



Westleigh Methodist Primary School

Science Progression of Skills and Knowledge

With God, all things are possible – Matthew 19:26

Love Teamwork Thankfulness Generosity Peace Forgiveness Equality Justice



National Curriculum

Purpose of study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Seasonal Changes

Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seasonal Changes	<p>Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons and how day length varies.</p> <p>Pupils should observe and talk about changes in the weather and the seasons.</p> <p>Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.</p>					

Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
--	--------	--------	--------	--------	--------	--------

Seasonal Changes:	Make tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change.					
Plants						
Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	<p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants including trees.</p> <p>Use the local environment throughout the year to explore and answer questions about plants growing in their habitat.</p> <p>Observe the growth of flowers and vegetables they have planted.</p>	<p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p> <p>Use the local environemt throughout the year to observe how different plants grow.</p> <p>Understand the requirements of plants for germination, growth and survival as well as the reproduction and growth in plants.</p> <p>Note: seeds and bulbs need water to grow but many do not need light. Seeds and bulbs have a food store inside of them.</p>	<p>Identify and describe the functions of different parts of a flowering plant: roots, stem/ trunk, leaves and flowers.</p> <p>Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary from plant to plant.</p> <p>Investigate ways in which water is transported within plants.</p> <p>Explore the part flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p>Understand the relationship between structure and function: the idea that every part has a job to do.</p> <p>Explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.</p> <p>Note: pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.</p>			
Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Plants Working Scientifically	<p>Observe closely, using magnifying glasses, comparing and contrasting familiar plants.</p> <p>Describe how they were able to identify and group them. Draw diagrams showing the parts of different plants, including trees.</p> <p>Keep a record of how plants have changed over time e.g. eaves falling and buds opening.</p> <p>Compare and contrast what they have found out about different plants.</p>	<p>Observing and recording with some accuracy the growth of a variety of plants as they change over time from a seed or a bulb.</p> <p>Observe similar plants at different stages of growth. Set up a comparative test to show that plants need light and water to stay healthy.</p>	<p>Working scientifically Compare the effect of different factors on plant growth e.g. amount of light, amount of fertiliser.</p> <p>Discover how seeds are formed by observing the different stages of plant life cycles over a period of time.</p> <p>Look for patterns in the structure of fruits that relate to how the seeds are dispersed.</p> <p>Observe how water is transported in plants e.g. putting cut white carnations in coloured water and observe how water travels up the stem to the flower.</p>			
-------------------------------	---	--	---	--	--	--

Vocabulary: Pupils should build up an extended specialist vocabulary and have opportunities to develop their spoken language across the curriculum. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants Vocabulary	Children should be familiar with common names of flowers and examples of deciduous and evergreen trees and plant structures; Leaves, flowers, blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem	Year 1 vocabulary plus; Germination Reproduce Growth Survival Temperature Light Air Water	Year 1 and 2 vocabulary plus; Nutrients Variation Support Reproduction Dispersed Dispersal Transported			

Living things and their habitats

Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
--------	--------	--------	--------	--------	--------

Living things and their habitats	<p>Children should be taught to; Explore and compare the differences between things that are living, dead, and things that have never been alive.</p> <p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats.</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p> <p>Understand all living things have certain characteristics that are essential for keeping them alive and healthy.</p> <p>Raise and answer questions that help them to become familiar with the life processes that are common to all living things.</p> <p>Understand the terms ‘habitat’ (a natural environment or home of a variety of plants and animals) and ‘micro-habitat’ (a very small habitat, for example for woodlice under stones, logs or leaf litter).</p> <p>Raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals.</p> <p>Compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest</p>	<p>Children should be taught to; Recognise that living things can be grouped in a variety of ways.</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>Use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat.</p> <p>Identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants.</p> <p>Begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. Note: Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses.</p> <p>Explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.</p>	<p>Children should be taught to; Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</p> <p>Describe the life process of reproduction in some plants and animals.</p> <p>Study and raise questions about their local environment throughout the year.</p> <p>Observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment.</p> <p>Find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.</p> <p>Find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.</p>	<p>Children should be taught to; 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.</p> <p>Give reasons for classifying plants and animals based on specific characteristics.</p> <p>Build on their learning about grouping living things in year 4 by looking at the classification system in more detail.</p> <p>Understand the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided.</p> <p>Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another.</p> <p>Find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.</p>		
	<p>Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.</p>					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Living things and their habitats: Working Scientifically		<p>Children should be taught to;</p> <p>Sort and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts.</p> <p>Describe how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions.</p> <p>Construct a simple food chain that includes humans (e.g. grass, cow, human).</p> <p>Describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there.</p>		<p>Children should be taught to;</p> <p>Use and make simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.</p>	<p>Children should be taught to;</p> <p>Observe and compare the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times). Ask pertinent questions and suggesting reasons for similarities and differences.</p> <p>Try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs.</p> <p>Observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.</p>	<p>Children should be taught to;</p> <p>Use classification systems and keys to identify some animals and plants in the immediate environment.</p> <p>Research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.</p>	
	Everyday Materials						
	Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.						
		Year 1	Year 2	Year 3	Year 4	Year 5	

