



Henbury View First School

Science Progression of Knowledge



Intent

'The important thing is to never stop questioning' Albert Einstein

At Henbury View, we define Science as the 'way to understand our world by carefully thinking about it and testing our guesses with observations and experiments.' At Henbury View First School, our children are scientists! Our intent is to give every child a broad and balanced Science curriculum which enables them to confidently explore and discover what is around them, so that they have a deeper understanding of the world we live in. We want our children to love science. We want them to have no limits to what their ambitions are and grow up wanting to be astronauts, forensic scientists, toxicologists or microbiologists. We want our children to remember their science lessons in our school, to cherish these memories and embrace the scientific opportunities they are presented with! To achieve this, it involves exciting, practical hands-on experiences that encourage curiosity and questioning. Our aim is that these stimulating and challenging experiences help every child secure and extend their scientific knowledge and vocabulary, as well as promoting a love and thirst for learning. At Henbury, we have a coherently planned and sequenced curriculum which has been carefully designed and developed with the need of every child at the centre of what we do. We want to equip our children with not only the minimum statutory requirements of the science National Curriculum but to prepare them for the opportunities, responsibilities and experiences of later life.

Implementation

Our Henbury Science curriculum allows children to know and remember more, ensuring that the children not only know 'the science'; they also know the evidence for it and can use this knowledge to work scientifically. Our curriculum is clearly organised and is progressive, both within substantive and disciplinary knowledge. We focus on 5 key enquiry skills, which allows the children to learn how scientific knowledge becomes established and gets revised. Knowledge is carefully sequenced to reveal the interplay between substantive and disciplinary knowledge. Disciplinary knowledge is taught explicitly throughout all year groups and comprises knowledge of concepts as well as procedures. When pupils develop their disciplinary knowledge, they learn about the diverse ways that science generates and grows knowledge through scientific enquiry. The curriculum outlines how disciplinary knowledge advances over time and teaches pupils about the similarities and differences between each science. We have developed our 'Big Ideas' of science, to ensure children develop a well-rounded understanding of what science looks like in the world around them, right from the start of EYFS. Each unit of work culminates in the children discovering the work of famous scientists from history, uncovering the impact their work has on modern life. We see science as a cross-curricular subject and therefore progression takes account of what is taught in other subjects.

Key Skills

At Henbury View, we have key scientific skills that run through and across year groups. These will continually be revisited and explored across the academic journey of a child at Henbury. Each skill is underpinned by key vocabulary and knowledge that will be explicitly taught in Science. The key threads are:

Asking questions	Making predictions	Setting up investigations	Observing and measuring	Recording data	Interpreting and communicating results	Evaluating
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Curriculum Organisation

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Foundation	<i>Knowledge and skills taught and recapped throughout the year</i>					
Year 1	<u>Animals, including humans</u> <ul style="list-style-type: none"> identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 		<u>Seasonal Changes</u> <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 	<u>Everyday Materials</u> <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 	<u>Animals, including humans</u> <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) 	<u>Plants</u> <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
	<u>Longitudinal Learning:</u> <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 					
Year 2	<u>Uses of Everyday Materials</u> <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 	<u>Animals, including humans</u> <ul style="list-style-type: none"> describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	<u>Living things and their habitats</u> <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 		<u>Animals, including humans</u> <ul style="list-style-type: none"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) 	<u>Plants</u> <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
	<u>Longitudinal Learning:</u> <ul style="list-style-type: none"> observe and describe how seeds and bulbs grow into mature plants 					
Year 3	<u>Animals, including humans</u> <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 	<u>Forces and magnets</u> <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 	<u>Plants</u> <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 		<u>Light</u> <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 	<u>Rocks</u> <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




	support, protection and movement	<ul style="list-style-type: none"> 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 		<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> recognise that soils are made from rocks and organic matter
Year 4	<u>Electricity</u> <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 	<u>States of Matter</u> <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 	<u>Sound</u> <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 	<u>Living things and their habitats</u> <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 	<u>Animals, including humans</u> <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








EYFS











The Early Years Foundation Stage Curriculum supports children's understanding of science through the planning and teaching of 'Understanding the World'. Children find out about objects, materials and living things using all their senses looking at similarities, differences, patterns and change. Both the environment and skilled practitioners foster curiosity and encourage explorative play, children are motivated to ask questions about why things happen and how things work. Our children are encouraged to use their natural environment around them to explore. Children enjoy spending time outdoors exploring mini-beasts and their habitats, observing the changing seasons, plants and animals. Children regularly participate in cookery and baking sessions which allows them to experience changes in state as ingredients are mixed, heated and cooled. In the early years, pupils are introduced to a wide-ranging vocabulary that categorises and describes the natural world. These words are not too technical but provide the 'seeds' for developing scientific concepts that will be built on in later years.

