


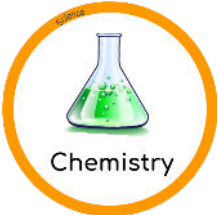
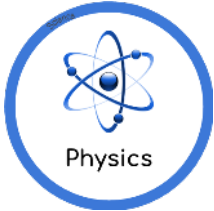
Science Curriculum Progression
Peasedown St John School

The important thing is to never stop questioning. - Albert Einstein

Our vision: All children are curious about the world around them and are able to test and evaluate their ideas knowing the impact science has on the world.

At Peasedown St John, our curriculum intent for science is important to us as a school as it ensures children are able to achieve the best learning outcomes possible. It reflects the purposes and aims taken from the National Curriculum, inspiring our pupils to develop their scientific knowledge and understanding of the world through the core disciplines of science: biology, chemistry and physics. We recognise the importance of science in every aspect of daily life. Our science curriculum aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of science, today and for the future. As one of the core subjects taught in primary schools, we give the teaching and learning of Science the prominence it requires. The children are exposed to a wide variety of topics which fall under the three core disciplines of biology, chemistry and physics. The biological threads of plants and animals, including humans, run across all year groups, building and developing children's understanding as they move through the school. This begins with identification of animals and their habitats, and progresses to food chains, life cycles and environmental impacts upon the natural world. Children are also taught in detail about the human body, its processes and how it functions. The chemistry and physics units cover a broad spectrum of topics including space, forces, state of matter, light and electricity among others. As with our whole school curriculum, we will make meaningful links where appropriate. For science these links may be with the study of our local area, geography, design technology or PSHE.

To help children build a reliable schemata in science, knowledge is built upon core threshold concepts, the 'big ideas'. The 'big ideas' help children to link old learning to new learning and in science are:

 <p style="text-align: center;">Biology</p>	 <p style="text-align: center;">Chemistry</p>	 <p style="text-align: center;">Physics</p>
<p style="text-align: center;">Plants Animals, including humans Living things and their habitats Evolution and inheritance</p>	<p style="text-align: center;">Materials, including rocks and soils</p>	<p style="text-align: center;">Movement, forces and magnets Light Sound Electricity Earth in space, including the seasons</p>

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Our Overview of Science Teaching (2024-25)

	TERM 1 7.5 weeks					TERM 2 7 weeks				TERM 3 6 weeks			TERM 4 6 weeks			TERM 5 5 weeks		TERM 6 7 weeks		
	September			October		November		Dec	January		Feb	March		April	May		June	July		
Nursery	Natural materials					Hibernation, light and dark				Ice Shadows			New life Senses			Minibeasts Life cycle		Summer time Rock pools		
Reception	All about me The weather					The weather Materials				Keeping healthy Materials Shadows			The weather Plants Forces			Animals Plants The weather		Protecting the environment		
Year 1	Plants A					Animals, including humans A				Materials			Plants B			Animals, including humans B				
	Seasonal changes are taught concurrently with other units through the year																			
Year 2	Living things and their habitats A					Animals, including humans A				Materials			Plants			Living things and their habitats B		Animals, including humans B		
Year 3	Plants A					Light				Animals, including humans			Rocks and soils			Plants B		Forces		
Year 4	Materials					Sound				Electricity			Living things and their habitats A			Animals, including humans		Living things and their habitats B		
Year 5	Materials A					Forces				Materials B			Space			Living things and their habitats		Animals, including humans		
Year 6	Animals, including humans					Electricity				Light			Living things and their habitats			Research inquiries linked to topics		Evolution		

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Links to whole school curriculum drivers (how we ensure our science learning is relevant to PSJ)





