Science - Curriculum

Science			
Working Scientifically			
EYFS	KS1	Lower KS2	Upper KS2
• 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. • explore a variety of materials	• 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.	• 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.	• 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

Science - Curriculum

Knowledge									
Animals including Humans	Forces	Materials	Electricity	Plants and habitats	Light	States of Matter	Sound	Earth and Space	Evolution and inheritance

At Billingshurst Primary Academy, we want all learners to embody the school values: **Ambition, Belonging and Curiosity**. Through our values-led curriculum, we work together to ensure children are prepared for their next stages of life in modern Britain and beyond. Within our curriculum, we aim to develop an interest and curiosity for science by having the ambition to explore the answers to big questions like: 'How does the digestive system work?' or 'What are the relative distances between the planets in our Solar System?' This involves developing children's ideas and ways of working that enable them to make sense of the world through investigation. We combine substantive and disciplinary knowledge to make practical skills, mathematical proficiency, and scientific practices meaningful. We provide regular enrichment opportunities to encourage our scientists of the future. Including: science days, visitors, school trips, diversity and promoting women in STEM, and a STEM club.

Science - Curriculum

EYFS		
EYFS End Points (informed by Early Learning Goals)	**Strand**	**I can/will…, I/We will…' and 'I know…' Statements**
<u>Personal, Social and Emotional Development</u> **ELG: Speaking** ● Offers explanations for why things might happen. **ELG: Managing Self** ● Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. **ELG: People, Culture and Communities** ● Describes the immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps. **<u>Understanding the World</u>** **ELG: The Natural World** ● Explores the natural world around them, making observations and drawing pictures of animals and plants. ● Knows some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. ● Understands some important processes and changes in the natural world around them, including the seasons and changing states of matter.	**Linking to Y1 Seasonal Change (Part 1) Topic:**	• We will talk about the seasons and seasonal changes. • We will observe and describe plant growth and the life cycle of butterflies.
	Linking to Y1 Animals Topic:	• Linking to Y1 Animals Topic: • We will learn about different habitats and the animals that live in these habitats, linking our understanding to why different animals are found in different countries. • We will explore the natural world, making observations and drawing pictures of animals and plants having identified the local habitats and contrasting environments.
	Linking to Y1 Materials Topic:	• I will develop my own ideas and decided which materials to use to express them (when making props for a play). • I will use junk modelling, paint and other materials to make a selection of transport vehicles. • I will develop my small movement (fine motor) skills: threading, pouring, stirring, constructing and using malleable (mouldable) materials.
	Linking to Y1 Plants Topic:	• We will create miniature gardens and discuss ways in which we can care for the garden, as well as the environment. • We will learn about the life cycle of a butterfly and created a butterfly garden with flowering plants.
	Linking to Seasonal Change (Part 2) Topic:	• I know when each of the four seasons occurs. • I know what the features of autumn are and what happens to trees in this season. • I know that days are longer in summer (sunshine hours) than in winter • I can observe changes across the four seasons.

Science - Curriculum

Year 1 – Working Scientifically		
KS1 Skills End Points (Working scientifically)	**Objectives**	
• Asks simple questions and recognises that they can be answered in different ways. • Observes closely, using simple • equipment. • Performs simple tests. • Can identify and classify. • Uses their observations and ideas to suggest answers to questions. • Gathers and records data to help in answering questions.	**Animals including Humans**	• Make observations of animals from each of the groups (first hand if possible) • Compare the structure of two animals from the same or different group e.g. wings, feathers, vertebrates/ invertebrates. • Classify animals using a range of features e.g. lay eggs/give birth to live young. herbivore, omnivore (these terms do not have to be explicitly taught). • Identify animals by matching statements to named images. • Take measurements of parts of the body and present results in a table to interpret. • Conduct simple sense experiments. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match?
	Materials	• Compare and group together a variety of everyday materials on the basis of their simple physical properties. • Classify objects made of one material in different ways e.g. a group of objects made of metal. • Classify one type of object made from a range of materials e.g. a collection of spoons made of different materials. • Chosen an appropriate method for testing an object for a particular property. • Use their test evidence to answer the questions about properties e.g. Which cloth is the most absorbent? • Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.
	Plants and habitats	• Can sort and group parts of plants using similarities and differences e.g. the shape of leaves, the colour of the flower/blossom. • Can use simple charts and Venn diagrams etc. to identify and classify plants. • Use photographs and their own observations to talk about how plants change over time (e.g. seed to sapling to tree) and over the year (deciduous and fruit bearing trees). * • Plant seeds and observe how they grow and change by making simple observations. * • Make close observations of plants, including trees - leaves, seeds, flowers etc. • Point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green
	Seasonal Changes	• Gather and record data about weather conditions in autumn, drawing on observation and using simple equipment (such as a container to measure rainfall) *.* • Use data to create a pictogram and use this to describe changes in day length over the seasons. • Use their evidence to describe some other features of the weather, surroundings, themselves, animals, and plants found in autumn. • Demonstrate their knowledge in different ways e.g. creating seasonal artwork, creating a pictogram (and use this to ask and answer related questions).