Working Scientifically

The table below highlights the progression in scientific disciplinary knowledge within working scientifically. We have identified 10 working scientifically skills that we think are essential for children's continued development as scientists. We have also ensured that these are all covered multiple times each year within different contexts:

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives	Taken from EYFS (Statutory Framework 2021 & Development Matters 2020)- <i>all text in italics indicates ELG</i>	<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 			<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 identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings
 Ask and Answer Questions	<ul style="list-style-type: none"> Explore the natural world around them (Understanding the World: reception) Notice and ask questions about differences (Personal, Social & Emotional Dev: birth-3) Understand simple questions about 'who', 'what' and 'where' (Communication & Language: 2 years)/understand 'why' questions (3-4 years)/ask questions to find out more (reception) Know more, so feel confident about coming up with their own ideas (Creating & Thinking Critically) <p><i>Listen attentively and respond to what they hear with relevant questions (ELG: Listening, Attention & Understanding)</i></p>	<ul style="list-style-type: none"> Raise questions about the world around them and begin to recognise that they can be answered in different ways 	<ul style="list-style-type: none"> Ask people questions that include scientific language and recognise that they can be answered in different ways Begin to use secondary sources to answer questions 	<ul style="list-style-type: none"> Ask questions related to their scientific experiences and use different types of enquiry to answer them 	<ul style="list-style-type: none"> Ask relevant scientific questions and use different types of scientific enquiry to answer them Recognise how and when secondary sources might help answer questions that cannot be answered through practical investigation
 Plan and set up enquires	<ul style="list-style-type: none"> Make choices and explore different resources and materials (Playing & Exploring) <p><i>Be confident to try new activities and show independence, resilience and perseverance in the face of challenge (ELG: Managing Self)</i></p>	<ul style="list-style-type: none"> Perform simple tests 	<ul style="list-style-type: none"> Perform simple tests 	<ul style="list-style-type: none"> Set up simple practical enquiries, comparative and fair tests 	<ul style="list-style-type: none"> Set up simple practical enquiries, comparative and fair tests
 Observe	<ul style="list-style-type: none"> Use a wider range of vocabulary (Communication & Language: 3-4 years) / learn new vocabulary & use new vocabulary through the day and in different contexts (reception) Talk about what they see, using a wide vocabulary (Understanding The World: 3-4 years) <p><i>Offer their own ideas, using recently introduced vocabulary (ELG: Speaking)</i></p>	<ul style="list-style-type: none"> Use simple equipment to observe closely 	<ul style="list-style-type: none"> Use simple equipment to observe closely including changes over time 	<ul style="list-style-type: none"> Make systematic and careful observations 	<ul style="list-style-type: none"> Make systematic and careful observations

 <p>Measure</p>	<ul style="list-style-type: none"> • Make comparisons between objects relating to size, length, weight and capacity (Mathematics: 3-4 years)/compare length, weight and capacity (reception) • Choose the right resources to carry out their own plan (Physical Dev 3-4 years) / develop their small motor skills so that they can use a range of tools competently, safely and confidently (reception) • <i>Use a range of small tools, including scissors, paint brushes and cutlery (ELG: Fine Motor Skills)</i> 			<ul style="list-style-type: none"> • Where appropriate, take accurate measurement using standard units, using a range of equipment, including thermometers and data loggers 	<ul style="list-style-type: none"> • Where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
 <p>Gather and Record Results</p>	<ul style="list-style-type: none"> • Sort materials (Creating & Thinking Critically) • Explore collections of materials with similar and/or different properties (Understanding the World: 3-4 years) • <i>Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class (ELG: The Natural World)</i> • Use all their senses in hands-on exploration of natural materials (Understanding the World: 3-4 years) • Explore different materials and tools (Physical Dev: birth-3) <i>Explore the natural world around them, making observations and drawing pictures of animals and plants (ELG: The Natural World)</i> 	<ul style="list-style-type: none"> • Gather and record data to help in answering questions • Identify and classify 	<ul style="list-style-type: none"> • Gather and record data to help in answering questions including from secondary sources of information • Identify, group and classify data 	<ul style="list-style-type: none"> • Gather, record, classify and present data in a variety of ways to help in answering questions • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables 	<ul style="list-style-type: none"> • Gather, record, classify and present data in a variety of ways to help in answering questions • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables
 <p>Interpret results</p>	<ul style="list-style-type: none"> • Realise that their actions have an effect on the world (Playing & Exploring) • Notice patterns and arrange things in patterns (Mathematics: birth-3)/talk about and identifies the patterns around them (3-4 years) / continue, copy and create repeating patterns (reception) <i>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter (ELG: The Natural World)</i> 	<ul style="list-style-type: none"> • Use his/her observations and ideas to suggest answers to questions 	<ul style="list-style-type: none"> • Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns • Compare simple comparative tests 	<ul style="list-style-type: none"> • Use straightforward scientific evidence to answer questions or to support his/her findings • Identify differences, similarities or changes related to simple scientific ideas and processes 	<ul style="list-style-type: none"> • Use straightforward scientific evidence to answer questions or to support his/her findings • Identify differences, similarities or changes related to simple scientific ideas and processes
 <p>Present Results</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) 		<ul style="list-style-type: none"> • Communicate ideas what he/she does and what he/she finds out in a variety of ways 	<ul style="list-style-type: none"> • Report on findings from, including oral and written explanations, displays or presentations of results and conclusions 	<ul style="list-style-type: none"> • Report on findings from, including oral and written explanations, displays or presentations of results and conclusions
 <p>Make Predictions</p>	<ul style="list-style-type: none"> • Respond to new experiences that you bring to their attention (Playing & Exploring) Solve real problems (Creating and Thinking Critically) 	<ul style="list-style-type: none"> • Children consider in advance, what might happen or what they might find 	<ul style="list-style-type: none"> • Children consider in advance, what might happen or what they might find and know this as a prediction 	<ul style="list-style-type: none"> • Use results to make predictions and suggest new values 	<ul style="list-style-type: none"> • Use results to make predictions and suggest new values
 <p>Draw Conclusions</p>	<p><i>Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate; (ELG: Speaking)</i></p>	<ul style="list-style-type: none"> • Tell others what you did and what you found out 	<ul style="list-style-type: none"> • Explain what happened, what you found out and why this is the case 	<ul style="list-style-type: none"> • Use evidence to explain what happened and why it happened (simple conclusions) 	<ul style="list-style-type: none"> • Use evidence to draw conclusions, explaining what you have found out why you believe it to be true
 <p>Evaluate</p>	<p><i>Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate; (ELG: Speaking)</i></p>	<ul style="list-style-type: none"> • Recall what went wrong and why • Recall the work of scientists and discuss the impact of their work 	<ul style="list-style-type: none"> • Recall what went wrong, why and how you could avoid this • Recall the work of scientists and discuss the impact of their work 	<ul style="list-style-type: none"> • Reflect on the enquiry, suggest improvements and raise further questions • Reflect on the work of scientists and evaluate the significance of their findings on modern life 	<ul style="list-style-type: none"> • Reflect on the enquiry, suggest improvements and raise further questions • Reflect on the work of scientists and evaluate the significance of their findings on modern life