	EYFS		KS1		LKS2		UKS2	
	N	R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Community links - local and global, diversity and commonality</p> <p><i>incl. key scientists</i></p>	<p>Mini beasts around the world and in our locality</p>	<p>Harvest festival linked to seasons and weather</p>	<p>Caring for the planet</p> <p>Growing and cooking local produce</p> <ul style="list-style-type: none"> • Anna Russell (Local) • Alan Titchmarsh (UK) 	<p>Caring for species in our local area</p> <p>Road safety and visibility in our village</p> <ul style="list-style-type: none"> • Chris Packham (UK) 	<p>Reducing food waste and encouraging healthy eating</p> <p>Significance of our local area in geology</p> <ul style="list-style-type: none"> • William Smith (Local) • Ben Garrod (UK) 	<p>Reducing electricity usage</p> <p>Impacts of deforestation in UK and around the world</p> <ul style="list-style-type: none"> • Karen Steel (Local) • Mary Anning (UK) 	<p>Impacts of plastic pollution</p> <p>Pioneering inventors from our local area</p> <ul style="list-style-type: none"> • William Herschel (Local) • Percy Pilcher and Richard Lovell Edgeworth (Local) • Isaac Newton (UK) • Katherine Johnson, Neil Armstrong and Mae Jemison (Global) 	<p>Renewable energy use in UK and around the world</p> <p>Impacts of human activity on selection pressures locally</p> <ul style="list-style-type: none"> • Thomas Alan Stephenson (Local) • Andrew Cross, Humphry Davy (Local) and Alessandro Volta (Global) • Percy Shaw (UK) • Charles Darwin and Jane Goodall (UK/Global) • Carl Linnaeus (Global)
<p>Visits, opportunities and experiences</p>	<p>Chicks, frogspawn and caterpillars</p> <p>Observe the changing seasons in the locality</p>	<p>Live giant snails and stick insects</p> <p>Chicks and frogspawn</p> <p>Observe the changing seasons in the locality</p>	<p>Seasons: observe the changes in the woods</p> <p>CREST Star Award</p> <p>CREST Star — CREST Awards</p>		<p>Visit to Cheddar Gorge</p>	<p>CREST Superstar Award</p> <p>CREST Superstar — CREST Awards</p>	<p>Visit Bristol Observatory</p> <p>Chain Reaction</p> <p>Chain Reaction - Primary Science Teaching Trust (psst.org.uk)</p> <p>Explorer Dome</p>	<p>Linnean Society Special Species Competition</p> <p>Special Species Competition - SchoolScience.co.uk</p> <p>BioArtAttack 2D Competition</p> <p>Nancy Rothwell Award (rsb.org.uk)</p>
<p>High quality books - fiction and non-fiction</p>	<p><i>One Snowy Day</i></p> <p><i>Arthur the Snowman</i></p> <p><i>Gruffalo's Child</i></p> <p><i>We're Going on an Egg Hunt</i></p> <p><i>Mummy and Baby Animals</i></p> <p><i>Dear Zoo</i></p> <p><i>Hungry Caterpillar</i></p> <p><i>Growing Frogs</i></p> <p><i>What the Ladybird Heard at the Seaside</i></p> <p><i>Commotion in the Ocean</i></p>	<p><i>The Wall and the Wild</i></p> <p><i>Oi Frog</i></p> <p><i>The Lighthouse Keeps Lunch</i></p> <p><i>Where the Wild Things Are</i></p>	<p><i>One Year with Kipper</i></p> <p><i>Snail Trail</i></p> <p><i>Superworm</i></p> <p><i>Tree: Seasons Come, Seasons Go</i></p> <p><i>A Little Guide to Wild Flowers</i></p> <p><i>The Things That I LOVE about TREES</i></p> <p><i>Harry's Hazelnut</i></p> <p><i>Tree: Seasons Come, Seasons Go</i></p> <p><i>One Year with Kipper</i></p> <p><i>After the Storm</i></p> <p><i>The Great Paper Caper</i></p> <p><i>Who Sank the Boat</i></p> <p><i>The Story of Cinderella</i></p> <p><i>Linked extracts and short texts from The Literacy Shed+</i></p>	<p><i>The Tin Forest</i></p> <p><i>A Seed Is Sleepy</i></p> <p><i>Meerkat Mail</i></p> <p><i>Tadpole's Promise</i></p> <p><i>No Place Like Home</i></p> <p><i>Three Little Pigs</i></p> <p><i>Superhero Animals</i></p> <p><i>The Incredible</i></p> <p><i>Ecosystems of Planet Earth</i></p> <p><i>Botanicum</i></p> <p><i>Linked extracts and short texts from The Literacy Shed+</i></p>	<p><i>Anatomicum</i></p> <p><i>Botanicum</i></p> <p><i>The Bright and Bold</i></p> <p><i>Human Body: The Skeleton and Muscles</i></p> <p><i>The Iron Man</i></p> <p><i>The Butterfly Lion</i></p> <p><i>Stig of the Dump</i></p> <p><i>Skeletons and Muscles</i></p> <p><i>Model Writing Text</i></p> <p><i>Under Your Feet: Soil, Sand and Other Stuff</i></p> <p><i>A Home for Every Plant</i></p> <p><i>Little People, Big Dreams: Mary Anning</i></p> <p><i>Linked extracts and short texts from The Literacy Shed+</i></p>	<p><i>Varjak Paw</i></p> <p><i>Charlotte's Web</i></p> <p><i>Red Alert!</i></p> <p><i>Under Your Feet: Soil, Sand and Other Stuff</i></p> <p><i>Everyday STEM: Geology</i></p> <p><i>Little People, Big Dreams: Mary Anning</i></p> <p><i>The Bright and Bold</i></p> <p><i>Human Body: The Digestive System</i></p> <p><i>Can You Hear Sounds in Space?</i></p> <p><i>There's a Rang-Tan in My Bedroom</i></p> <p><i>The River that Flows Beside Me</i></p> <p><i>Linked extracts/short texts from The Literacy Shed+</i></p>	<p><i>Amazing Animal Series (Chris Packham)</i></p> <p><i>Little People, Big Dreams: Mae Jemison and Neil Armstrong</i></p> <p><i>Counting on Katherine</i></p> <p><i>Hidden Figures: The True Story of Four Black Women and the Space Race</i></p> <p><i>Spaced Out</i></p> <p><i>Little Brown Nut</i></p> <p><i>Linked extracts and short texts from The Literacy Shed+</i></p>	<p><i>Anatomicum</i></p> <p><i>Kay's Anatomy</i></p> <p><i>Holes and linked texts</i></p> <p><i>Little People, Big Dreams: Louis Pasteur, Nikola Tesla, Charles Darwin and Jane Goodall</i></p> <p><i>Step Into Science: Light On A Beam of Light: A Story of Albert Einstein</i></p> <p><i>The Great Barrier Reef (Helen Scales)</i></p> <p><i>Timelines of Nature</i></p> <p><i>Linked extracts and short texts from The Literacy Shed+</i></p>

Science Curriculum Progression




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Progression across our school - key knowledge and vocabulary coverage




This table shows the progression of knowledge by each of the Big Ideas. Bulleted points from Y1-6 are taken directly from the National Curriculum programmes of study in science for each year; where the programme of study does not include a topic of learning, meaningful links to other units of study have been included. Essential vocabulary that children will learn has been included for each milestone and examples of scientific enquiry that children might undertake to embed substantive scientific knowledge have been included.

Big Idea	EYFS	KS1		LKS2		UKS2	
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p align="center">Biology</p>  <p>Biology is the study of life. It involves learning about all living organisms, their parts and structures and their interactions with each other and the environment.</p>	<ul style="list-style-type: none"> Grow plants Explore our local area including the plants that live there 	<p>Year 1:</p> <ul style="list-style-type: none"> 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 	<p>Year 2:</p> <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 	<p>Year 3:</p> <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 	<p>Year 4:</p> <p>Though plants are not studied in explicit detail in Year 4, children will draw upon their knowledge of plants from previous learning to observe, identify and group different living things. They will learn how plants provide important food sources and habitats within ecosystems. Children will recognise the importance of plants as producers in food chains.</p>	<p>Year 5:</p> <p>Though plants are not studied in explicit detail in Year 5, children will draw upon their knowledge of the structures and growth of plants to observe and make comparisons between life cycles of different living things, including plants. They will learn about different types of reproduction, including sexual and asexual reproduction in plants.</p>	<p>Year 6:</p> <p>Though plants are not studied in explicit detail in Year 6, children will draw upon their knowledge of the characteristics of plants to deepen their understanding of the Linnaean classification system. They will understand that the broad group of plants can be subdivided and provide morphological and physiological reasons for grouping different types of plants.</p>
		<p align="center">Plants</p>	<p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> Which trees and plants are growing in PSJ? Do all leaves in our local area have the same shapes and sizes? How did Anna Russell (Bristol) help us to learn about plants? 	<p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> How will a tree in our local area change over the term? Are brown leaves dead or alive? How does the height of a plant we've planted change over time? Will a plant grow better indoors or outdoors? Is there a link between the size of the seed and the size of the grown plant? 	<p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> What will the effect of depriving a plant of water/light/nutrients/ the correct temperature be? How does water travel up a plant stem? What is the effect of seed shape and size on the way it is dispersed? 	<p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> What will the effect of depriving a plant of water/light/nutrients/ the correct temperature be? How does water travel up a plant stem? What is the effect of seed shape and size on the way it is dispersed? 	<p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> What will the effect of depriving a plant of water/light/nutrients/ the correct temperature be? How does water travel up a plant stem? What is the effect of seed shape and size on the way it is dispersed?
		 <p>Children will be exposed to, learn and use these words:</p> <p><i>Plant, flower, blossom, petals, fruit, leaves, stem, trunk, branch, bulb, roots, shoots, water, light, temperature, seed, grow, living, alive, not living, soil, seedlings, deciduous, evergreen</i></p>	 <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal, air, nutrients, minerals, soil, absorb, transport, classification, classification keys</i></p>	 <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, cuttings, flowering, non-flowering, mosses, ferns, conifers</i></p>			