Science - Curriculum

Year 1 – Knowledge		
KS1 End Points (NC)	**Strand**	**Objectives**
• Has experienced and observed phenomena, having looked more closely at the natural and humanly-constructed world around them. • Shows curiosity, asking questions about what they have noticed. Has developed understanding of scientific ideas through the use of different types of scientific enquiry to answer own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information. • Is beginning to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways	**Animals including Humans**	• Know and can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals e.g. cat, robin, adder, frog, salmon. • Know and can 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 e.g. some have wings, feathers or vertebrates/ invertebrates • Can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense
	Materials	• Distinguish between an object and the material from which it is made. EG This chair is made from metal and plastic • Identify and name a variety of materials (wood, plastic, glass, metal, water, and rock) and describe their physical properties (vocabulary) • Compare and sort everyday materials according to their physical properties • why and how the properties of materials make them particularly useful for specific purposes (for example, stone is a hard, heavy and durable material so is useful for construction of buildings). • Know how the properties of a material can make it useful for a range of different purposes (for example, plastic is waterproof so it can be used to coat fabric for clothing but can also be used for outdoor play equipment) • know that different materials can share the same properties (for example glass and plastic can both be transparent).
	Plants and habitats	• Can identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Can identify and describe the basic structure of a variety of common flowering plants, including trees.
	Seasonal Changes	**<u>Part 1 Autumn</u>** Know when each of the four seasons occurs Know what the features of autumn are and what happens to trees in this season Know that days are longer in summer (sunshine hours) than in winter Observe changes across the four seasons **<u>Part 2 Summer</u>** Know about and can describe weather in different seasons over a year. Know and can describe the features of different seasons and how they change through the year

Science - Curriculum

Year 2 – Working Scientifically

KS1 Skills End Points (Working scientifically)	Objectives	
• Asks simple questions and recognises that they can be answered in different ways. • Observes closely, using simple equipment. • Performs simple tests. • Can identify and classify. • Uses their observations and ideas to suggest answers to questions. • Gathers and records data to help in answering questions.	**Animals including Humans**	• Ask questions and use secondary sources to find out about the life cycles of some animals • Observe animals growing over a period of time e.g. chicks, caterpillars, a baby • Ask questions of a parent about how they look after their baby • Ask pet owners questions about how they look after their pet
		• Investigate the effect of exercise on their bodies • Classify food in a range of ways, including using the Eatwell guide • Investigate washing hands, using glitter gel • Describe, using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child • Measure/observe how animals, including humans, grow. • Collate what they know about looking after a baby/animal by creating a parenting/pet owners' guide • Explain how development and health might be affected by differing conditions and needs being met/not met
	Materials	• Classify and sort materials by their properties e.g. manmade, natural • Investigate and observe what happens to different materials during testing and use this to inform explanation of their properties • Investigate which materials are fit for a purpose e.g. What is the best material for an umbrella? • Explain from their observations how materials change when a force is exerted on them by squashing, bending, twisting and stretching. • Investigate the transparency of objects, recording class data in a table and drawing simple conclusions from the findings. • Ask and answer questions about everyday materials
	Plants and habitats	• Explore the outside environment regularly to find objects that are living, dead and have never lived • Classify objects found in the local environment • Observe animals and plants carefully, drawing and labelling diagrams • Create simple food chains for a familiar local habitat from first hand observation and research • Create simple food chains from information given e.g. in picture books (Gruffalo etc.) • Can sort into living, dead and never lived • Can give key features that mean the animal or plant is suited to its microhabitat • Using a food chain can explain what animals eat • Can explain in simple terms why an animal or plant is suited to a habitat