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Year 1		✓	✓	✓	✓	✓
	Year 2	✓			✓	✓	✓
	Year 3		✓	✓		✓	✓
	Year 4	✓	✓	✓			✓
	Year 1			✓	✓		
	Year 2	✓	✓	✓			✓
	Year 3			✓		✓	✓
	Year 4	✓				✓	
	Year 1		✓	✓	✓		✓
	Year 2			✓	✓	✓	✓
	Year 3			✓	✓		✓
	Year 4		✓				✓
	Year 1		----	----	----	----	----
	Year 2	----	✓	----	----	----	----
	Year 3	✓	✓			✓	
	Year 4	✓	✓	✓			✓
	Year 1		✓			✓	✓
	Year 2	✓		✓	✓		
	Year 3		✓	✓	✓		
	Year 4		✓	✓	✓		
	Year 1		✓			✓	✓
	Year 2	✓			✓	✓	
	Year 3	✓		✓	✓		
	Year 4			✓	✓	✓	
	Year 1		----	----	----	----	----
	Year 2		✓	✓		✓	✓
	Year 3	✓				✓	✓
	Year 4	✓			✓	✓	✓
	Year 1			✓	✓	✓	
	Year 2	✓	✓			✓	✓
	Year 3	✓	✓		✓	✓	
	Year 4	✓				✓	
	Year 1		✓	✓	✓		
	Year 2		✓	✓		✓	✓
	Year 3	✓	✓		✓		✓
	Year 4		✓	✓	✓	✓	✓
	Year 1		✓	✓	✓	✓	
	Year 2	✓	✓		✓		
	Year 3	✓	✓	✓	✓	✓	✓
	Year 4	✓	✓	✓	✓		✓

Scientific Enquiry

Within our science curriculum, we aim to develop the children's scientific enquiry. Each enquiry skill helps children to work scientifically and is clearly mapped below in our knowledge progressions through the use of enquiry questions. The 5 key enquiry skills that we look at are:



Comparative and Fair testing- Helps pupils explore relationship between variables. Comparative tests children compare one event with another (e.g. does the red car go faster than the green car?) A fair test identifies the causal relationship between two variables (e.g. does the height of the ramp affect how quickly the toy car rolls down the ramp and everything else remains the same)






Identifying, classifying and grouping- Pupils make sense of how the world is organised. Identification is the process of using differences to name something and classification is organising things into groups. Opportunities to identify arise when pupils recognise not all birds are the same for example and can identify and name them. They can then use observable and behavioural similarities to group them and add new things

Pattern seeking- Pupils observe, measure and record events and systems when carrying out pattern seeking enquires. They also collect and interpret data from secondary sources. They make observations and conduct surveys where the variables can't easily be controlled for practical or ethical reasons

Observing Over Time- Pupils identify and measure events and changes in living things, materials and physical process or events. These observations may take place over time spans of minutes or hours (e.g. puddles evaporating) up to several weeks or months (e.g. rearing young chicks)

Research using secondary sources- Where the answer is found using secondary sources. This is usually where it is impossible or unsafe for pupils to answer with first hand enquiries. This enquiry helps them evaluate sources, distinguish between fact and opinion and recognise conflicting evidence and bias

We have mapped out enquiry skills carefully to ensure children experience each of these multiple times each academic year within different contexts. Although each area of scientific enquiry might be covered in each unit, we have identified in the table below the enquiry areas that are most prominent within each unit:

		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Year 1			✓	✓		
	Year 2	✓	✓	✓			✓
	Year 3		✓	✓		✓	
	Year 4	✓		✓			
	Year 1		✓		✓	✓	
	Year 2	✓	✓	✓	✓		
	Year 3	✓	✓		✓	✓	✓
	Year 4		✓		✓	✓	✓
	Year 1			✓	✓		
	Year 2				✓	✓	
	Year 3	✓		✓		✓	✓
	Year 4	✓		✓	✓	✓	✓
	Year 1		✓	✓			✓
	Year 2			✓		✓	✓
	Year 3	✓		✓	✓		
	Year 4		✓			✓	✓
	Year 1		✓			✓	✓
	Year 2	✓	✓		✓		✓
	Year 3		✓		✓		✓
	Year 4		✓		✓		