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Animals, including humans	<p>Nursery:</p> <ul style="list-style-type: none"> Learn about the life cycles of animals Compare adult animals to their babies Observe how baby animals change over time Learn about the life cycles of humans Learn about how to take care of themselves Learn about their senses <p>Reception:</p> <ul style="list-style-type: none"> Name and describe animals that live in different habitats Describe different habitats Describe people who are familiar to them Learn about how to take care of themselves 	<p>Year 1:</p> <ul style="list-style-type: none"> 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) 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>Examples of inquiries might include...</p> <ul style="list-style-type: none"> Which different animals live in and around PSJ? Which different animals live in Britain and other parts of the world? In which different ways can we group animals? Which parts of my body can I use to compare different sights, textures and smells? Is a snail a carnivore, herbivore or omnivore? 	<p>Year 2:</p> <ul style="list-style-type: none"> Notice that animals, including humans, have offspring which grow into adults Begin to notice that offspring resemble their parents 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 <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> How do the size and characteristics of a chick/frog change from hatching to an adult? How has my body changed from when I was a baby? Which characteristics do family members share? What does an animal in our local area need to survive? Why do we need different types of food? 	<p>Year 3:</p> <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 <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> How can we classify types of food based on their nutritional information? How does the amount of a particular nutrient vary across different food types? By measuring people in different year groups, does a forearm get longer as we get older? 	<p>Year 4:</p> <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 <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> How do an animal's teeth link to the type of diet it eats? What type of liquid is the least healthy for our teeth? Which type of creature does an owl most commonly eat? 	<p>Year 5:</p> <ul style="list-style-type: none"> Describe the changes as humans develop to old age <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> How do the gestation periods of different animals compare to that of a human? Is there a relationship between the mass of the animal and the length of gestation? How does the weight or length of a baby change over time? What happens during puberty? (Refer to RSE curriculum) What happens to adults as they become older? 	<p>Year 6:</p> <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 Describe the ways in which nutrients and water are transported within animals, including humans. <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> How has our understanding of blood changed over time? What is the impact of exercise on heart function? Which drink type is the healthiest?
	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, parts of the body, senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ears, tongue, offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/chicken, kitten/cat, caterpillar/butterfly), survive, survival, water, food, air, exercise, heartbeat, breathing, hygiene, germs, disease, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy)</i></p> </div> </div>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine, digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, incisor, canine, molar, premolar, herbivore, carnivore, omnivore, producer, predator, prey</i></p> </div> </div>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; puberty, the vocabulary to describe sexual characteristics in line with the PSJ RSE policy, heart, pulse, rate, pumps, blood, blood vessels, veins, arteries, red blood cells, white blood cells, platelets, plasma, transported, lungs, oxygen, carbon dioxide, cycle, circulatory system, diet, drugs, lifestyle</i></p> </div> </div>				





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<p>Living things and their habitats</p>	<p>Nursery:</p> <ul style="list-style-type: none"> • Explore the surrounding natural environment • Explore natural objects from the surrounding environment <p>Reception:</p> <ul style="list-style-type: none"> • Explore the plants in the surrounding natural environment • Explore the animals in the surrounding natural environment • Explore the plants and animals in a contrasting natural environment 	<p>Year 1:</p> <p>Through their study of plants, children will identify and name a variety of common wild and garden plants and be able to talk about their structure.</p> <p>By studying animals, including humans, children will identify and name a variety of common animals including those who are carnivores, herbivores and omnivores. Some will begin to make very simple trophic connections between species in a habitat.</p> <p>In studying seasonal changes, children will understand how a habitat changes through the year.</p>	<p>Year 2:</p> <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 microhabitats • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • Which type of microhabitat is the most popular in our outdoor area? • How can we classify items as living, dead and never alive? • What do invertebrates eat? 	<p>Year 3:</p> <p>By understanding that animals cannot make their own food and linking back to their knowledge gained in Year 2, children will begin to understand that organisms are linked closely to their environment by way of dietary interdependence.</p> <p>In studying plants, children will understand the important interactions between pollinators and flowers in a shared habitat.</p>	<p>Year 4:</p> <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 • Recognise that, as a result, living things have changed over time <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • How can a classification key be used to identify different plant and animal species in PSJ? • How has the Writhlington SSSI contributed to our understanding of the fact that living things have changed over time? • What factors are threatening species in Somerset? 	<p>Year 5:</p> <ul style="list-style-type: none"> • 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 <p>Examples of enquiries might include...</p> <ul style="list-style-type: none"> • What is the life cycle of a...? • How does frogspawn change over time? • In our local area, is there evidence of a link between the flower colour and the type of pollinator? • Which flower has the strongest scent? 	<p>Year 6:</p> <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 microorganisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • How can we classify organisms into one of the five kingdoms of life? • How has our understanding of the classification of species changed over time? • What was Carl Linnaeus' contribution to our modern classification system? • How did Jane Goodall's work affect our views of classification? • How did Thomas Alan Stephenson (Somerset) contribute to our understanding of global biodiversity? • How does handwashing affect the number of microorganisms on our hands?
	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, names of local habitats (e.g. pond and woodland), names of microhabitats (e.g. under logs, orin bushes), native, exotic, conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and microhabitats studied</i></p> </div> </div>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; classification, classification keys, environment, habitat, human impact, positive, negative, endangered, threatened, extinct, depend, migrate, hibernate, herbivore, carnivore, omnivore, producer, predator, prey</i></p> </div> </div>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, cuttings, classification, taxonomy, kingdom, species, subdivide, subgroups, Carl Linnaeus, vertebrates, invertebrates, fish, amphibians, reptiles, birds, mammals, warm-blooded, cold-blooded, invertebrates, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers</i></p> </div> </div>				





