



KS1 National Curriculum											
KS1 Working Scientifically. By the end of Year 2, children will be able to:											
<ul style="list-style-type: none"> Ask simple questions and recognise that they can be answered in different ways Observe closely, using simple equipment and measurement Perform simple tests Identify and classify Use their observations and ideas to suggest answers to questions Gather and record data to help in answering questions Use scientific language and read and spell age-appropriate scientific vocabulary Begin to notice patterns and relationships 	Physics		Chemistry		Year 1						
	Seasonal change		Everyday materials		Biology		Biology		Physics		
	Seasonal change		Everyday materials		Animals, including humans		Plants		Seasonal change		
	Year 2										
Chemistry			Biology			Biology			Biology		
Uses of everyday materials			Living things and their habitats			Plants			Animals, including humans		

Lower KS2 National Curriculum Strands											
Lower KS2 Working Scientifically. By the end of Year 4, children will be able to:											
<ul style="list-style-type: none"> Make decisions, ask relevant questions and use different types of scientific enquiries to answer them Set up simple practical enquiries, comparative and fair tests Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables Report on findings from enquiries, using relevant scientific language, including oral and written explanations, displays or presentations of results and conclusions Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Identify differences, patterns, similarities or changes related to simple scientific ideas and processes Use straightforward scientific evidence to answer questions to support their findings Begin to look for naturally occurring patterns and relationships Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations 	Physics		Chemistry		Year 3						
	Light		Rocks		Biology		Biology		Physics		
	Light		Rocks		Animals, including humans		Plants		Forces and magnets		
	Year 4										
Physics		Biology		Biology		Chemistry		Physics		Biology	
Electricity		Animals, including humans 1		Living things and their habitats		States of matter		Sound		Animals, including humans 2	

Upper KS2 National Curriculum Strands

Upper KS2 Working Scientifically. By the end of Year 6, children will be able to:

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Use test results to make predictions to set up further comparative and fair tests
- Report and present 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 presentations
- Identify scientific evidence that has been used to support or refute ideas or arguments
- Explore and talk about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically
- Recognise that scientific ideas change and develop over time
- Draw conclusions based on their data and observations, use evidence to justify their ideas and use their scientific knowledge and understanding to explain their findings

Year 5				
Physics		Chemistry	Biology	Biology
Earth in space	Forces	Uses and properties of materials	Living things and their environment	Animals, including humans
Year 6				
Biology		Physics		Biology
Evolution and inheritance	Animals, including humans; circulatory system	Light	Electricity	Living things and their habitats