Materials	<p>Everyday Materials</p> <p>Children should be taught to; Distinguish between an object and the material from which it is made</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p> <p>Describe the simple physical properties of a variety of everyday materials.</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</p> <p>Explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties (see vocab)</p> <p>Explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil.</p>	<p>Uses of Everyday materials</p> <p>Children should be taught to; Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p>Identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass).</p> <p>Think about the properties of materials that make them suitable or unsuitable for particular purposes.</p> <p>Think about unusual and creative uses for everyday materials.</p> <p>Find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam.</p>		<p>States of matter</p> <p>Children should be taught to; Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>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).</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> <p>Explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container).</p> <p>Observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled. Note: Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning.</p>	<p>Properties and changes of materials</p> <p>Children should be taught to; Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</p> <p>Build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4.</p> <p>Explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.</p> <p>Explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda.</p> <p>Find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials.</p>	
	<p>Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.</p>					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Materials: Working Scientifically	Children should be taught to; Performing simple tests to explore questions, for example: ‘What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast’s leotard?’	Children should be taught to; Compare the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs) Observe closely, identifying and classifying the uses of different materials, and recording their observations.		Children should be taught to; Group and classify a variety of different materials. Explore the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). Research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. Observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.	Children should be taught to; Carry out tests to answer questions, for example, ‘Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?’ Compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. Research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.	

Vocabulary: Pupils should build up an extended specialist vocabulary and have opportunities to develop their spoken language across the curriculum. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Everyday Materials: Vocabulary	hard/soft stretchy/stiff shiny/dull rough/smooth bendy/not bendy waterproof/not waterproof absorbent/not absorbent opaque/transparent.	Year 1 vocabulary plus;				

Forces and Magnets

Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
--	--------	--------	--------	--------	--------	--------

Forces and Magnets			<p>Forces Compare how things move on different surfaces.</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</p> <p>Observe how magnets attract or repel each other and attract some materials and not others.</p> <p>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.</p> <p>Describe magnets as having two poles.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> <p>Observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing).</p> <p>Explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).</p>		<p>Forces and Magnets Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p> <p>Explore falling objects and raise questions about the effects of air resistance.</p> <p>Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.</p> <p>Experience forces that make things begin to move, get faster or slow down.</p> <p>Explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel.</p> <p>Explore the effects of levers, pulleys and simple machines on movement.</p> <p>Find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.</p>	
	<p>Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.</p>					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Forces and Magnets: Working Scientifically			<p>Compare how different things move and grouping them. Raise questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions.</p> <p>Explore the strengths of different magnets and finding a fair way to compare them.</p> <p>Sort materials into those that are magnetic and those that are not.</p> <p>Look for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; Identify how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.</p>		<p>Explore falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective.</p> <p>Explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.</p>	
Light						
Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Light			<p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</p> <p>Find patterns in the way that the size of shadows change.</p> <p>Explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves.</p> <p>Think about why it is important to protect their eyes from bright lights.</p> <p>Look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.</p> <p>Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.</p>			<p>Recognise that light appears to travel in straight lines.</p> <p>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</p> <p>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p> <p>Build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. Talk about what happens and make predictions.</p>
	<p>Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.</p>					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Light: Working Scientifically			Look for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.			<p>Decide where to place rear-view mirrors on cars.</p> <p>Design and make a periscope and using the idea that light appears to travel in straight lines to explain how it works.</p> <p>Investigate the relationship between light sources, objects and shadows by using shadow puppets.</p> <p>Extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).</p>
-------------------------------	--	--	---	--	--	--

Rocks

Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Rocks			<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter.</p> <p>Linked with work in geography, explore different kinds of rocks and soils, including those in the local environment.</p>			

Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
--	--------	--------	--------	--------	--------	--------

Rocks: Working Scientifically			<p>Observe rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time.</p> <p>Use a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.</p> <p>Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed.</p> <p>Explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water.</p> <p>Raise and answer questions about the way soils are formed.</p>				
	Sound						
	Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.						
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Sound				<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as the distance from the sound source increases.</p> <p>Explore and identify the way sound is made through vibration in a range of different musical instruments from around the world.</p> <p>Find out how the pitch and volume of sounds can be changed in a variety of ways.</p>		
Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.							