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Evolution and inheritance	<p>The building blocks of this topic are taught through other science topics, such as Animals, including humans: Describe people who are familiar to them.</p>	<p><u>Year 1:</u> Through their study of plants, children will begin to understand that broad groups of living things share common characteristics. Through their study of animals, including humans, children will begin to identify common characteristics of all or most members of a group of animals, e.g. fish have fins for swimming.</p>	<p><u>Year 2:</u> Through their study of animals, including humans, children will begin to notice that offspring resemble (inherit traits) from their parents.</p>	<p><u>Year 3:</u> Through their study of rocks and fossils, children will begin to understand that we have evidence to support the idea that some species have died out or evolved.</p>	<p><u>Year 4:</u> Through their study of living things and their habitats, children will begin to understand that changing environments provide selection pressures. They will begin to understand how organisms are adapted to live in their habitats.</p>	<p><u>Year 5:</u> Through their study of reproduction, children will begin to understand that characteristics are passed from parents to their offspring through genetic material by way of reproduction.</p>	<p><u>Year 6:</u></p> <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. <p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> • Which is the best beak shape for consuming each type of food? • How has the Writhlington SSSI contributed to our knowledge of evolution? • How do advantageous adaptations lead to changes in a population? • How did Charles Darwin contribute to our understanding of evolution?
		 <p>Children will be exposed to, learn and use these words:</p> <p><i>Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, parts of the body, skin, eyes, nose, ears, tongue, offspring, reproduction, growth, baby, child, adult, names of animals and their babies (e.g. chick/chicken, kitten/cat, caterpillar/butterfly)</i></p>	 <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; soil, fossil, bone, flesh, minerals, environment, habitat, human impact, positive, negative, migrate, adapt, survive, trait, physical feature</i></p>	 <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; reproduce, sexual, fertilises, asexual, offspring, sexual reproduction, vary, characteristics, adapted, inherited, species, evolve, evolution, Charles Darwin, DNA, selection pressure, advantage, genetic, natural selection</i></p>			




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<p align="center">Chemistry</p>  <p align="center">Chemistry</p> <p>Chemistry is the study of matter – all it consists of, its properties and how it changes. Studying chemistry involves understanding different substances and the ways in which they interact with other substances.</p>	<p align="center">Materials, including rocks and soils</p>	<p>Nursery:</p> <ul style="list-style-type: none"> • Explore a range of materials • Shape and join materials • Combine and mix ingredients • Change materials by heating and cooling, including cooking <p>Reception:</p> <ul style="list-style-type: none"> • Explore a range of materials, including natural materials • Make objects from different materials, including natural materials • Observe, measure and record how materials change when heated and cooled • Compare how materials change over time and in different conditions 	<p>Year 1:</p> <ul style="list-style-type: none"> • 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>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • How can we sort objects based on what they are made from? • Which materials have been used in our indoor and outdoor areas? • Which material would make the best coat for a teddy? • How well do different materials absorb water? 	<p>Year 2:</p> <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 <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • Which material is the best for blocking a hole in a bucket? • Which ingredients make the best slime? • Which material will make the best windscreen for a toy race car? • Which material is best for a cycling jacket? • How flexible are plastics used for bottles? 	<p>Year 3:</p> <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 <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • Which rock is the most permeable? • How hard are different rocks? • How did William Smith's studies in High Littleton contribute to our understanding of sedimentary rock? • How is Bath stone formed? • How can we classify different soils based on their properties? 	<p>Year 4:</p> <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 <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • How can we classify materials into solids, liquids and gases? • Which liquid will travel the fastest? • At which temperature will a solid begin to melt? • What will happen to frozen water over time? • Will the location of a puddle affect how quickly it evaporates? 	<p>Year 5:</p> <ul style="list-style-type: none"> • Compare and group together everyday materials on the basis of their properties (hardness, solubility, transparency, conductivity and magnetism) • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a solute • Use knowledge of solids, liquids and gases to decide how mixtures might be separated (filtering, sieving and evaporating) • Give reasons 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, such as burning, result in the irreversible formation of new materials <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • How does salt/sugar dissolve in water? • How does the temperature of a solvent affect the speed of the solute dissolving? • Which material should an insulated cup be made from? • Which changes are reversible and which are irreversible? • How has the work of David Hartley (Bath) and Audrey Stuckes (Bristol) contributed to the safety of our houses? 	<p>Year 6:</p> <p>Though materials and their properties are not studied explicitly in Year 6, children will link their previous learning about rocks and fossils to new ideas about how we know that species have evolved. By using their knowledge of density, solids, liquids and gases, children might begin to hypothesise about, and explain, phenomena linked to how light travels through different materials.</p>
		 <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through, opaque, transparent, translucent, reflective, non-reflective, flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching</i></p>	 <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorbs water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, types of soil (peat, sandy, chalky, clay), magnetic force, magnet, attract, magnetic material, metal, iron, steel, solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle, viscous/viscosity, electrical conductor, electrical insulator, metal, non-metal</i></p>	 <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; thermal insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material</i></p>				




