (Properties and changes of materials, Y5?) EXCELLENCE		All creature great and small Living things and their habitats Y6 Living things and their habitats Y5 Adaptation? SUSTAINABILITY		Indian adventures States of matter Y4 DIVERSITY	
Year 4/5/6 Year B	Off with their heads! Forces Y5 EXCELLENCE		Around the world in 80 lives Materials – how can we stay warm/ cool? Animals including humans Y6 (heart and blood) EXCELLENCE/ DIVERSITY		Amazing me Animals, including humans Y5 AND 4? (digestions, puberty) Evolution and <u>inheritance</u> Y6 DIVERSITY	
Year 4/5/6 Year C	To infinity and beyond Earth and Space Y5 Properties and changes of state, Y5? EXCELLENCE		Destination Westbury – Electricity Y4 and Y6 DIVERSITY		All the world's a stage – Sound Y4 Light Y6 EXCELLENCE	

Working Scientifically:	Preschool	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
<p>Strand of scientific enquiry (symbols from the PSTT)</p>	<p>Understanding the world</p> <ul style="list-style-type: none"> Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes. <p>Characteristics of Effective Learning</p> <ul style="list-style-type: none"> Show curiosity about objects, events and people Engage in open-ended activity Take a risk, engage in new experiences and learn by trial and error Find ways to solve problems / find new ways to do things / test their ideas Develop ideas of grouping, sequences, cause and effect Use senses to explore the world around them Make links and notice patterns in their experience 	<p>KS1 Statutory requirements from NC</p> <p>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:</p> <ul style="list-style-type: none"> asking simple questions and recognising that they can be answered in different ways observing closely, using simple equipment performing simple tests identifying and classifying using their observations and ideas to suggest answers to questions gathering and recording data to help in answering questions. <p>Understanding the world</p> <ul style="list-style-type: none"> Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments 	<p>Lower KS2 Statutory requirements from NC</p> <p>During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> 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 using straightforward scientific evidence to answer questions or to support their findings. identifying differences, similarities or changes related to simple scientific ideas and processes <p>KS1 Statutory requirements from NC</p> <p>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:</p> <ul style="list-style-type: none"> asking simple questions and recognising that they can be answered in different ways observing closely, using simple equipment performing simple tests identifying and classifying using their observations and ideas to suggest answers to questions gathering and recording data to help in answering questions. 	<p>Upper KS2 Statutory requirements from NC</p> <p>During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> 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 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. <p>Lower KS2 Statutory requirements from NC</p> <p>During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> 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 				

			might vary from one another. •They make observations of animals and plants and explain why some things occur, and talk about changes.			<ul style="list-style-type: none"> • using straightforward scientific evidence to answer questions or to support their findings. • Identifying differences, similarities or changes related to simple scientific ideas and processes 		
Observation over time 			Use their own senses to describe Talk about what they have found out and how they found out Observe closely with support and scaffolding, using simple equipment.	Observe closely, using simple equipment. Record in a range of ways and begin to use simple scientific language.	Write about what has been found out Form decisions about what observations to make and how long to make them for	Help to make decisions about the type of simple equipment that might be used. Learn how to use new equipment appropriately.	Use a range of scientific equipment with increasing accuracy and precision. Make decisions about what observations to make, what measurements to use, and how long make them for.	Record data and results of increasing complexity using scientific diagrams and labels, tables and bar and line graphs.
Identifying, Grouping and classifying Making observations to name, sort and organise items. 			Describe how to identify and group familiar objects, biological beings or physical/chemical states	Identifying and classifying groups of biological/chemical/physical materials independently	Discuss the criteria for grouping, sorting and classifying.	Use and design simple keys	Use and design simple keys	Use and design classification keys.
Pattern –seeking Identifying patterns and looking for relationships.			Ask simple questions and recognise that they can be answered in different ways. With help, record	Make tables and charts to help display data. Secondary sources.	Ask unprompted questions about what is observed Decide which types of scientific enquiry are likely to be	Raise questions independently Record in notes, drawings, labelled	Independently suggest reasons for similarities and differences.	Recognise how abstract ideas help them to understand and predict