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sound: Working Scientifically				<p>Find patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.</p> <p>Make earmuffs from a variety of different materials to investigate which provides the best insulation against sound.</p> <p>Make and play their own instruments by using what they have found out about pitch and volume.</p>		
Electricity						
Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Electricity				<p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>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.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p> <p>Construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices.</p> <p>Draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6.</p> <p>Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.</p>		<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</p> <p>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.</p> <p>Use recognised symbols when representing a simple circuit in a diagram.</p> <p>Building on their work in year 4, construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors.</p> <p>Learn how to represent a simple circuit in a diagram using recognised symbols.</p> <p>Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity.</p>
	<p>Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.</p>					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Electricity: Working Scientifically				<p>Observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.</p>		<p>Systematically identifying the effect of changing one component at a time in a circuit.</p> <p>Designing and making a set of traffic lights, a burglar alarm or some other useful circuit.</p>
Earth and Space						

Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Earth and Space					<p>Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</p> <p>Describe the movement of the Moon relative to the Earth.</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies.</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p> <p>Introduce pupils to a model of the Sun and Earth that enables them to explain day and night.</p> <p>Learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).</p> <p>Understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).</p> <p>Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.</p> <p>Find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.</p>	
Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Earth and Space: Working Scientifically					<p>Compare the time of day at different places on the Earth through internet links and direct communication.</p> <p>Create simple models of the solar system.</p> <p>Constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day.</p> <p>Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks.</p>	

Animals including humans

Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals including humans	<p>Children should be taught to; Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) 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>Use the local environment throughout the year to explore and answer questions about animals in their habitat. Understand how to take care of animals taken from their local environment and the need to return them safely after study.</p> <p>Become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.</p> <p>Learn the names of the main body through games, actions, songs and rhymes. See vocab</p>	<p>Children should be taught to; Children should be taught to; Notice that animals, including humans, have offspring which grow into adults</p> <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>Understand the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans.</p> <p>Begin to learn about the processes of reproduction and growth in animals. Note: The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult.</p>	<p>Children should be taught to; Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p> <p>Understand the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions.</p>	<p>Children should be taught to; Describe the simple functions of the basic parts of the digestive system in humans</p> <p>Identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p> <p>Know the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions.</p>	<p>Children should be taught to; Describe the changes as humans develop to old age.</p> <p>Draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.</p>	<p>Children should be taught to; Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans.</p> <p>Build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function.</p> <p>Understand how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.</p>
<p>Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.</p>						
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Animals including humans: Working Scientifically	<p>Children should be taught to;</p> <p>Use their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them.</p> <p>Group animals according to what they eat; and using their senses to compare different textures, sounds and smells.</p>	<p>Children should be taught to;</p> <p>Observe, through video or first-hand observation and measurement, how different animals, including humans, grow.</p> <p>Ask questions about what things animals need for survival and what humans need to stay healthy.</p> <p>Suggest ways to find answers to their questions.</p>	<p>Children should be taught to;</p> <p>Identify and group animals with and without skeletons and observing and comparing their movement.</p> <p>Explore ideas about what would happen if humans did not have skeletons.</p> <p>Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat.</p> <p>Research different food groups and how they keep us healthy and design meals based on what they find out.</p>	<p>Children should be taught to;</p> <p>Compare the teeth of carnivores and herbivores, and suggesting reasons for differences.</p> <p>Find out what damages teeth and how to look after them.</p> <p>They might draw and discuss their ideas about the digestive system and compare them with models or images.</p>	<p>Children should be taught to;</p> <p>Research the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.</p>	<p>Children should be taught to;</p> <p>Work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.</p>

Vocabulary: Pupils should build up an extended specialist vocabulary and have opportunities to develop their spoken language across the curriculum. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals including humans: Vocabulary	Head neck, arms elbows legs knees face ears eyes hair mouth teeth	Year 1 vocabulary plus;				

Evolution and Inheritance

Knowledge and understanding: It is vitally important that pupils develop secure understanding of the knowledge identified in each year group in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression and pupils may struggle, build misconceptions or have difficulties in understanding later content.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
--------	--------	--------	--------	--------	--------