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<p align="center">Physics</p>  <p>Physics is the study of physical phenomena, like the motion of matter, energy and force. It is the most fundamental part of science; studying physics helps us to understand the world around us and our place in the vast universe.</p>	<p align="center">Movement, forces and magnets</p>	<p>Nursery:</p> <ul style="list-style-type: none"> • Feel forces • Explore how things work • Explore how objects and materials are affected by forces <p>Reception:</p> <ul style="list-style-type: none"> • Explore how to change how things work • Explore how the wind can move objects • Explore how objects move in water 	<p>Year 1 & 2: Through exploration of the world around them, and their learning in D.T., children will begin to notice and describe how things move, using simple comparisons such as 'faster' and 'slower'. They will compare how different things move.</p>	<p>Year 3:</p> <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 <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • How does the type of surface affect the speed of an object travelling on it? • How can we classify materials based on how they behave around magnets? • Are all metals magnets? • Which materials can magnets attract through? 	<p>Year 4: Though forces are not studied in explicit detail in Year 4, children will revisit their knowledge of gravity to link their new knowledge of states of matter to the concepts of density and buoyancy.</p>	<p>Year 5:</p> <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 object • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • How does the shape of an object affect how it moves through water? • How does the surface area of a spinner affect the time it takes to fall? • How does parachute size affect the time it takes for an object to fall? • How might a pulley system be used to move objects much heavier than ourselves in a mine? • Which is the best material for a trainer sole? • How did Percy Pilcher (Bath) and Richard Lovell Edgeworth (Bath) use knowledge of forces in their pioneering inventions? 	<p>Year 6: Though forces are not studied in explicit detail in Year 6, children will revisit their knowledge about the cyclical movements of the Earth and moon when studying light to explain the phenomena of lunar and solar eclipse. When linking this previous knowledge to their new learning, children will further their understanding of the gravitational pulls of the Sun, Earth and moon being linked to the orbits of the planets and moon and the tides respectively.</p>
		 <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching, accelerate, slow down, bounce, roll, slide, glide</i></p>	 <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole</i></p>	 <p align="center">Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears, orbit, gravitational, tides</i></p>			




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Light	<p>Nursery:</p> <ul style="list-style-type: none"> • Explore light sources • Shine light on or through different materials <p>Reception:</p> <ul style="list-style-type: none"> • Explore shadows • Explore rainbows 	<p>Year 1 & 2:</p> <p>Through their study of animals, including humans, children will identify the eyes and their function. During their study of materials, they will identify materials which are see-through, then transparent, not see-through, then opaque, and translucent.</p>	<p>Year 3:</p> <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 • Recognise natural and artificial light sources <p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> • How can we classify light sources? • Where can shadows be found around our school site? • What is the link between object shape, direction of light and the shadow shape? • How does the distance between object and light source affect the size of the shadow? 	<p>Year 4:</p> <p>During their study of changing states, children will draw upon their previously-learned vocabulary to describe their observations over time. When learning about living things and their habitats, examples of adaptations to different habitats with varied light levels will be included.</p>	<p>Year 5:</p> <p>During their study of materials, children will revisit their knowledge of the concepts of transparency and translucency to identify and classify different materials. When learning about the Earth in space, they will apply their knowledge of natural and artificial light sources and reflectors to understand how we see the moon and the world around us.</p>	<p>Year 6:</p> <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 <p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> • Which window lets in the most light? • Which type of surface reflects light the most effectively? • How did Percy Shaw use knowledge of how light travels to improve road safety?
			<p align="center">Children will be exposed to, learn and use these words:</p>  <p><i>Senses, see, eyes, shiny, dull, see-through, not see-through, opaque, transparent, translucent, reflective, non-reflective</i></p>	<p align="center">Children will be exposed to, learn and use these words:</p>  <p><i>Vocabulary from KS1; light, light source, artificial, natural, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous</i></p>	<p align="center">Children will be exposed to, learn and use these words:</p>  <p><i>Vocabulary from KS1 and LKS2; straight lines, light rays, light diagram, pupil, absence of light, angle of incidence, expand, constrict, dilate</i></p>	




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Sound	<p>Nursery:</p> <ul style="list-style-type: none"> • Listen to sounds • Make sounds <p>Reception:</p> <ul style="list-style-type: none"> • Listen to sounds outside and identify the source • Make sounds 	<p>Year 1 & 2:</p> <p>During their learning about animals, including humans, children use their senses to recognise and sort different animals, including by the sounds they make. They will 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>Year 3:</p> <p>Though sound is not explicitly studied in Year 3, children will draw upon their previous knowledge of the five senses, to include hearing, when learning about light and how we see. When studying the bones in animals, including humans, children will be given the example of the bones in the ear being the smallest bones in the body and helpful for hearing.</p>	<p>Year 4:</p> <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. <p>Examples of inquiries might include...</p> <ul style="list-style-type: none"> • What happens to the sound of a drum as we get further away from it? • How can we alter the volume of a sound? • How does the height from which an object is dropped affect the loudness of the sound produced? • Does the length of an elastic band affect the pitch of the sound produced? • How has the work of Karen Steel (Midsomer Norton) contributed to our understanding of hearing loss in humans? 	<p>Year 5 & 6:</p> <p>Though sound is not studied in explicit detail in Year 5, during their study of materials and their properties, children will make links with their previous learning about how sound travels through a medium. In Year 6, children will likely draw a connection and comparison between the way sound travels to the ear and how light travels to the eye so that we can perceive our surroundings. When studying evolution, children will connect their knowledge of sound to new learning about species' adaptations including echolocation and ear shape.</p>
	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Sound, noise, listen, hear, music, voices, bird song, traffic, sirens, thunder; high, low, loud, quiet, soft, volume, crackle, thunder, hum, buzz, roar, senses, hear, ear</i></p> </div> </div>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; source, vibrate, vibration, travel, pitch (high, low), volume, faint, quiet, loud, insulation, ossicles (malleus, incus and stapes)</i></p> </div> </div>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; echolocation, adaptation, advantage, medium, density</i></p> </div> </div>		