Year 1 Science Overview

Term	Autumn		Spring	Summer	
Overview	Seasons (part 1)	Everyday materials	Animals, including humans	Plants	Seasons (part 2)
Key Scientists	Dr Steve Lyons Holly Green	Charles Mackintosh Chester Greenwood William Addis	Chris Packham Ibn Sina (known also as Avicenna)	David Attenborough	Dr Steve Lyons Holly Green
Big Question	Why does the weather change?	Are all materials the same?	Are humans different to all other animals? Why?	Do all flowering plants consist of the same parts?	Why does the weather change?
NC Content	<ul style="list-style-type: none"> Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies <p>This unit focuses on autumn and winter and runs throughout the year</p>	<ul style="list-style-type: none"> Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties 	<ul style="list-style-type: none"> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals Identify and name a variety of common animals who are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 	<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees Use their local environment throughout the year to explore and answer questions about plants growing in their habitat 	<ul style="list-style-type: none"> Observe changes across the four seasons Observe and describe weather associated with the seasons and how day length varies
Key Knowledge	<ul style="list-style-type: none"> Know that the 4 seasons are spring, summer, autumn and winter and know the order of the cycle Know that weather changes through the year, getting hotter in the summer and colder in the winter Know that days are longer in the summer and shorter in winter Know that the winter is likely to bring ice on the ground when water freezes due to the cold 	<ul style="list-style-type: none"> Know that an object is made from/of a material and know some examples of materials in the real world Know that materials can be hard, soft, strong, weak, absorbent, heavy, light, solid and runny, smooth and rough; these descriptions denote the properties of a material Know from observation how to distinguish between materials made of wood, plastic, glass, metal, water, rock Know how the properties of a material can make it useful 	<ul style="list-style-type: none"> Know that a trout is an example of a fish; a frog is an amphibian; a lizard is an example of a reptile; a robin is an example of a bird; a rabbit and a human are examples of a mammal and explore further examples of each animal type Know that herbivorous animals eat plants; carnivorous animals eat other animals; omnivorous eat both animals and plants Know that a cat is an example of a carnivore; that a rabbit is an example of a herbivore; know that many humans are examples of omnivores (though not vegetarians) 	<ul style="list-style-type: none"> Know a rose bush, a sunflower and a dandelion by sight Know an oak tree, a birch tree and a horse chestnut tree by sight Know that trees can be evergreen or deciduous Know that evergreen trees maintain their leaves throughout the year and that deciduous trees shed their leaves in autumn Know and describe the basic structure of a variety of common flowering plants, including trees, using scientific vocabulary (flower, blossom, 	<ul style="list-style-type: none"> Know how the weather changes throughout the different seasons Know that the Earth orbits the Sun with one orbit constituting a year of 365 ¼ days.

	<ul style="list-style-type: none"> Know what the features of autumn are and what happens to trees in this season 	<p>for a range of different purposes (e.g. plastic is waterproof so it can be used to coat fabric for clothing but can also be used for outdoor play equipment; stone is a hard, heavy and durable material so is useful for construction of buildings)</p> <ul style="list-style-type: none"> Know that different materials can share the same properties (e.g. glass and plastic can both be transparent) 	<ul style="list-style-type: none"> Know that feet, legs, arms, hands, torso, head, skin, ears, eyes, nose, mouth and tongue are parts of the body and identify them Identify the 5 senses and know that eyes are associated with sight' ears with sound, nose with smell, tongue with taste and skin with touch 	petal, root, leaf, stem, trunk, bulb, seed, branches)	
Key Vocabulary	Humidity, cloudy, pouring, droplet, crystal, blizzard, shiver, clear	Object, material, hard, soft, stretchy, stiff, bendy, rough, absorbent	Carnivore, omnivore, herbivore, identify, predator, construct, responsibility, grouping	Warmth, evergreen, deciduous, bud, leaf, branch, root, stem	Bloom, blossom, bright, vegetation, newborn, flower, swelter, rays
Key Enquiry Approach	<ul style="list-style-type: none"> Observing over time 	<ul style="list-style-type: none"> Identifying, grouping and classifying Comparative testing Research 	<ul style="list-style-type: none"> Identifying, grouping and classifying Comparative testing Research 	<ul style="list-style-type: none"> Identifying, grouping and classifying Comparative testing Research 	<ul style="list-style-type: none"> Observing over time Research Identifying, grouping and classifying
Key Skills	<ul style="list-style-type: none"> Gather and record data about weather conditions in autumn, drawing on observation and using simple equipment 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) 	<ul style="list-style-type: none"> 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 1 type of object made from a range of materials e.g. a collection of spoons made of different materials Chose 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 of different papers, stiffness of paper plates, waterproofness of shelters 	<ul style="list-style-type: none"> Make first hand close observations of animals from each of the groups Compare the structure of 2 animals from the same or different groups e.g. wings, feathers, vertebrate/invertebrate Classify animals using a range of features e.g. lay eggs/give birth to live young, herbivore/omnivore Identify animals by matching statements to names 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? 	<ul style="list-style-type: none"> Describe and compare plants, seeds and bulbs Ask simple questions and recognise that they can be answered in different ways Observe closely, using simple equipment 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 photos 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 Point to and name the parts of a plant, recognising that they are not always the same e.g. 	<ul style="list-style-type: none"> Collect information about the weather regularly throughout the year Present this information in tables and charts to compare the weather across the seasons Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans Gather data about day length regularly throughout the year and present this to compare the seasons Present information in different ways to compare the seasons Use gathered evidence to describe the general types of weather and change in day length over the seasons

				leaves and stems may not be green, the leaves are different shapes	<ul style="list-style-type: none">• Demonstrate knowledge in different ways e.g. creating seasonal artwork
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Year 2 Science Overview