Plants

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives	<p><u>The Natural World (ELG)</u></p> <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter 	<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 	<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 	<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 	
Vocabulary	Tree, leaf, flower, stem, seed, petal	Leaves, trunk, branch, root, seed, bulb, flower, stem, wild, garden, deciduous, evergreen	Leaves, trunk, branch, root, seed, bulb, flower, stem, wild, garden, deciduous, evergreen, observe, grow, compare, record, temperature, predict, measure, diagram, germinate, warmth, sunlight	Air, light, water, nutrients, soil, support, anchor, reproduction, pollination, dispersal, transportation, flower, energy, growth, seedling, carbon dioxide, oxygen, sugar, material, photosynthesis, chlorophyll	
Knowledge	<p>I know and can gather the equipment I need to plant a seed</p> <p>I know how to plant seeds so that they will grow well</p> <p>I know how to take care of growing plants</p> <p>I know the key features of the life cycle of a plant</p> <p>I know how to compare plants and group them based on their appearance</p> <p>I know how to describe the parts of a flowering plant</p>	<p>I know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn</p> <p>I know that a flowering plant consists of roots, stem, leaves and flowers, and that a tree's stem is called a trunk</p> <p>I know by name a variety of common wild and garden plants</p> <p>I know by name a variety of deciduous and evergreen trees</p>	<p>I know that seeds and bulbs need to be buried underground in soil and that they will grow into adult plants under the right conditions (water, warmth)</p> <p>I know that plants that are deprived of light, food or air will not grow and will die</p> <p>I know that plants produce offspring that grow into adults</p>	<p>I know that different parts of plants have one or more functions (jobs)</p> <p>I know that the roots collect water and minerals from the soil, and hold the plant firmly in the ground</p> <p>I know that the stem holds up the leaves so that they can gather light to make food and holds up the flowers so that they can receive pollen and disperse their fruits; know that the stem also transports water and minerals from the roots to the other parts of the plant</p> <p>I know that the leaves make food by absorbing light and using its energy to turn carbon dioxide and water into carbohydrates</p> <p>I know that the function of a flower is reproduction, and can explain the processes of pollination, seed formation and seed dispersal</p>	
Lines of Enquiry	<p><u>Communication and Language (ELG)</u></p> <ul style="list-style-type: none"> Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions Make comments about what they have heard and ask questions to clarify their understanding 	<p>Which type of compost grows the tallest sunflower? Which tree has the biggest leaves?</p> <p>How can we sort the leaves?</p> <p>How does a daffodil bulb change over the year? How does my sunflower change each week? How does the oak tree change over the year?</p> <p>Do trees with bigger leaves lose their leaves first in autumn? Is there a pattern</p>	<p>Do seeds grow quicker inside or outside? How can we identify the trees that we observed on our tree hunt?</p> <p>What happens to my bean after I have planted it?</p> <p>Do bigger seeds grow into bigger plants? How does a cactus survive in a desert with no water?</p>	<p>How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals? Which conditions help seeds germinate faster?</p> <p>How many ways can you group our seed collection?</p> <p>What happens to celery when it is left in a glass of coloured water? How do flowers in a vase change over time?</p> <p>What colour flowers do pollinating insects prefer?</p> <p>What are all the different ways that seeds disperse?</p>	

	<ul style="list-style-type: none"> Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary Offer explanations for why things might happen, making use of recently introduced vocabulary Express their ideas and feelings about their experiences 	<p>in where we find moss growing in the school grounds?</p> <p>What are the most common British plants and where can we find them?</p>			
Big Ideas	B1, B2	B2	B1	B3	
Key Scientists	Beatrix Potter (Author/Botanist)		Agnes Arber (Botanist), Alan Titchmarsh (Botanist/Gardener)	Jan Ingenhousz (Photosynthesis), Joseph Banks (Botanist)	

Rocks

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives				<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 	
Vocabulary				Rocks, igneous, metamorphic, sedimentary, anthropic, permeable, impermeable, chemical fossil, body fossil, trace fossil, Mary Anning, cast fossil, mould fossil, replacement fossil, extinct, organic matter, topsoil, sub soil, base rock	
Knowledge				<p>I know that the Earth has a solid crust made up of tectonic plates with molten rock beneath</p> <p>I know that there are three kinds of rocks: igneous, sedimentary and metamorphic</p> <p>I know some examples of the different types of rock and can explain how they are made</p> <p>I know how to compare and group together rocks based on their appearance and properties</p> <p>I know how fossils are formed and that fossils help us to learn things about things that lived a long time ago</p> <p>I know that soil is made from tiny particles of rock broken down by the action of weather (weathering)</p>	
Lines of Enquiry				<p>How does adding different amounts of sand to soil affect how quickly water drains through it? Which soil absorbs the most water?</p> <p>Can you use the identification key to find out the name of each of the rocks in your collection?</p> <p>How does tumbling change a rock over time? What happens when water keeps dripping on a sandcastle?</p> <p>Is there a pattern in where we find volcanos on planet Earth?</p> <p>Who was Mary Anning and what did she discover?</p>	
Big Ideas				C1, C2	
Key Scientists				Mary Anning (Discovery of Fossils), Inge Lehmann (Earth's Mantle)	