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Electricity	<ul style="list-style-type: none"> • Identify electrical devices • Use battery-powered devices 	<p>Year 1 & 2: By studying the differences between living and non-living things, and those that have never been alive, children will begin to understand that a common misconception when viewing a moving electrical device is that it is alive. Motors and joints can give the impression of natural movement but we can apply the other characteristics of living things to determine whether or not something is alive.</p>	<p>Year 3: Through learning to recognise natural and artificial light sources, children will gain knowledge of the fact that some light sources are powered using electricity.</p>	<p>Year 4:</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><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> • How can we group materials according to their electrical conductivity? • Will a bulb within this circuit light up? 	<p>Year 5: Though electricity is not studied explicitly in Year 5, children will draw upon their knowledge gained in Year 4 in order to identify and classify materials by their properties, including electrical conductivity.</p>	<p>Year 6:</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><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> • What is the effect of adding more bulbs to a circuit on the bulbs' brightness? • Is there a link between the potential difference in a circuit and the volume of a buzzer? • How did the work of Andrew Cross (Somerset) and Humphry Davy (Bristol) contribute to our ability to harness and use electricity? • From coal mines to renewables, how has the way we get electricity in Somerset changed over time?
	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Battery, plug, socket, electricity, wire, sound, light, move</i></p> </div> </div>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol</i></p> </div> </div>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; circuit diagram, circuit symbol, potential difference, electrons, current, flow, continuous</i></p> </div> </div>			

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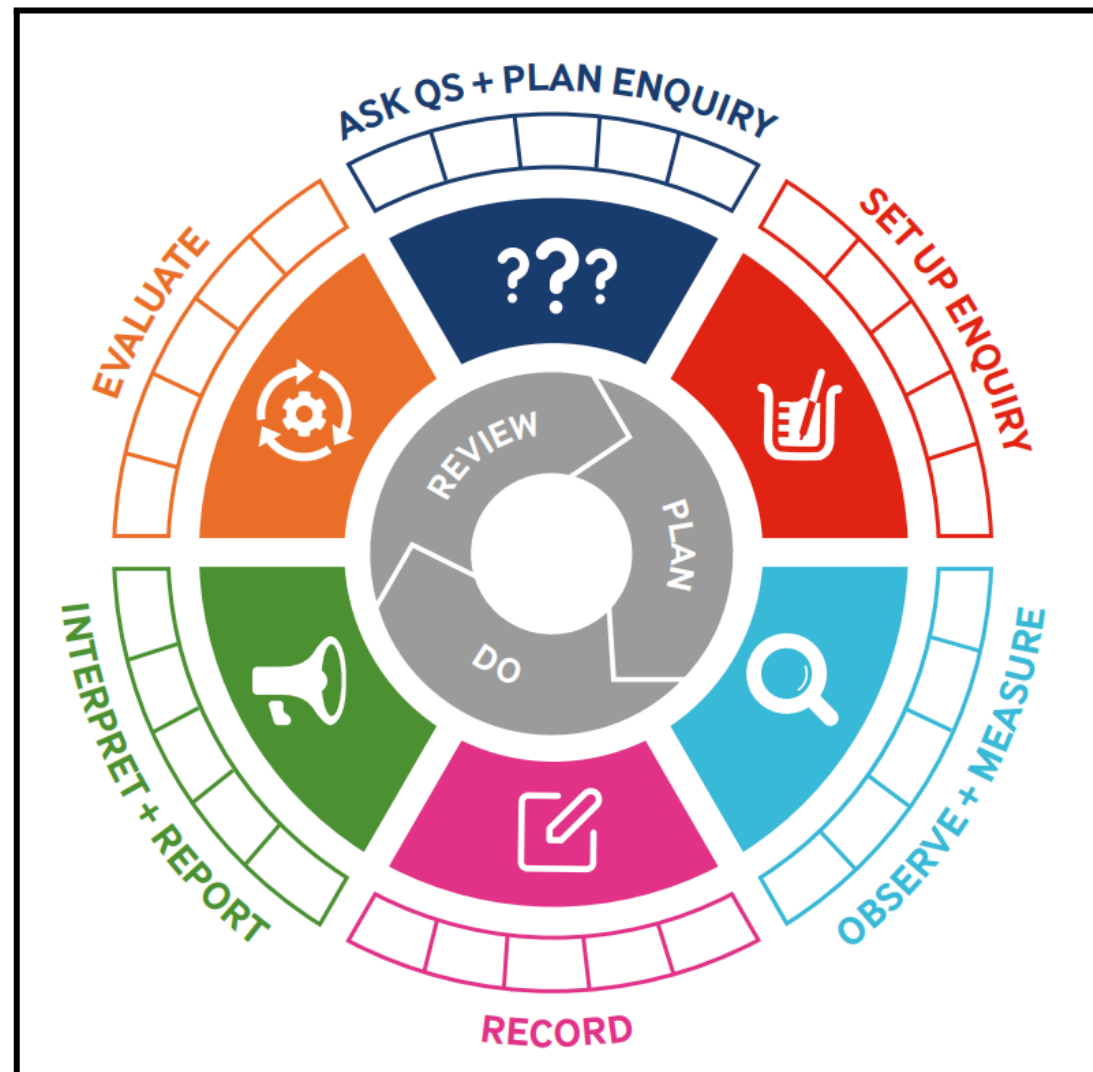
Earth in space, including the seasons	<p>Reception:</p> <ul style="list-style-type: none"> • Learn about the Earth, sun, moon, planets and stars • Learn about space travel • Play and explore outside in all seasons and in different weather • Observe living things throughout the year 	<p>Year 1:</p> <ul 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>This unit of learning will be taught concurrently with the other Year 1 topics. Children will observe their local area at different times throughout the year, recording differences to the plant and animal biodiversity, appearance of plants and weather patterns.</p>	<p>Year 2:</p> <p>Through their study of plants, children will continue to build on their knowledge of how their local natural environment varies through the year. In learning about the suitability of materials for different purposes, they will understand how the effects of temperature and weather conditions that are usually at particular times of the year can be mitigated by having suitable equipment or clothing.</p>	<p>Year 3 & 4:</p> <p>Through their studies of plants and living things, children will understand that the Earth and its seasonality provide living organisms with the nutrients and conditions essential for their survival. In studying states of matter and by learning about rivers in Geography, children will gain knowledge of the cyclical physical processes of the Earth, such as the water cycle. During their study of rocks and soils, children will learn about the processes that have taken place over millions of years to lead to the appearances of our coastlines and other natural features.</p>	<p>Year 5:</p> <ul style="list-style-type: none"> • 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 <p><u>Examples of inquiries might include...</u></p> <ul style="list-style-type: none"> • How has our understanding of the solar system changed over time? • How did the work of William Herschel (Bath) contribute to our understanding of the solar system? • How does a planet's distance from the Sun affect its temperature? • How does the length of a shadow change throughout the day? 	<p>Year 6:</p> <p>When studying light, children will connect their previous learning of the movement of the Earth relative to the sun to the change in shadow length throughout a day. Through their learning about evolution and their study of volcanoes in Geography, children will further their understanding of the Earth's layers and the formation of its rocks.</p>
	<div style="display: flex; align-items: center;">  <p>Children will be exposed to, learn and use these words:</p> <p><i>Spring, summer, autumn, winter, seasons, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, windy, rainbow, animals, young, plants, flowers. Sun, Moon, Earth, star, planet, sky, day, night, space, round, bounce, float</i></p> </div>	<div style="display: flex; align-items: center;">  <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; light, natural light source, sunlight, reflector</i></p> </div>	<div style="display: flex; align-items: center;">  <p>Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star; orbit, gravity, sphere, spherical, axis, equator, sunrise, sunset, East, West</i></p> </div>			