Term	Autumn	Spring	Summer	
Overview	Uses of everyday materials	Living things and their habitats	Plants	Animals, including humans (basic need for survival)
Key Scientists	Dr Alex King John McAdams Isambard Kingdom Brunel	Rachel Carson Liz Bonnin	George Washington Carver	Elizabeth Garrett Anderson Florence Nightingale
Big Question	Would rubber be a good material to make a classroom table with?	Why don't we find polar bears in the rainforest?	What do plants need to survive?	How can I keep my body healthy as it changes?
NC Content	<ul style="list-style-type: none"> Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching 	<ul style="list-style-type: none"> Explore and compare the differences between things that are living, dead, and things that have never been alive Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other Identify and name a variety of plants and animals in their habitats, including micro-habitats Describe how humans obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food 	<ul style="list-style-type: none"> Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy 	<ul style="list-style-type: none"> Notice that animals, including humans, have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance of humans and exercise, eating the right amount of different types of food, and hygiene
Key Knowledge	<ul style="list-style-type: none"> Know that many types of plastic are waterproof, that steel (a type of metal) is strong, that rock is hard, that cotton wool is soft, that rubber is flexible, that rock is rigid, that polystyrene (a type of plastic) is light and that iron (a type of metal) is heavy Know that pushes and pulls can change the shape of some materials Know that when objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller Know that applying forces to objects can change their shape, by 	<ul style="list-style-type: none"> Know that living things move, grow, consume nutrients and reproduce; that dead things use to do these things, but no longer do; and that things that never lived have never done these things Know that most living things live in habitats to which they are suited Know that polar bears are an example of an animal adapted to its environment – thick fur for warmth and oily paw pads to ensure that they don't freeze to the ice Know that sharks are another example – smooth skin and streamlined shape for quick swimming; and gills for breathing underwater Know that cacti are an example of a plant adapted to its environment – thick skin 	<ul style="list-style-type: none"> Know that plants may grow from either seeds or bulbs Know that seeds and bulbs need to be buried underground in soil and that they grow into adult plants under the right conditions (water, warmth) Know that plants that are deprived of light, food or air will not grow and will die 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 	<ul style="list-style-type: none"> Know the main stages in the life cycle of at least 3 animals, including humans Know that animals, including humans, need food, water and air to survive Know the basic food groups: fruit and vegetables, carbohydrates, protein, dairy, fat and sugary foods Know that proteins are good for growth, carbohydrates for energy and fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth)