Evolution and Inheritance						<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p> <p>Building on what they learned about fossils in the topic on rocks in year 3; Find out more about how living things on earth have changed over time. introduce the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles.</p> <p>Appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox.</p> <p>Find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.</p> <p>Note: At this stage, pupils are not expected to understand how genes and chromosomes work.</p>
	<p>Working scientifically: this should not be taught separately but embedded through the identified content above, focussing on the key features of scientific enquiry so that pupils can learn to use a variety of approaches to answer relevant scientific questions.</p>					
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						<p>Observe and raise questions about local animals and how they are adapted to their environment.</p> <p>Compare how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels.</p> <p>Analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.</p>
	Pedagogy					
	EYFS	Key Stage 1		Lower Key Stage 2		Upper Key Stage 2
	<p>Learning should allow children to;</p> <ul style="list-style-type: none"> - Explore the natural world around them - Explore a range of materials - Have a wide range of experiences to increase their knowledge of the world 	<p>Lessons should allow pupils to;</p> <ul style="list-style-type: none"> - experience and observe phenomena - look closely at the natural and humanly-constructed world around them 		<p>Lessons should allow pupils to;</p> <ul style="list-style-type: none"> - broaden their scientific view of the world around them - explore, talk about, test and develop ideas about everyday phenomena and 		<p>Lessons should allow pupils to;</p> <ul style="list-style-type: none"> - Develop a deeper understanding of a wide range of scientific ideas - Explore and talk about their ideas - Ask their own questions about scientific phenomena

<p>around them e.g. visiting parks, farms and museums</p> <ul style="list-style-type: none"> - understand some of the similarities and differences in the natural world around them and contrasting environments drawing on their experiences and what they have read in class - Understand and observe some important process and changes in the natural world around them e.g. changing seasons, changing states of matter - Use images, videos, shared texts and other resources alongside first hand experiences. <p>Scientific enquiry should include;</p> <ul style="list-style-type: none"> - Observing changes in the natural world - Observe changes over time - Communicating their observations and findings through conversation and play <p>Through language development children should;</p> <ul style="list-style-type: none"> - Begin to talk about what they observe with others - Communicate their understanding regularly through conversation and play using simple scientific language 	<ul style="list-style-type: none"> - be encouraged to be curious and ask questions about what they notice - be helped to develop their understanding of scientific ideas using different types of enquiry to answer their own questions. - Learn mostly through the use of first hand practical experiences but there should be some use of appropriate secondary sources such as books, photographs and videos. <p>Working scientifically should include;</p> <ul style="list-style-type: none"> - asking simple questions and recognising that they can be answered in different ways - observing closely, using simple equipment - performing simple tests - identifying and classifying - using their observations and ideas to suggest answers to questions - gathering and recording data to help in answering questions. - observing changes over a period of time - noticing patterns - grouping and classifying things - carrying out simple comparative tasks - finding things out using secondary sources of information <p>Through language development pupils should;</p> <ul style="list-style-type: none"> - begin to use simple scientific language to talk about what they have found out - communicate their ideas to a range of audiences in a variety of ways 	<p>the relationship between living things and familiar environments</p> <ul style="list-style-type: none"> - begin to develop their ideas about functions, relationships and interactions - Ask their own questions about what they observe - Make decisions about which type of enquiry is best to answer them <p>Working scientifically should include;</p> <ul style="list-style-type: none"> - asking relevant questions and using different types of scientific enquiries to answer them - setting up simple practical enquiries, comparative and fair tests - making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers - gathering, recording, classifying and presenting data in a variety of ways to help in answering questions - recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables - reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions - using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions - identifying differences, similarities or changes related to simple scientific ideas and processes - using straightforward scientific evidence to answer questions or to support their findings. - Observing changes over time - Noticing patterns - Grouping and classifying things - Carrying out comparative and fair tests - Finding things out through secondary sources of information. 	<ul style="list-style-type: none"> - Analyse functions, relationships and interactions more systematically - Encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates - Recognise that scientific ideas change and develop over time - Select the most appropriate ways to answer science questions using different types of enquiry <p>Working scientifically should include;</p> <ul style="list-style-type: none"> - planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate - recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - using test results to make predictions to set up further comparative and fair tests - reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations - identifying scientific evidence that has been used to support or refute ideas or arguments. - Observing changes over different periods of time - Noticing patterns - Grouping and classifying things - Carry out comparative and fair tests - Find things out using a wide range of secondary sources of information - Drawing conclusions based on their data and observations - Use evidence to justify their ideas
--	---	---	--

		<p>Through language development pupils should;</p> <ul style="list-style-type: none"> - Use some scientific language to talk about what they have found out. - Use scientific language to write about what they have found out. - Read and spell scientific vocabulary correctly and with confidence, using growing word reading and spelling knowledge. 	<ul style="list-style-type: none"> - Use scientific knowledge and understanding to explain their findings. <p>Through language development pupils should;</p> <ul style="list-style-type: none"> - Read, spell and pronounce scientific vocabulary correctly.
--	--	--	--