Science - Curriculum

	Plants	• Make close observations of seeds and bulbs • Classify seeds and bulbs • Research and plan when and how to plant a range of seeds and bulbs • Look after the plants as they grow – weeding, thinning, watering etc. • Make close observations and measurements of their plants growing from seeds and bulbs • Make comparisons between plants as they grow • Can spot similarities and difference between bulbs and seeds

Science - Curriculum

Year 2 – Knowledge		
KS1 End Points (NC)	**Strand**	**Objectives**
• Has experienced and observed phenomena, having looked more closely at the natural and humanly-constructed world around them. • Shows curiosity, asking questions about what they have noticed. Has developed understanding of scientific ideas through the use of different types of scientific enquiry to answer own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information. • Is beginning to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways	**Animals including Humans**	• Can describe how animals including humans have offspring which grow into adults, using the appropriate names for the stages (baby, child etc) • Know that to survive animals need sunlight, water, air, food and a suitable habitat (including shelter for protection from predators and the environment). • Understand that exercise is important to humans and can explain why. • Understand the different food groups and the benefits of each as part of a healthy, balanced diet • Understand which food groups common foods belong to (Carbohydrates, protein, fats etc) • Understand about general hygiene and its importance and can state examples of hygienic practice.
	Forces Materials	• Know and can explain the differences between things that are living, dead, and things that have never been alive • can explain why some materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard are particularly suited to specific purposes • understand how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching • Know the difference between materials that are transparent, translucent and opaque.
	Habitats	• Know that most living things live in habitats to which they are suited • Know and can describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Know and can name a variety of plants and animals in their habitats, including micro-habitats • Know and can describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and make the different sources of food.
	Plants	• Know that plants may grow from either seeds or bulbs • know that seeds and bulbs can germinate and then grow into seedlings and then continue to grow into mature plants. • Know that mature plants may have flowers which then develop into seeds, berries and fruits etc. • know that seeds and bulbs need to be planted at particular times of the year and will germinate and grow at different rates. • know that some plants are better suited to growing in full sun and some grow better in partial and full shade. • Know that plants need water, light and a suitable temperature to grow and stay healthy

Science - Curriculum

Year 3 – Working Scientifically

Lower KS2 Skills (Working Scientifically) End Points:	Objectives	
● Asks relevant questions and use different types of scientific enquiries to answer them. ● Sets up simple practical enquiries, comparative and fair tests. ● Makes systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. ● Gathers, records, classifies and presents data in a variety of ways to help in answering questions. ● Records findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. ● Reports on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. ● Uses results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. ● Identifies differences, similarities or changes related to simple scientific ideas and processes.	**Animals including Humans**	● Classify food in a range of ways ● Use food labels to explore the nutritional content of a range of food items ● Use secondary sources to find out the types of food that contain different nutrients * * * ● Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? ● Plan a daily diet contain a good balance of nutrients and record and present findings * * * * * ● Explore the nutrients contained in fast food ● Use secondary sources to research the parts and functions of the skeleton* ● Investigate pattern seeking questions such as ; Can people with longer legs run faster?; Can people with bigger hands catch a ball better? ● Compare, contrast and classify skeletons of different animals
	Forces	● Record and report on findings from investigations, involving how things move on different surfaces* ● Compare and group materials following magnetic testing, recording findings and use the outcome to answer questions about which materials are magnetic.* ● Make and investigate predictions on whether two magnets will attract or repel, depending on which poles are facing.
	Materials	● Can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. ● Can devise tests to explore the properties of rocks and use data to rank the rocks.* ● Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily. ● Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc. ● Can identify plant/animal matter and rocks in samples of soil. ● Can devise a test to explore the water
	Plants and habitats	● Observe what happens to plants over time when the leaves or roots are removed. ● Observe the effect of putting cut white carnations or celery in coloured water. ● Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. ● Spot flowers, seeds, berries and fruits outside throughout the year.