Progression across our school - skills in working scientifically

As well as substantive scientific knowledge, children will experience a curriculum rich in opportunities to hone their skills as scientists. The 'working scientifically' skills, laid out in the National Curriculum, reflect the cyclical nature of scientific research: asking questions, planning an investigation, making observations, recording results, drawing conclusions and evaluating the efficacy of the investigation at advancing knowledge, including asking further questions and planning further relevant enquiries.

As they progress through the school, children will develop these skills by explicit instruction, teacher modelling and undertaking enquiries themselves. By the end of Year 6, children should be able to work through the Plan → Do → Review cycle by focussing on the same inquiry over a period of time, but it is not essential that every skill in working scientifically is developed in every unit of learning as we recognise that some topics lend themselves to different skills more seamlessly. For example, children might analyse a set of data provided for them when studying the impact of exercise on heart rate; their focus could be to interpret this information, draw conclusions, decide on appropriate reporting and plan a further investigation.

It is expected that the skills in working scientifically are woven through each unit of learning but that substantive knowledge is not gained solely through practical approaches to answering questions. Research using secondary sources, which include lessons, teacher models and diagrams, is therefore given weight as a type of enquiry as it is essential in gaining the scientific knowledge required for every child to have a deep understanding of each of the 'big ideas' at the end of KS2.








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Working scientifically: types of enquiry

Our science lessons aim to be practical and interactive, teaching knowledge through using and applying the skills of scientific inquiry, enabling children to ask and answer scientific questions with confidence and accuracy. We recognise that whilst working on each of the five **enquiry types**, children must learn and develop a range of scientific enquiry skills which progress as children move through the school. Specialist vocabulary for topics is taught and built up, and effective questioning to communicate ideas is encouraged.

In each unit of learning, the majority of science lessons will enable children to undertake scientific enquiry in some form. This may form the whole of, or an element of, the lesson. Across each year, children will learn about and undertake a variety of types of inquiry.




Types of Scientific Enquiry

<u>Observation Over Time</u>	<u>Research</u>	<u>Pattern Seeking</u>	<u>Comparative/Fair Testing</u>	<u>Identifying, Grouping and Classifying</u>
				
Observing changes that occur over a period of time, which can range from minutes to months	Using secondary sources of information - such as slides, images, videos books and web pages - to answer scientific questions	Identifying patterns and looking for relationships in inquiries where variables are difficult to control	Changing one variable to see its effect on another, whilst keeping all other variables the same	Making observations to name, sort and organise items
<p><u>Examples:</u></p> <ul style="list-style-type: none"> • How does our local area change from Autumn to Winter? (Y1 Seasons) • How will a tree in our local area change over time? (Y2 Plants) • How does the length of a shadow change throughout the day (Y5 Space) 	<p><u>Examples:</u></p> <ul style="list-style-type: none"> • How has the Writhlington SSSI contributed to our understanding of the fact that living things have changed over time? (Y4 Living things) • How has our understanding of blood changed over time? (Y6 Animals including humans) 	<p><u>Examples:</u></p> <ul style="list-style-type: none"> • What is the effect of seed shape and size on the way it is dispersed? (Y3 Plants) • Is there a relationship between the mass of the animal and the length of gestation? (Y5 Animals including humans) 	<p><u>Examples:</u></p> <ul style="list-style-type: none"> • Which rock is the most permeable? (Y3 Rocks) • Which material should an insulated cup be made from? (Y5 Materials) • Which window lets in the most light? (Y6 Light) 	<p><u>Examples:</u></p> <ul style="list-style-type: none"> • Which different animals live in and around PSJ? (Y1 Plants) • How can we classify items as living, dead or never alive? (Y2 Living things) • How can we classify organisms into one of the five kingdoms of life? (Y6 Living things)