Animals, including humans

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives	<p><u>The Natural World (ELG)</u></p> <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter <p><u>Managing Self (ELG)</u></p> <ul style="list-style-type: none"> Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices 	<ul style="list-style-type: none"> identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 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) 	<ul style="list-style-type: none"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	<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 	<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
Vocabulary	Head, eyes, nose, mouth, ears, hands, fingers, feet, toes, arm, leg, animal, see, hear, touch, taste, smell	Amphibians, birds, fish, mammals, reptiles, carnivores, herbivore, omnivore, sight, hearing, touch, taste, smell, head, neck, ear, mouth, shoulder, hand, fingers, leg, foot, thumb, eye, nose, knee, toes, teeth	Living, dead, never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, seashore, woodland, ocean, rainforest, conditions, desert, damp, shade	Nutrients, nutrition, carbohydrates, protein, fats, vitamins, minerals, water, fibre, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic skeleton, vertebrates, invertebrates, muscles, contract, relax	Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, liver, tooth, canine, incisor, molar, premolar, producer, consumer
Knowledge	<p>I know the name of different animals and can describe them based on their appearance and characteristics</p> <p>I know how to compare and group animals in different ways</p> <p>I know about different environments and what animals might live there</p> <p>I know that there are similarities and differences between others and myself</p> <p>I know how to name some parts of the body that can be seen</p> <p>I know that I grow from a baby to a child and then to an adult</p> <p>I know the 5 senses and can describe things based on these criteria</p>	<p>I know that feet, legs, arms, hands, torso, head, skin, ears, eyes, nose, mouth and tongue are parts of the body and identify them</p> <p>I know that eyes are associated with sight, ears with sound, nose with smell, tongue with taste and skin with touch</p> <p>I know how to identify and can name examples of fish, amphibians, reptiles, birds and mammals</p> <p>I know that herbivorous animals eat plants; carnivorous animals eat other animals; omnivorous animals eat both animals and plants</p> <p>I know how to identify and can name examples of carnivores, herbivores and omnivores</p>	<p>I know that animals, including humans, need food, water and air to survive</p> <p>I know the basic food groups: fruit and vegetables, carbohydrates, protein, dairy, fat and sugary foods</p> <p>I know that proteins are good for growth, carbohydrates for energy and fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth)</p> <p>I know that more than half of our diet should be made up of carbohydrates, fruit and vegetables and that fats and sugary foods should be eaten rarely and in small amounts</p>	<p>I know that getting the right amount of each food group is called a balanced diet</p> <p>I know why it is important for my body to receive each type of food group</p> <p>I know that lack of a nutrient can cause ill health</p> <p>I know that animals, including humans, have a skeleton made up of solid objects</p> <p>I know that some animals (such as insects) have an exoskeleton – a solid covering on the outside of their body</p> <p>I know that many invertebrates (such as earthworms and slugs) have water</p>	<p>I know that food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion</p> <p>I know that the process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body</p> <p>I know, can order and can describe the stages of the digestive system</p> <p>I know that a human has three types of teeth- incisors, canines and molars- and that these each perform different functions</p> <p>I know that a food chain traces the path of energy through a habitat</p>

	<p>I know some food that will keep my body healthy and some that won't keep my body healthy</p> <p>I know features of a healthy lifestyle (e.g. exercise) and can describe why this is important</p> <p>I know basic hygiene (e.g. washing hands) and can describe why this is important</p>	<p>I know that fish, amphibians, reptiles, birds and mammals are similar in that they are vertebrates, which means they are animals that have a backbone</p> <p>I know that fish are different to other animals in having gills so that they can breathe underwater and scaly skin</p> <p>I know that amphibians are different to other animals in that they begin their lives with gills but then develop lungs and breathe on land</p> <p>I know that reptiles are different to other animals in that they breathe air and have scaly skin</p> <p>I know that birds are different to other animals in that they have feathers and wings</p> <p>I know that mammals are different to other animals in that they have fur/hair and they feed milk to their young</p>	<p>I know that people need to exercise often to help their body stay strong and fit</p> <p>I know that keeping clean is an important part of staying healthy</p>	<p>held inside by muscles which acts like a skeleton</p> <p>I know that skeletons provide support for muscles and protect the body; for example, the rib cage protects the vital organs in the human body</p> <p>I know that muscles can only contract, so they must be arranged in pairs in the body so that as one contracts the other loosens</p>	<p>I know that the arrows in a food chain show the direction that energy is travelling through a habitat</p> <p>I know that all energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers</p> <p>I know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator</p>
Lines of Enquiry	<p><u>Communication and Language (ELG)</u></p> <ul style="list-style-type: none"> Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions Make comments about what they have heard and ask questions to clarify their understanding Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary Offer explanations for why things might happen, making use of recently introduced vocabulary Express their ideas and feelings about their experiences 	<p>Is our sense of smell better when we cannot see? How can we organise all the zoo animals? What are the names for all the parts of our bodies? How does my height change over the year? Do you get better at smelling as you get older? Do all animals have the same senses as humans?</p>	<p>Do amphibians have more in common with reptiles or fish? Do bananas make us run faster? Which offspring belongs to which animal? How would you group things to show which are living, dead, or have never been alive? How does a tadpole change over time? How much food and drink do I have over a week? Which age group of children wash their hands the most in a day? What food do you need in a healthy diet and why? What do you need to do to look after a pet dog/cat/lizard and keep it healthy?</p>	<p>How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh? How does the skull circumference of a girl compare with that of a boy? How do the skeletons of different animals compare? How does our skeleton change over time? (from birth to death) Do male humans have larger skulls than female humans? Why do different types of vitamins keep us healthy and which foods can we find them in?</p>	<p>In our class, are omnivores taller than vegetarians? What are the names for all the organs involved in the digestive system? How can we organise teeth into groups? How does an eggshell change when it is left in cola? Are foods that are high in energy always high in sugar? How do dentists fix broken teeth?</p>
Big Ideas	B1, B2	B1, B2	B1	B3	B3
Key Scientists	Chris Packham (Animal Conservationist)		Steve Irwin (Crocodile Hunter), Robert Winston (Human Scientist), Joe Wicks (Personal Trainer)	Adelle Davis (20th Century Nutritionist), Marie Curie (Radiation/X-Rays)	Ivan Pavlov (Digestive System Mechanisms), Joseph Lister (Discovered Antiseptics)