	<p>squeezing, stretching, bending and twisting</p> <ul style="list-style-type: none"> Know the difference between materials that are transparent, translucent and opaque Know that different materials are sometimes used to make the same object 	<p>keeps a store of water safe; sharp spikes keep animals from stealing the water</p> <ul style="list-style-type: none"> Know that pine trees are adapted to their environment in that they have thick bark and pine cones to protect against cold winters Know that woodlice live under logs – an example of a microhabitat – as they need somewhere dark and damp so that they do not dry out Know that frogs can live in ponds – an example of a microhabitat – as they use the water to lay their eggs (frogspawn) Know that 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Know that more than half of our diet should be made up of carbohydrates, fruit and vegetables Know that fats and sugary foods should be eaten rarely and in small amounts Know that people need to exercise often to help their body stay strong and fit Know that keeping clean, including washing and brushing teeth, is an important part of staying healthy
Key Vocabulary	Solid, absorbent, waterproof, man-made, suitable, properties, forces, material, push/pull, friction, twist/bend/squash/stretch	Suitable, micro-habitat, food-chain, classification, offspring, organism	Germinate, require, dormant, shade, condition, moist, produce, photosynthesis	Exercise, vitamins, portion, balanced, carbohydrate, proteins, fats, sugars
Key Enquiry Approach	<ul style="list-style-type: none"> Observing over time Identifying, grouping and classifying Comparative testing 	<ul style="list-style-type: none"> Observing over time Research Comparative testing 	<ul style="list-style-type: none"> Observing over time Pattern seeking 	<ul style="list-style-type: none"> Pattern seeking Identifying, grouping and classifying
Key Skills	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 observations and research Create simple food chains from information given e.g. in picture books Sort into living, dead and never lived Give key features that mean the animal or plant is suited to its micro-habitat Use a food chain to explain what animals eat Explain in simple terms why an animal or plant is suited to a habitat 	<ul style="list-style-type: none"> 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 Identify and explain similarities and differences between bulbs and seeds 	<ul style="list-style-type: none"> Investigate the effect of exercise on their bodies Classify food in a range of ways, including using the Eatwell guide Investigate the effect of 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 owner's guide Explain how development and health might be affected by differing conditions and needs being met/not met



Year 3 Science Overview					
Term	Autumn		Spring		Summer
Overview	Light	Rocks	Animals, including humans	Plants	Forces and magnets
Key Scientists	Jutus Von Liebig	Mary Anning	Marie Curie	Joseph Banks David Douglas	Michael Faraday
Big Question	Why do shadows change size?	Are all rocks formed in the same way?	Do all animals have skeletons?	Do all plants need exactly the same things?	Are all metals attracted to magnets?
NC Content	<ul style="list-style-type: none"> Recognise that they need light in order to see things and that dark is the absence of light Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Recognise that shadows are formed when the light from a light source is blocked by an opaque object Find patterns in the ways that the size of shadows change 	<ul style="list-style-type: none"> Compare and group together different kinds of rock on the basis of their appearance and simple physical properties Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter 	<ul style="list-style-type: none"> Identify that animals, including humans, need the right types and amounts of nutrition, and that they cannot make their own food; they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement 	<ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants; roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Know that plants make their own food Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 	<ul style="list-style-type: none"> Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance Observe how magnets attract or repel each other and attract some materials and not others Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials Describe magnets as having two poles Predict whether two magnets will attract or repel each other, depending on which poles are facing
Key Knowledge	<ul style="list-style-type: none"> Know that light is a form of energy Know that energy comes in different forms and can be neither created nor destroyed, only changed from one form to another 	<ul style="list-style-type: none"> Know that rock is a type of solid material Know that there are 3 types of rock (igneous, sedimentary and metamorphic) 	<ul style="list-style-type: none"> Know animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need Know food contains a range of different nutrients that are needed by the body to stay 	<ul style="list-style-type: none"> Know that different parts of plants have one or more functions Know that the roots collect water and minerals from the soil, and hold the plant firmly in the ground Know that the stem holds up the leaves so that they can gather 	<ul style="list-style-type: none"> Know that a force can be thought of as a push or pull Know that there are different types of contact force: impact forces (when 2 surfaces