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		<u>EYFS</u>	<u>KS1</u>	<u>Lower KS2</u>	<u>Upper KS2</u>
<p><u>Working Scientifically</u></p> <p>A key component of the National Curriculum is the development of children's awareness of and fluency with the nature, processes and methods of science – in other words, 'being scientists'. Skills in working scientifically are taught explicitly through different types of science enquiries that help children to answer scientific questions about the world around them.</p> <p>Bold writing is from the National Curriculum; bullet-pointed information is from the PLAN progression of skills in working scientifically and supplemented with information based on the expectations we have for our children's learning at PSJ.</p>	<p>Ask questions and predict</p>	<p>Listen attentively and respond to what they hear with relevant questions (ELG: Listening, Attention & Understanding)</p> <ul style="list-style-type: none"> • Explore the natural world around them (R: Understanding the World) • Notice and ask questions about differences (Birth – 3: Personal, Social & Emotional Dev.). • Understand simple questions about 'who', 'what' and 'where' (Communication & Language: 2 years/ understanding 'why' questions (3–4 years) • Ask questions to find out more (Reception) 	<p>Asking simple questions and recognising that they can be answered in different ways</p> <ul style="list-style-type: none"> • While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions. • The children answer questions developed with the teacher, often through a scenario. • The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered. 	<p>Asking relevant questions and using different types of scientific enquiries to answer them</p> <ul style="list-style-type: none"> • The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions. • The children answer questions posed by the teacher. • They begin to draw upon the knowledge they already have when supposing what may happen. • Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question. 	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <ul style="list-style-type: none"> • Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an inquiry. • Where a new inquiry is to be planned from a question arising following a previous inquiry, children should draw upon their prior knowledge to make a reasonable prediction. • Given a wide range of resources, the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.
	<p>Observe and measure</p>	<p>Explore the natural world around them, making observations and drawing pictures of animals and plants (ELG: The Natural World)</p> <p>Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity (ELG: Numerical Patterns)</p> <ul style="list-style-type: none"> • Sort materials (Creating & Thinking Critically) Explore different materials and tools (Physical Dev.: Birth–3) • Use all their senses in hands-on exploration of natural materials (Understanding the World: 3–4 years). • Make comparisons between objects relating to size, length, weight and capacity (Mathematics: 3–4 years) • Compare length, weight and capacity (Reception) 	<p>Observing closely, using simple equipment</p> <ul style="list-style-type: none"> • Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. • They begin to take measurements, initially by comparisons, then using non-standard units. 	<p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p> <ul style="list-style-type: none"> • The children make systematic and careful observations. • They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. 	<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <ul style="list-style-type: none"> • The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. • During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).
	<p>Record data</p>	<p>Explore the natural world around them, making observations and drawing pictures of animals and plants (ELG: The Natural World)</p> <p>Use a range of tools, including scissors, paint brushes and cutlery (ELG: Fine Motor Skills)</p> <ul style="list-style-type: none"> • Use drawing to represent ideas (Expressive Arts & Design: 3–4 years) • Return to and build on their previous learning, refining ideas and developing their ability to represent them (Reception). 	<p>Gathering and recording data to help in answering questions</p> <ul style="list-style-type: none"> • The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing. • They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs. • They classify using simple prepared tables and sorting rings. 	<p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <ul style="list-style-type: none"> • The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams. • Children are supported to present the same data in different ways in order to help with answering the question. 	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <ul style="list-style-type: none"> • The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. • Children present the same data in different ways in order to help with answering the question.

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<p align="center">Interpret, conclude and report</p>	<p>Offer explanations for why things might happen, making use of recently introduced vocabulary when appropriate (ELG: Speaking)</p>	<p align="center">Using their observations and ideas to suggest answers to questions</p> <ul style="list-style-type: none"> Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. The children recognise 'biggest and smallest', 'best and worst' etc. from their data. 	<p align="center">Identifying differences, similarities or changes related to simple scientific ideas and processes</p> <ul style="list-style-type: none"> Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships. <p align="center">Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <ul style="list-style-type: none"> They draw conclusions based on their evidence and current subject knowledge. <p align="center">Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <ul style="list-style-type: none"> They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary. 	<p align="center">Identifying scientific evidence that has been used to support or refute ideas or arguments</p> <ul style="list-style-type: none"> Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer. They talk about how their scientific ideas change due to new evidence that they have gathered. They talk about how new discoveries change scientific understanding. <p align="center">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</p> <ul style="list-style-type: none"> In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge. 	
	<p align="center">Evaluate</p>			<p align="center">Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <ul style="list-style-type: none"> Children identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry. Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface. Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry. 	<p align="center">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</p> <ul style="list-style-type: none"> Children evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. They identify any limitations that reduce the trust they have in their data. <p align="center">Using test results to make predictions to set up further comparative and fair tests</p> <ul style="list-style-type: none"> Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.
			<p align="center"> Children will be exposed to, learn and use these words:</p> <p><i>Observe, changes, patterns, grouping, sorting, compare, same, different, identify (name), measure, data, record results, drawing, picture, table, tally chart, present, pictogram, block chart, Venn diagram, ask questions, test, investigate, explore, equipment, resources, magnifying glass, hand lens, ruler, tape measure, metre stick, pipette, syringe, spoon, teaspoon, answer questions, interpret results, scientific enquiry, pattern seeking, comparative testing, observing over time, classifying, researching</i></p>	<p align="center"> Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1; practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve</i></p>	<p align="center"> Children will be exposed to, learn and use these words:</p> <p><i>Vocabulary from KS1 and LKS2; variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force metre, theory, support, refute</i></p>

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Disadvantaged and SEND Pupils

We recognise that all pupils are entitled to a quality of provision that will enable them to achieve their potential. We believe in positive intervention, removing barriers to learning, raising expectations and levels of achievement, in order to close the gap. High quality teaching that is differentiated and personalised will meet the individual needs of the majority of our children. We establish and maintain a culture of high expectations that expects children with SEND and those who are disadvantaged to be included in all the opportunities available to other children so they can achieve well.

We ensure that children with any additional needs are supported through regular assessment and feedback, differentiated planning, scaffolding, target setting, pre-teaching, overlearning, recall activities, targeted interventions, 1:1 support and regular reviews of progress. Some children access the curriculum through a personalised timetable, such as Science being taught through outdoor learning, or PSHE being taught through Sunshine Circles.

Greater Depth within Science

It is important in Science that we create opportunities for all children to demonstrate high ability. In turn we can then identify those who can, or have the potential to, work at a deeper level within the subject. This will enable us to challenge and extend their learning further through purposeful planning, ensuring that the skills of these gifted and talented children are nurtured and developed.

A greater depth learner in Science will use subject vocabulary effectively in construction of abstract ideas. They will be able to think flexibly, generalise ideas, reason logically and adapt problem-solving approaches. They will be confident evaluating findings and be able to think critically, aware of how the context can influence the interpretation of science content. When analysing data, they will be able to recognise patterns and hypothesise based on valid evidence and draw on conclusions. They will recognise and process reliable valid and accurate data and be able to explain this.

Assessment for and of learning

We recognise that the purpose of assessment is to identify where there is under or over provision for learners so that any problem can be addressed promptly. Therefore teachers have a clear understanding of the expectations for their year group and the relevant milestone; know what good learning looks like on a daily basis and over time; and know that it is their understanding of **how** a pupil completes a task or activity enables the pupil to clearly demonstrate **what** they have learned and their **depth** of learning. Teachers complete ongoing informal assessments on children's learning that help them to identify gaps in learning which can be addressed promptly. These may be in the form of careful questioning, recall quizzes, mind maps or other assessment for learning tasks, or through assessment of the child's exercise book. Short term planning refers back to milestones at the end of every lesson.

End of year in the skills of Science

Children are assessed for the knowledge that they have learnt and the skills they have developed and honed.