Forces and Magnets

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives				<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 	
Vocabulary				Force, push, pull, friction, surface, magnet, magnetic, magnetic field, pole, north, south, attract, repel, compass	
Knowledge				<p>I know that a force can be thought of as a push or a pull</p> <p>I know that there are different types of contact force: impact forces (when two surfaces collide), frictional forces (when two surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed)</p> <p>I know that as objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller</p> <p>I know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force</p> <p>I know that magnets have two poles called north and south</p> <p>I know that like poles (south-south and north-north) of two magnets repel each other and that opposite poles of two magnets (north-south) attract each other</p> <p>I know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic</p>	
Lines of Enquiry				<p>How does the mass of an object affect how much force is needed to make it move? Which magnet is strongest? Which surface is best to stop you slipping?</p> <p>Which materials are magnetic?</p> <p>If we magnetise a pin, how long does it stay magnetised for?</p> <p>Do magnetic materials always conduct electricity? Does the size and shape of a magnet affect how strong it is?</p> <p>How have our ideas about forces changed over time? How does a compass work?</p>	
Big Ideas				P2	
Key Scientists				William Gilbert (Theories on Magnetism), Andre Marie Ampere (Founder of Electro-Magnetism)	

Materials and their properties

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives	<p><u>The Natural World (ELG)</u></p> <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter 	<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 	<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 		
Vocabulary	Material, wood, glass, paper, hard, soft, smooth, rough, heavy, light	Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent, opaque	Waterproof, fabric, rubber, cars, rock, paper, cardboard, wood, metal, plastic, glass, brick, twisting, squashing, bending		
Knowledge	<p>I know the name of some materials</p> <p>I know how to describe materials based on their appearance</p> <p>I know materials that are hard and materials that are soft</p> <p>I know materials that are smooth and materials that are rough</p> <p>I know materials that are heavy and materials that are light</p> <p>I know how to compare materials and can talk about changes I notice</p> <p>I know how to compare the suitability of materials for a particular purpose</p>	<p>I know that an object is made from/of a material and know some examples of materials in the real world</p> <p>I know from observation how to distinguish between materials made of wood, plastic, glass, metal, water, rock</p> <p>I know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material</p> <p>I know how to compare and group together a variety of everyday materials on the basis of their simple physical properties</p> <p>I know that matter (stuff) is made from tiny building blocks</p>	<p>I know that materials can have useful properties for a given job (including being waterproof, strong, hard, soft, flexible, rigid, light or heavy)</p> <p>I know that many types of plastic are waterproof, that steel (a type of metal) is strong, that rock is hard, that cotton wool is soft, that rubber is flexible, that rock is rigid, that polystyrene (a type of plastic) is light and that iron (a type of metal) is heavy</p> <p>I know that when objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller</p> <p>I know that applying forces to objects can change their shape, by squeezing, stretching, bending and twisting</p>		
Lines of Enquiry	<p><u>Communication and Language (ELG)</u></p> <ul style="list-style-type: none"> Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions Make comments about what they have heard and ask questions to clarify their understanding Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary Offer explanations for why things might happen, making use of recently introduced vocabulary Express their ideas and feelings about their experiences 	<p>Which materials are the most flexible? Which materials are the most absorbent?</p> <p>We need to choose a material to make an umbrella. Which materials are waterproof?</p> <p>What happens to materials over time if we bury them in the ground? What happens to shaving foam over time? Is there a pattern in the types of materials that are used to make objects in a school?</p> <p>How are bricks made? Which materials can be recycled?</p>	<p>Which shapes make the strongest paper bridge? Which material would be best for the roof of the little pig's house?</p> <p>Which materials will float and which will sink? Which materials will let electricity go through them, and which will not? Which materials are shiny and which are dull?</p> <p>How long do bubble bath bubbles last for? What will happen to our snowman?</p> <p>How do materials change with heat? How does amount of water affect the strength of a kitchen towel?</p> <p>How have the materials we use changed over time? How are plastics made?</p>		
Big Ideas	C1, C2	C1, C2	C1, C2		
Key Scientists	William Addis (Toothbrush Inventor), Charles Mackintosh (Waterproof coat), John McAdam (roads)		William Addis (Toothbrush Inventor), Charles Mackintosh (Waterproof coat), John McAdam (roads)		