	<ul style="list-style-type: none"> • Know that light is needed to see things and that dark is the absence of light • Know that light travels in straight lines • Knows that light is reflected when it travels from a light source and then 'bounces' off an object • Know that everything that we can see is either a light source or something that is reflecting light from a light source into our eyes • Know that the Sun is a light source, but that the Moon is not and is merely reflecting light from the Sun • Know that many light sources give off light and heat • Know that light from the sun can be dangerous and that there are ways to protect the eyes • Know that shadows are formed when the light from a light source is blocked by an opaque object • Know how the shadows of transparent, opaque and translucent materials vary • Know that as objects move towards a light source, the size of the shadow increases • Know how to show the changing of shadow size by drawing diagram with straight lines representing light 	<ul style="list-style-type: none"> • Know that the Earth has a solid crust made up of tectonic plates with molten rock beneath • Know that rock is a naturally occurring material • Know there are different types of rocks e.g. sandstone, limestone, slate etc which have different properties • Know rocks can be hard or soft. They have different sizes of grain or crystal • Know rocks can be different shapes of sizes (stones, pebbles, boulders) and some absorb water • Know that granite and basalt are types of igneous rock and that igneous rocks form from molten rock below the Earth's crust • Know that limestone and sandstone are types of sedimentary rock which form when small, weathered fragments of rock or shell settle and stick together, often in layers • Know that marble and slate are types of metamorphic rock which form when rocks in Earth's crust get squashed and heated in processes such as tectonic plates press against each other • Know, in simple terms, how fossils are formed when things that have lived are trapped within rock • Know that soils are made from rocks and organic matter • Know that some soils retain more water than others 	<p>healthy – carbohydrates including sugars, protein, vitamins, minerals, fibre, fat, sugars and water</p> <ul style="list-style-type: none"> • Know a piece of food will often provide a range of nutrients • Know that animals, including humans, have a skeleton made up of solid objects • Know that some animals (such as insects) have an exoskeleton – a solid covering on the outside of their body • Know that many invertebrates (such as earthworms and slugs) have water held inside by muscles which acts like a skeleton • Know the names of key bones in the body; know that an adult human body has 206 bones, the longest is which is the femur • Know that skeletons provide support for muscles and protect the body; e.g. the rib cage protects the vital organs in the human body • Know that human skeletons are made up of bones and cartilage • Know that muscles can only contract, so that they must be arranged in pairs in the body so that as one contracts the other loosens 	<p>light to make food and holds up the flowers so that they can receive pollen and disperse their fruits; know that the stem also transports water and minerals from the roots to the other parts of the plant</p> <ul style="list-style-type: none"> • Know that the leaves make food by absorbing light and using its energy to turn carbon dioxide and water into carbohydrates • Know that the function of the flower is reproduction, where flowers of the same kind exchange pollen – made by the anther – in a process called fertilisation, and a structure in the flower's ovary called an ovule becomes a seed; the ovary then becomes a fruit which helps the seed leave the plant in a process called dispersal 	<p>collide), frictional forces (when 2 surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed)</p> <ul style="list-style-type: none"> • Know that as objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller • Know that objects move differently on rough and smooth surfaces; objects resist movement on rough surfaces because there is higher friction as the object moves • Know that some forces need contact between 2 objects, but magnetic forces can act at a distance • Know that magnets have 2 poles called north and south • Know that like poles of 2 magnets repel each other and that opposite poles of 2 magnets attract each other • Know that there is a magnetic field around a magnet which is strongest at each pole • Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic
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Key Vocabulary	Proximity, ultraviolet, concave, convex, reflect, transparent, translucent, opaque, protect, absence, reflect, enter, signal, brain, detect	Fossil, sedimentary rock, metamorphic rock, igneous rock, permeable, decay, durable, absorb	Bone, x-ray, tendon, cartilage, ligament, reflex, joint, hollow	Vascular, phloem, spore, sucrose, starch, fertilisation, transpiration, respiration	Iron, attract, repel, magnetic, needle, pendulum, force, poles, gravity
Key Enquiry Approach	<ul style="list-style-type: none"> Identifying, grouping and classifying Comparative testing Fair testing 	<ul style="list-style-type: none"> Research Identifying, grouping and classifying Comparative testing Fair testing 	<ul style="list-style-type: none"> Identifying, grouping and classifying Research 	<ul style="list-style-type: none"> Observing over time Research Comparative testing 	<ul style="list-style-type: none"> Pattern seeking Comparative testings
Key Skills	<ul style="list-style-type: none"> Identify a range of light sources. Explain that dark is caused by the absence of light and that light is needed to see things Ask appropriate scientific questions about how we see Notice that light is reflected from surfaces. Explain reflection and identify reflective materials. Select the most reflective material for a purpose Discuss the benefits and dangers of the sun. Explain about UV light and its dangers. Record findings using simple scientific language and labelled diagrams Classify materials according to opaque, transparent and translucent Observe and identify changes to the size and orientation of shadows, relative to their proximity to the light source Investigate the size of shadows according to times of day and year, by tracing shadows outside and comparing differences Observe and identify the different in shadows of opaque, translucent and transparent objects/materials 	<ul style="list-style-type: none"> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Devise tests to explore the properties of rocks and use data to rank the rocks Link the changes of rocks over time with their properties e.g. soft rocks get worn away more easily Present in different ways their understanding of how fossils are formed e.g. in role play, chronological report Identify plant/animal matter and rocks in samples of soil Devise a test to explore the water retention of soils 	<ul style="list-style-type: none"> 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 Plan a daily diet containing 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 a 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 	<ul style="list-style-type: none"> 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 amounts of space Find flowers, seeds, berries and fruits outside throughout the year Observe flowers carefully to identify the pollen Observe flowers being visited by pollination e.g. bees and butterflies in the summer Observe seeds being blown from the trees e.g. sycamore trees Research different types of seed dispersal Classify seeds in a range of ways including by how they are dispersed Look at the features of seeds to decide on their method of dispersal Draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and dispersal 	<ul style="list-style-type: none"> 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 2 magnets will attract or repel, depending on which poles are facing