			<p>in a range of ways and begin to use simple scientific language.</p>		<p>the best ways of answering questions posed</p>	<p>diagrams, bar charts and simple tables so that patterns are clear.</p>	<p>Report and present findings from enquires, including conclusions, causal relationships and explanation of results.</p>	<p>how the world operates. Analyse functions, relationships and interactions.</p>
<p>Research Using secondary sources of information to answer questions</p> 			<p>Use observations to compare and contrast at first hand or through videos and photographs</p> <p>Suggest answers to questions from own knowledge.</p>	<p>Gather and record data to suggest answers to their questions</p> <p>Research simple secondary sources to find answers. Take measurements.</p>	<p>Identify how these properties make a scientific concept useful</p> <p>Testing and develop ideas about everyday phenomena and the relationships between living things and familiar environments with the use of secondary resources</p>	<p>Recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations.</p>	<p>Use a wide range of secondary sources of information</p> <p>Recognise when secondary sources will be most useful to research ideas</p>	<p>Recognise that scientific ideas change and develop over time</p> <p>Begin to separate opinion from fact.</p>
<p>Comparative and fair testing Changing one variable to see its effect on another.</p> 			<p>Notice patterns and relationships in their observations.</p> <p>Make predictions around 'what might happen next.'</p>	<p>Undertake simple tests where they have been given the opportunity to select factors to change Answer questions using data</p> <p>Communicate what they have found out and</p>	<p>use standard units in testing to keep outcomes in the same measure</p> <p>Explore the strengths of their own enquiry</p>	<p>Recognise when a simple fair test is necessary</p> <p>Collect data from their own observations and measurements and consider</p>	<p>draw conclusions based on data and observations. Plan different types of enquiry to answer questions.</p> <p>Use scientific knowledge and</p>	<p>Use evidence to justify ideas.</p> <p>Use test results to make prediction to set up further comparative and fair tests.</p>

				how they found out. Evaluate their enquiry- do they know the answer?		whether it is useful or right. Identify new questions arising from the data, making predictions for new values within or beyond the data collected	understanding to explain any findings. Recognise and control variables where necessary	
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Knowledge progression:	Preschool	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Biology Chemistry Physics								
Plants	Use all their senses in hands-on exploration of natural materials. Understand the key features of the life cycle of a plant and an animal. Plant seeds and care for growing plants.	Explore the natural world around them. Recognise some environments that are different from the one in which they live.	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees	observe and describe how seeds 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 (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			

<p>Seasonal Changes</p>		<p>Understand the effect of changing seasons on the natural world around them</p>	<p>observe changes across the 4 seasons; observe and describe weather associated with the seasons and how day length varies.</p>					
<p>Materials</p>	<p>Explore collections of materials with similar and/or different properties. Talk about the differences between materials and changes they notice</p>	<p>Explore the natural world around them. Describe what they see, hear and feel whilst outside</p>	<p>Everyday Materials distinguish between an object and the material from which it is made; identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock; describe the simple physical properties of a variety of everyday materials; compare and group together a variety of everyday materials on the basis of their simple physical properties.</p>	<p>Uses of Everyday Materials 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.</p>	<p>Rocks 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.</p>	<p>States of Matter Compare and group materials together, according to whether they are solids, liquids or gases. Observes that some materials change state when they are heated or cooled, and measure or research the temperature degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>Properties and changes of Materials. compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets; know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution; use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating; give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic; demonstrate that dissolving, mixing and changes of state are reversible changes; explain that some changes result in the</p>	

							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.	
Living things and their habitats	Begin to understand the need to respect and care for the natural environment and all living things.	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.	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees. Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).	Explore and compare the difference 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 foods.		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	describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird; describe the life process of reproduction in some plants and animals.	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
Light					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			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

					<p>light from a light source is blocked by an opaque object;</p> <p>find patterns in the way that the size of shadow change</p>			<p>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>Animals Including humans</p>	<p>Continue developing positive attitudes about the differences between people</p> <p>Understand the key features of the life cycle of a plant and an animal.</p>	<p>Name and describe people who are familiar to them</p> <p>Talk about members of their immediate family and community</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>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>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>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>Describe how humans change and develop to old age.</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>
<p>Forces and Magnets</p>	<p>Explore and talk about different forces they can feel</p>	<p>Explore the natural world around them.</p>			<p>compare how things move on different surfaces;</p> <p>notice that some forces need contact between 2 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>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>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;</p> <p>describe magnets as having 2 poles;</p> <p>predict whether 2 magnets will attract or repel each other, depending on which poles are facing.</p>		<p>recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.</p>	
Earth and Space		<p>Explore the natural world around them.</p> <p>Describe what they see, hear and feel whilst outside.</p>					<p>Describe the movement of the Earth and other planets around the Sun. Describe the movement of the Moon around the Earth.</p> <p>Describe the sun, Earth and moon as approximately spherical bodies.</p> <p>Understand that the Earth's rotation causes day and night.</p>	
Sound						<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</p>		

						distance from the sound source increases.		
Electricity	Explore how things work					Identify common appliances that run on electricity. Construct simple circuits, identifying and naming basic parts, including cells wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit. investigate common conductors and insulators. Recognise that a switch opens.		Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a 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 to draw simple circuit diagrams.
Evolution and Inheritance	Begin to understand the need to respect and care for the natural environment and all living things.	Recognise some environments that are different to the one in which they live						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.