States of Matter

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives	<u>The Natural World (ELG)</u> <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter 				<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
Vocabulary	solid, liquid, freeze, melt, heat, cool, ice, water				Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection
Knowledge	<p>I know how to describe materials that are solids</p> <p>I know how to describe materials that are liquids</p> <p>I know what freezing is and can describe materials that are frozen</p> <p>I know what heating is and can describe materials that have been heated</p>				<p>I know that things are composed of a matter commonly in one of three states of matter: solid, liquid or gas</p> <p>I know that things are made of particles (tiny building blocks) and that these are organized differently in different states</p> <p>I know that materials can change state when temperature changes</p> <p>I know that when solids turn into liquids, this is called melting and that the reverse process is called freezing</p> <p>I know that when liquids turn into gases, this is called evaporation and that the reverse process is called condensation</p> <p>I know that the melting point of water is 0° C and that the boiling point of water is 100° C</p> <p>I know that water flows around our world in a continuous process called the water cycle, and explain the part evaporation and condensation play</p>
Lines of Enquiry	<u>Communication and Language (ELG)</u> <ul style="list-style-type: none"> Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions Make comments about what they have heard and ask questions to clarify their understanding Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary Offer explanations for why things might happen, making use of recently introduced vocabulary Express their ideas and feelings about their experiences 				<p>How does the mass of a block of ice affect how long it takes to melt? How does the surface area of water affect how long it takes to evaporate? Does seawater evaporate faster than fresh water? Can you group these materials and objects into solids, liquids, and gases? How would you sort these objects/materials based on their temperature?</p> <p>Which material is best for keeping our hot chocolate warm? How does the level of water in a glass change when left on the windowsill?</p> <p>Is there a pattern in how long it takes different sized ice lollies to melt? How does evaporation rate change as you add more salt to your water?</p> <p>What are hurricanes, and why do they happen?</p>
Big Ideas	C2, C3				C3
Key Scientists					Anders Celsius (Celsius Temperature Scale), Daniel Fahrenheit (Fahrenheit Temperature Scale/Invention of the Thermometer)

Seasonal Changes

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives	<u>The Natural World (ELG)</u> <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter 	<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 			
Vocabulary	Summer, day, Spring, dark, Autumn, light, Winter, night, Season, Moon, Sun	Seasons, spring, summer, autumn, winter, windy, sunny, overcast, snow, rain, temperature			
Knowledge	<p>I know that weather changes through the year, getting hotter in the summer and colder in the winter</p> <p>I know that the winter is likely to bring ice on the ground when water freezes due to the cold</p> <p>I know that the four seasons are spring, summer, autumn and winter and know the order of the cycle</p> <p>I know the basic characteristics of each season</p> <p>I know what season it currently is</p>	<p>I know the names of the 4 seasons, can order them and can describe characteristics of each</p> <p>I know key days and events that occur during each season, including celebrations relating to the time of year</p> <p>I know the likely weather that occurs in each season, and can reason the season that it currently is based on this</p> <p>I know that days are longer in the summer and shorter in winter</p> <p>I know how to observe changes across the 4 seasons, describing similarities and differences</p> <p>I know that the Earth orbits the Sun with one orbit constituting a year of roughly 365 days</p>			
Lines of Enquiry	<u>Communication and Language (ELG)</u> <ul style="list-style-type: none"> Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions Make comments about what they have heard and ask questions to clarify their understanding Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary Offer explanations for why things might happen, making use of recently introduced vocabulary Express their ideas and feelings about their experiences 	<p>In which season does it rain the most?</p> <p>How could you organise all the objects in the solar system into groups?</p> <p>How does the colour of a UV bead change over the day?</p> <p>Does the wind always blow the same way?</p> <p>Are there plants that are in flower in every season? What are they?</p>			
Big Ideas	E2	E2			
Key Scientists	Dr Steve Lyons (Extreme Weather), Holly Green (Meteorologist)				

Electricity

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives					<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
Vocabulary					Electricity, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component
Knowledge					<p>I know that electrical energy is one of many forms of energy</p> <p>I know and can name common appliances that use electricity</p> <p>I know how to construct a simple circuit, identifying its parts</p> <p>I can identify and reason why a circuit will or will not work</p> <p>I know that a switch functions by completing or breaking a complete circuit</p> <p>I know that electrical current flows well through some materials, called electrical conductors, and poorly through other materials, called electrical insulators</p> <p>I know that exposure to high levels of electrical current can be dangerous</p>
Lines of Enquiry					<p>How does the thickness of a conducting material affect how bright the lamp is? Which metal is the best conductor of electricity?</p> <p>How would you group these electrical devices based on where the electricity comes from?</p> <p>How long does a battery light a torch for?</p> <p>Which room has the most electrical sockets in a house?</p> <p>How has electricity changed the way we live? How does a light bulb work?</p>
Big Ideas					P3
Key Scientists					Thomas Edison (First Working Lightbulb), Joseph Swan (Incandescent Light Bulb)