Year 4 Science Overview						
Term	Autumn		Spring		Summer	
Overview	Electricity	Animals, including humans	Living things and their habitats	States of matter	Sound	Animals, including humans
Key Scientists	Thomas Edison Joseph Swan	Ivan Pavlov Washington and Lucius Sheffield	Cindy Looy Joean Beauchamp	Joseph Priestly Anders Celsius Daniel Fahrenheit	Alexander Graham Bell	Charles Elton Al-Jahiz
Big Question	Does electricity flow easily through all objects?	What happens to our food when we eat it?	Why do some species become endangered?	Does ice always melt at the same speed?	How do instruments make different sounds?	Where does all energy for a food chain initially come from?
NC Content	<ul style="list-style-type: none"> Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not a lamp is part of a complete loop with a battery Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with good conductors 	<ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions 	<ul style="list-style-type: none"> Recognise that living things can be grouped in a variety of ways Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Recognise that environments can change and that this can sometimes pose dangers to living things 	<ul style="list-style-type: none"> Explore a variety of everyday materials and develop simple descriptions of the states of matter Compare and group materials together, according to whether they are solids, liquids and gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius 	<ul style="list-style-type: none"> Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sound travel through a medium to the ear Find patterns between pitch of a sound and features of the object that produces it Find patterns between the volume of a sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases 	<ul style="list-style-type: none"> Construct and interpret a variety of food chains, identifying producers, predators and prey
Key Knowledge	<ul style="list-style-type: none"> Know that electrical energy is one of many forms of energy Know that some appliances require electricity to function 	<ul style="list-style-type: none"> Know that food passes through a body with the nutrients being extracted and the waste products excreted, and that this 	<ul style="list-style-type: none"> Know that animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and 	<ul style="list-style-type: none"> Know how to distinguish between a solid, liquid and gas Know that things are made of particles (tiny building blocks) and 	<ul style="list-style-type: none"> Know that energy comes in different forms and can be neither created or destroyed, only changed from one form to another 	<ul style="list-style-type: none"> Know that a food chain traces the path of energy through a habitat Know that the arrows in a food