Science - Curriculum

● Use straightforward scientific evidence to answer questions or to support their findings.		● Observe flowers carefully to identify the pollen ● Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. ● Observe seeds being blown from the trees e.g. sycamore seeds. ● Research different types of seed dispersal. ● Classify seeds in a range of ways including by how they are dispersed. ● Create a new species of flowering plant ● Can explain observations made during investigations. ● Can look at the features of seeds to decide on their method of dispersal. ● Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal.
	Light	● Observe and identify changes to the size and orientation of shadows, relative to their proximity to the light source. ● Observe and identify the difference in shadows of opaque, translucent and transparent objects/materials. ● Observe how shadows are formed and affected by different circumstances. ● To notice that light can be reflected off surfaces and Replace with 'investigate the visibility of different materials (eg shiny; foil, mirrors and matt; sugar paper) in a darker environment according to which reflect most light.' ● Investigate the size of shadows according to times of day and year, by tracing shadows outside and comparing differences. ● Classify materials according to opaque, transparent and translucent. ● Use oral and written explanations to report on why shadows are formed and how the length and size of a shadow can be changed. ● Investigates questions related to an object and the shadow it will cause.*

Science - Curriculum

Year 3 – Knowledge		
Lower KS2 End Points (NC):	**Strand**	**Objectives**
● Has broadened their scientific view of the world around them through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments and by beginning to develop ideas about functions, relationships and interactions. ● Asks their own questions about what they observe and is able to make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. ● Draws simple conclusions and uses some scientific language, to both and write about what they have found out. ● Reads and spells scientific vocabulary correctly and with confidence, using their growing word and spelling knowledge.	**Animals including Humans**	• Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. • Food contains a range of different nutrients that are needed by the body to stay healthy – carbohydrates including sugars, protein, vitamins, minerals, fibre, fat, sugars, water. • A piece of food will often provide a range of nutrients. • Humans and some other animals have skeletons and muscles which help them move and provide protection and support
	Forces	• Know that friction affects the way that things move on different surfaces (eg carpet, smooth tiles, playground) • Know that some forces need contact between two objects, but magnetic forces can act at a distance • Know that magnets attract or repel each other and attract some materials and not others • Know and can describe magnets as having two poles • Know whether two magnets will attract or repel each other, depending on which poles are facing.
	Materials	• That rock is a naturally occurring material. • There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. • Rocks can be hard or soft. They have different sizes of grain or crystal. • Rocks can be different shapes and sizes (stones, pebbles, boulders) and some absorb water. • Knows, in simple terms, how fossils are formed when things that have lived are trapped within rock and help us understand the past. • Knows that soils are made from rocks and organic matter and are different from place to place.
	Plants	• 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 • Know through investigation, the ways 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.
	Light	• Can explain that light is needed to see things and that dark is the absence of light • Know that light is reflected from surfaces • know that light from the sun can be dangerous and that there are ways to protect the eyes (give examples) • know that shadow are formed when the light from a light source is blocked by an opaque object. • Know and can explain some of the reasons why the size of shadows changes. • Know how the shadows of transparent, opaque and translucent materials vary.