Light

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives				<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 	
Vocabulary				Light source, dark, reflect, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow, block, transparent, translucent	
Knowledge				<p>I know that light is a form of energy</p> <p>I know that we need light to see things and that darkness is the absence of light</p> <p>I know that light travels in straight lines</p> <p>I know that light is reflected when it travels from a light source and then 'bounces' off an object</p> <p>I know that everything that we can see is either a light source or something that is reflecting light from a light source into our eyes</p> <p>I know that opaque objects block light creating shadows and that light passes easily through transparent objects</p> <p>I know that sunglasses can protect eyes from sunlight but looking at the Sun directly – even with sunglasses – can damage the eyes</p> <p>I know that as objects move towards a light source, the size of the shadow increases</p>	
Lines of Enquiry				<p>How does the distance between the shadow puppet and the screen affect the size of the shadow? Which pair of sunglasses will be best at protecting our eyes?</p> <p>How would you organise these light sources into natural and artificial sources?</p> <p>When is our classroom darkest? Is the Sun the same brightness all day?</p> <p>Are you more likely to have bad eyesight and to wear glasses if you are older?</p> <p>How does the Sun make light?</p>	
Big Ideas				P3, E2	
Key Scientists				Louis Braille (Braille communication system)	

Living things and their habitats

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives	<p><u>The Natural World (ELG)</u></p> <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter 		<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 		<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
Vocabulary	<i>See 'Plants' and 'Animals, including humans' sections</i>		Living, dead, never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, seashore, woodland, ocean, rainforest, conditions, desert, damp, shade		Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation
Knowledge	<i>See 'Plants' and 'Animals, including humans' sections</i>		<p>I know that living things move, grow, consume nutrients and reproduce; that dead things use to do these things, but no longer do; and that things that never lived have never done these things</p> <p>I know that herbivorous animals eat plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants</p> <p>I know that plants absorb energy from the Sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals</p> <p>I know that the arrows on a food chain show the direction that the energy travels</p> <p>I know examples of animals that have adapted to their habitat and can give reasons why</p>		<p>I know that animals can be grouped based on their physical characteristics and based on their behaviour</p> <p>I know that living things are divided into kingdoms: the animal kingdom, plants, fungi, bacteria, and single-celled organisms</p> <p>I know that a species is a group of living things have many similarities that can reproduce together produce offspring</p> <p>I know that a classification key uses questions to sort and identify different living things</p> <p>I know how to use a classification key to identify living things</p> <p>I know that changes to the environment can make it more difficult for living things to survive and reproduce; in extreme cases this leads to extinction</p> <p>I know that human activity- such as climate change caused by pollution- can change the environment for many living things, endangering their existence</p>
Lines of Enquiry	<p><u>Communication and Language (ELG)</u></p> <ul style="list-style-type: none"> Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions Make comments about what they have heard and ask questions to clarify their understanding 		<p>Which pets are the easiest to look after? Is there the same level of light in the evergreen wood compared with the deciduous wood?</p> <p>How would you group these plants and animals based on what habitat you would find them in?</p> <p>How does the school pond change over the year?</p> <p>What conditions do woodlice prefer to live in? Which habitat do worms prefer – where can we find the most worms?</p>		<p>Does the amount of light affect how many woodlice move around? How does the average temperature of the pond water change in each season?</p> <p>Can we use the classification keys to identify all the animals that we caught pond dipping?</p> <p>How does the variety of invertebrates on the school field change over the year?</p> <p>How has the use of insecticides affected bee population?</p>

	<ul style="list-style-type: none"> Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary Offer explanations for why things might happen, making use of recently introduced vocabulary Express their ideas and feelings about their experiences 		How are the animals in Australia different to the ones that we find in Britain? How does the habitat of the Arctic compare with the habitat of the rainforest?		Why are people cutting down the rainforests and what effect does that have?
Big Ideas	B1, B2		B1		B2
Key Scientists	Terry Nutkins (TV Presenter)		Liz Bonnin (Conservationist)		Carl Linnaeus (classification), Jaques Cousteau (Marine Biologist)

Sound

	Foundation	Year 1	Year 2	Year 3	Year 4
Curriculum Objectives					<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
Vocabulary					Amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave
Knowledge					<p>I know that sound is generated when an object vibrates; some of the energy from the vibrating object is transferred to the air, making the air particles move</p> <p>I know that sound is a form of energy</p> <p>I know that sound travels through a medium</p> <p>I know that longitudinal sound waves are detected in the ear by humans and that the brain interprets this as the sounds we hear</p> <p>I know that pitch is how high or low a sound is and that this is determined by how many vibrations per second are being made by the vibrating object</p> <p>I know that volume is how loud or quiet a sound is and that this is determined by the amount of energy in the wave</p> <p>I know that the volume of a sound is quieter if the listener is further away from the object</p>
Lines of Enquiry					<p>How does the volume of a drum change as you move further away from it? How does the length of a guitar string/tuning fork affect the pitch of the sound? Are two ears better than one?</p> <p>Which material is best to use for muffling sound in ear defenders?</p> <p>Is there a link between how loud it is in school and the time of day?</p> <p>If there is a pattern, is it the same in every area of the school?</p> <p>Do all animals have the same hearing range?</p>
Big Ideas					P3
Key Scientists					Aristotle (Sound Waves), Galileo Galilei (Frequency and Pitch of Sound Waves), Alexander Graham Bell (Invented the Telephone)