<ul style="list-style-type: none"> • Know the basic parts of a circuit, including cells, wires, bulbs, switches and buzzers • Know that more than one cell lined up to work together is called a battery • Know that cells, batteries and the mains are all sources of electrical energy • Know that for an appliance to work within a circuit, it has to be part of a complete loop with a battery • Know that wires – which contain a conductor inside them, usually made of metal – can allow electrical current to flow around a circuit • Know that when electrical current flows through a circuit components within that circuit – such as buzzers which make a noise and bulbs which emit light – begin to work • Know that a switch in a circuit is a temporary break in an otherwise ‘complete circuit’ • Know that all metals conduct electricity but some, such as aluminium and titanium, are relatively poor electrical conductors • Know the recognised symbols used to represent components of a circuit and use these to represent a circuit pictorially 	<ul style="list-style-type: none"> • Know that the process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body • Know that the process of digestion begins with food being chewed in the mouth and by the teeth and saliva added • Know that a human has 3 types of teeth – incisors, canines and molars – and that these each perform different functions • Know that incisors slice food, canines tear food (especially meat) and that molars grind food • Know that children develop an initial set of teeth which are gradually replaced between the age of 6 and 12 • Know the basic parts of the digestive system in humans and their functions 	<p>process is called digestion</p> <ul style="list-style-type: none"> • Know that living things are divided into kingdoms: the animal kingdom, plants, fungi, bacteria, and single-celled organisms • Know that a species is a group of living things that have many similarities that can reproduce together to produce offspring • Know that a classification key uses questions to sort and identify different living things • Know how to use a classification key to identify living things • Know that changes to the environment can make it more difficult for living things to survive and reproduce; in extreme cases this leads to extinction, where an entire species dies • Know that human activity – such as climate change caused by pollution – can change the environment for many living things, endangering their existence • Know that many species of living things have already been made extinct as a result of human activity 	<p>based on their behaviour (e.g. herbivores, carnivores and omnivores)</p> <ul style="list-style-type: none"> • Know that some materials change state when they are heated or cooled • Know that when solids turn into liquids, this is called melting and that the reverse process is called freezing • Know that when liquids turn into gases, this is called evaporation and that the reverse process is called condensation • Know that when a solid turns into a gas without passing through the liquid state this is called sublimation • Know that the melting point of water is 0 degrees Celsius and that the boiling point of water is 100 degrees Celsius • Know that water flows around our world in a continuous process called the water cycle • Know that, along with evaporation, water on the Earth’s surface moves to the air in a process called transpiration in which water turns into water vapour (gas) on the surface of leaves on plants • Know that rain condenses in clouds and falls to earth as rain, snow or hail in a 	<p>that these are organised differently in different states</p> <ul style="list-style-type: none"> • Know that sound is generated when an object vibrates; some of the energy from the vibrating object is transferred to the air, making the air particles move • Know that sound is a form of energy that transfers in a longitudinal wave – like that seen in a slinky • Know that sound travels through a medium (e.g. particles in the air) and thus sound does not travel through a vacuum which has no particles in it at all • Know that longitudinal sound waves are detected in the ear by humans and that the brain interprets this as the sounds we hear • Know that sound travels at different speeds through different objects; it travels at around 340 metres per second in air, much slower than light travels; this is why we often hear thunder after we see lightening as the light reaches our eye before the sound reaches our ears • Know that pitch is how high or low a sound is and that this is determined by how many vibrations per second are being made by the vibrating object; the number of vibrations per second is called the frequency • Know that the volume is how loud or quiet a sound is and that this is 	<ul style="list-style-type: none"> • Know that all energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers • Know that consumers take in energy by eating • Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator • Know that the first consumer in a food chain is called a primary consumer, the second is called a secondary consumer and above it is called a tertiary consumer 	<p>chain show the direction that energy is travelling through a habitat</p> <ul style="list-style-type: none"> • Know that all energy for a food chain initially comes from the Sun which is absorbed and turned into energy by plants which are called producers • Know that consumers take in energy by eating • Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator • Know that the first consumer in a food chain is called a primary consumer, the second is called a secondary consumer and above it is called a tertiary consumer
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Key Vocabulary	Electricity, electron, battery, motor, bulb, circuit, switch, insulator, conductor	Digestion, excretion, anus, duodenum, small intestine, large intestine, stomach, oesophagus, tongue, saliva, acid, bite, enzymes, incisors, canines, molars	Habitat, ecology, bacteria, reintroduce, emission, pesticide, woodland, kingdom, classification key, species, climate change, pollution	Solid, liquid, gases, melting, freezing, evaporation, condensation, transpiration, precipitation, reversible, boiling point, melting point, thermometer, water cycle	Vibration, percussion instrument, wind instrument, string instrument, frequency, volume, pitch, transverse wave, longitudinal wave, medium, vacuum	Food chain/web, consumer, producer, prey, predator, environment, ecosystem, interdependent, primary, secondary, tertiary
Key Enquiry Approach	<ul style="list-style-type: none"> Research Identifying, grouping and classifying Comparative testing 	<ul style="list-style-type: none"> Observing over time Pattern seeking Identifying, grouping and classifying Fair testing 	<ul style="list-style-type: none"> Research Identifying, grouping and classifying Comparative testing 	<ul style="list-style-type: none"> Pattern seeking Comparative testing 	<ul style="list-style-type: none"> Observing over time Pattern seeking Comparative testing Fair testing 	<ul style="list-style-type: none"> Research Identifying, grouping and classifying
Key Skills	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Identify differences and similarities of different types of teeth according to herbivore, omnivore and carnivore Can record the teeth in their mouth Recreate the human stomach and observe representation of how food breaks down Label the different parts of the digestive system 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Observe closely and classify a range of solids and liquids Explore making gases visible Classify materials according to whether they are solids, liquids or gases Observe a range of materials melting Investigate how to melt ice more quickly Observe the changes that are non-reversible relating to common ingredients Investigate melting points of different materials 	<ul style="list-style-type: none"> Experiment with at least 3 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 their own instruments that produce a range of pitches Record decibels using a data logger 	<ul style="list-style-type: none"> Construct and interpret a variety of food chains, identifying producers, predators and prey Can create food chains based on research