Science - Curriculum

Year 4 – Working Scientifically

Lower KS2 Skills (Working Scientifically) End Points:	Objectives	
● Asks relevant questions and use different types of scientific enquiries to answer them. ● Sets up simple practical enquiries, comparative and fair tests. ● Makes systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. ● Gathers, records, classifies and presents data in a variety of ways to help in answering questions. ● Records findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. ● Reports on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. ● Uses results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	**Plants and habitats**	● Observe plants and animals in different habitats throughout the year and use recordings to compare and contrast the living things observed. ● Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. ● Classify living things found in different habitats based on their features. ● Create a simple identification key based on observable features. ● Use research to explore human impact on the local environment e.g. litter, tree planting.* ● Use secondary sources to find out about how environments may naturally change.* ● Use secondary sources to find out about human impact, both positive and negative, on environments.
	Electricity	● Construct and investigate a range of circuits. ● Investigate which materials can be used instead of wires to make a circuit . ● Classify materials that conduct electricity and those that don't following investigation and record findings..* ● Investigate the effect of a switch and combinations of switches in simple circuits. ● Investigate switches and consider variations for specific uses, such as a pressure switch for a burglar alarm. ● Apply their knowledge of conductors and insulators to design and make different types of switch.
	Animals including Humans	Construct and interpret a variety of food chains, identifying producers, predators and prey. ● Can create food chains based on research.* ● Identifies differences, and similarities of different types of teeth according to herbivore, omnivore and carnivore. ● Can record the teeth in their mouth (make a dental record). ● recreate the human stomach and observe representation of how food breaks down. ● Label the different parts of the digestive system.
	States of Matter	● Observe closely and classify a range of solids and liquids. ● Explore making gases visible ● Classify materials according to whether they are solids, liquids and gases. ● Observe a range of materials melting. ● Investigate how to melt ice more quickly. ● Observe the changes that are non-reversible relating (common ingredients). ● Investigate melting point of different materials. ● Explore freezing different liquids. ● Observe and measure temperature of icy water, tap water, hot water.

Science - Curriculum

• Identifies differences, similarities or changes related to simple scientific ideas and processes. • Use straightforward scientific evidence to answer questions or to support their findings.		• Observe water evaporating and condensing. • Set up investigations to explore changing the rate of evaporation.* • Use secondary sources to find out about the water cycle.* • Using their data, can explain what affects how quickly a solid melts. • From their data, can explain how to speed up or slow down evaporation. • Present learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet.
	Sound	• Experiment with at least three different instruments to observe and explore volume and pitch. • Make predictions and draw conclusions about the pitch and volume of sounds.* • Note how vibrations make sounds of different volumes and travel to our ears. • Identify and show how sound travels through particles and into the ear. • Make own instruments that produce a range of pitches

Science - Curriculum

Year 4 – Knowledge		
Lower KS2 End Points (NC):	**Strand**	**Objectives**
● Has broadened their scientific view of the world around them through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments and by beginning to develop ideas about functions, relationships and interactions. ● Asks their own questions about what they observe and is able to make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. ● Draws simple conclusions and uses some scientific language, to both and write about what they have found out. ● Reads and spells scientific vocabulary correctly and with confidence, using their growing word and spelling knowledge.	**Animals including Humans**	• Know the basic parts of the digestive system in humans • Understand that the blood carries the nutrients around the body. • Know and can identify the different types of teeth in humans and their simple functions. • Understand which organisms are producers, predators and prey (producers, primary and secondary consumers) apply to the construction and interpretation of food chains.
	Electricity	• Can identify and name appliances that require electricity to function • Knows the basic parts of a circuit, including cells, wires, bulbs, switches and buzzers • Knows that for an appliance to work within a circuit, it has to be part of a complete loop with a battery. • Knows that a switch in a circuit is a temporary break in an otherwise 'complete circuit'. • All metals conduct electricity but some, such as aluminium and titanium, are relatively poor conductors. • Knows the recognised symbols used to represent components of a circuit and uses these to represent a circuit pictorially.
	Plants and habitats	• Understand that living things can be grouped in a variety of ways. • Know and can name living things in a range of habitats. • Understand and can relate the key adaptational features of an organism to the known features of its habitat. • Can give examples of how an environment may change both naturally and due to human impact.
	States of Matter	• Understand how to distinguish between a solid, liquid and gas • Know that some materials change state when they are heated or cooled. • Know the temperatures at which ice, water and water vapour change state. • Know the part played by evaporation and condensation in the water cycle.
	Sound	• Know how sounds are made, associating some of them with vibrating. • Understand how sound travels from a source to our ears. • Understand the correlation between pitch and the object Changing the shape, size and material of an object will change the sound it produces). • Understand the correlation between the volume of a sound and the strength of the vibrations that produced it. • Understand that sounds get fainter as the distance from the sound source increases

Science - Curriculum

Year 5 – Working Scientifically		
Upper KS2 End Points:	**Objectives**	
● Plans different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. ● Takes measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. ● Records data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. ● Reports and presents 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. ● Uses test results to make predictions to set up further comparative and fair tests. ● Identifies scientific evidence that has been used to support or refute ideas or arguments.	**Forces**	● Investigate the pull on different objects using a newton meter and record forces in Newtons (N). ● Report on conclusions relating to an object's mass and its weight in Newtons. ● Investigate the effect of friction in a range of contexts . ● Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water, pulling shapes e.g. boats along the surface of water. ● Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. ● Explore how levers, pulleys and gears work. ● Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation
	Materials **Electricity**	● Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat ● Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate ● Investigate rates of dissolving by carrying out comparative and fair test and records findings * * ● Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture ● Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning ● Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? ● Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton)
	Plants and habitats	● Grow and observe plants that reproduce asexually e.g. strawberries, spider plant, potatoes ● organise mammals into different groups - sea and land and marsupials and use scientific evidence to refute/support correct/incorrect statements (such as 'dolphins are fish'). ● Draw and label appropriate scientific diagrams following use of secondary sources and first hand observations relating to the life cycle of a range of animals. ● compare and contrast the life cycles of different living things and present findings identify which insects complete which type of metamorphosis and present findings identify the key differences between some amphibians – for example, toads and frogs, and present findings in different forms. ● Use data to compare and find patterns, for example to compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth/Look for patterns between the size of an animal and its expected life span)

Science - Curriculum

	Earth and Space	● Use secondary sources to help create a model e.g. role play or using balls, to show the movement of the Earth around the Sun and the Moon around the Earth. ● Use secondary sources to create a model to show why day and night occur ● Make first-hand observations of how shadows caused by the Sun change through the day ● Make a sundial and report on findings following observation of the changing place of the shadow, making conclusions as to what this demonstrates and how the sundial was used to indicate the time. ● Research time zones ● Consider the views of scientists in the past and how evidence was used to deduce the shapes and movements of the Earth, Moon and planets before space travel.

Science - Curriculum

Year 5 – Knowledge		
Upper KS2 End Points:	**Strand**	**Objectives**
● Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. ● Has encountered more abstract ideas and is beginning to recognise how these help them to understand and predict how the world operates. ● Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fair tests and finding things out using a wide range of secondary sources of information. ● Is able to draw conclusions based on their data and observations, using evidence to justify their ideas and their scientific knowledge and understanding to explain their findings.	**Animals including Humans**	• Know and can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • Can describe the life processes of reproduction in some plants (including the pollination process) and animals • Knows that bulbs, tubers, runners and plantlets are examples of plant reproduction involving only one parent
	Forces	• Understand that unsupported objects fall to Earth because of the force of gravity acting between the earth and the falling object • Know and can identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Understand that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
	Materials Electricity	• Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. • Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. • Mixtures can be separated by filtering, sieving and evaporation. • Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.
	Earth and Space	• The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. • Earth takes 365¼ days to complete its orbit around the Sun. • The Earth rotates (spins) on its axis every 24 hours. • As Earth rotates half faces the Sun (here it is day) and half is facing away from the Sun (night). As the Earth rotates the Sun appears to move across the sky. • The Moon orbits the Earth. It takes about 28 days to complete its orbit.

Science - Curriculum

Year 6 – Working Scientifically		
Upper KS2 Skills End Points (Working Scientifically):	**Objectives**	
● Plans different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. ● Takes measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. ● Records data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. ● Reports and presents 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. ● Uses test results to make predictions to set up further comparative and fair tests. ● Identifies scientific evidence that has been used to support or refute ideas or arguments.	**Animals including Humans Forces**	● Plan and conduct a scientific enquiry to identify different food groups. ● Use labelled diagrams to support understanding of how nutrients and oxygen are delivered around the body. ● Use information to identify the main components of the heart. ● Predict what will happen to the heart during exercise. ● Construct and analyse the variables that make a fair test. ● Conduct a fair investigation on the effects of exercise on the heart. ● Use scientific equipment to track results and record data using tables and graphs. ** ● Analyse whole class data after investigation to compare and reflect on findings and draw conclusions. ● Use information acquired to write a scientific report on how the human circulatory system works
	Electricity	● Draw circuit diagrams of a range of simple series circuits, using recognised symbols. ● Communicate structures of circuits using circuit diagrams with recognised symbols ● make electric circuits and demonstrate, following investigation, how variation in the working of particular components can be changed. ● Plan and select resources for a fair scientific enquiry, deciding which variables to control. ● Record results from an experiment using tables and graphs ● Evaluate and explain their investigation, results and conclusions.
	Plants and habitats	● Classify plants and animals and record conclusions from the use of classification keys. ● Use information about the characteristics of an unknown animal or plant to assign it to a group. ● Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. ● Research an unfamiliar animal or plant using its characteristics to establish where it belongs in the classification system
	Light	● Plan and conduct a test to investigate how light travels and explain/present the findings. ● Investigate the use of mirrors to reflect light and record using straight line diagrams to indicate the direction of light. ● Use mirrors, torches and protractors to demonstrate and record how light is reflected in a mirror and how we see ourselves in a mirror. ● Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram
	Evolution and inheritance	▯ Follow lines of enquiry to support Explanation of the process of evolution. ▯ Demonstrate an understanding, with specific examples, of how an animal or plant has evolved over time e.g. penguin, peppered moth. ▯ Identify characteristics that will make a plant or animal suited or not suited to a particular habitat. ▯ Identify how Charles Darwin and Alfred Wallace used observation to support their theory of natural selection and evolution. ▯ Referring to and using examples of fossil evidence that support the theory of evolution, including learning about the work of Mary Morland and William Buckland.

Science - Curriculum

Year 6 – Knowledge		
Upper KS2 End Points:	**Strand**	**Objectives**
● Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. ● Has encountered more abstract ideas and is beginning to recognise how these help them to understand and predict how the world operates. ● Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fair tests and finding things out using a wide range of secondary sources of information. ● Is able to draw conclusions based on their data and observations, using evidence to justify their ideas and their scientific knowledge and understanding to explain their findings.	**Animals including Humans Forces**	• Can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and lifestyle on the way the body functions • Knows and can describe the way in which nutrients and water are transported within animals, including humans
	Electricity	• Understand that the brightness of a bulb, or the volume of a buzzer, correlates with the voltage of cells used in the circuit. • Knows and can give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • Knows the effect of adding more components to a circuit with one cell and the effect of adding multiple cells Knows and can use the recognised symbols to represent a simple circuit in a diagram.
	Plants and habitats	• Plants can be divided broadly into two main groups – flowering plants and nonflowering plants. • Living things can be formally grouped according to characteristics. • Animals can be divided into two main groups – vertebrates and invertebrates. • Each group has common characteristics.
	Light	• Light appears to travel in straight lines • Know and can explain that objects are seen because they give out or reflect light into the eye • Know and can 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. • Know and can explain, with reference to how light travels, why shadows have the same shape as the objects that cast them
	Evolution and inheritance	• All living things have offspring of the same kind. The offspring are not identical to their parents and vary. • Plants and animals have characteristics that make them suited (adapted) to their environment. • If an environment changes rapidly some variations may not suit the new environment and will die. If it changes slowly, animals and plants with variations that are best suited survive and reproduce. • Over a very long period of time these characteristics may be so different that a new species is created. This is evolution. • Fossils give us evidence of what lived on the Earth millions of years ago, and how organisms have changed over time. • Scientists such as Darwin and Wallace observed how living things adapt to different environments. Understanding how inheritance and dominant genes allows us to predict the likelihood of certain characteristics in offspring (e.g. dog fur colour)