	<p>as a pressure switch for a burglar alarm</p> <ul style="list-style-type: none"> Apply their knowledge of conductors and insulators to design and make different types of switches 		<p>based on observable features</p> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Explore freezing of different liquids Observe water evaporation and condensing Set up investigations to explore changing the rate of evaporation Use secondary sources to find out about the water cycle Use their data to explain what effects how quickly a solid melts Present learning about the water cycle in a range of ways 	<ul style="list-style-type: none"> Experiment how to block sounds and investigate materials that are suitable for soundproofing 	
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Year 5 Science Overview					
Term	Autumn		Spring	Summer	
Overview	Earth in Space	Forces	Uses and Properties of materials	Living things and their habitats	Animals, including humans
Key Scientists	Nicolaus Copernicus Katherine Johnson Neil Armstrong Caroline Herschel	Sir Isaac Newton Galileo Galilei	Spencer Silver Ruth Benerito	Jane Goodall Mangala Mani Sir David Attenborough	Professor Robert Winston
Big Question	How does the moon appear to change shape?	How do parachutes work?	Can I make a gas using a solid and a liquid?	How does pollination take place?	What happens to our bodies during puberty?
NC Content	<ul style="list-style-type: none"> Describe the movement of the Earth, and other planets, relative to the sun in the solar system Describe the movement of the moon relative to the Earth Describe the sun, Earth and moon as approximately spherical bodies Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky 	<ul style="list-style-type: none"> Explain that unsupported objects fall towards Earth because of the force of gravity acting between the Earth and the falling object Identify the effects of air resistance and friction, that act between moving surfaces Recognise that some mechanisms, including levers, pulley and gears, allow a smaller force to have a greater effect 	<ul style="list-style-type: none"> Compare and group together everyday materials based on their properties: hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and changes of state are reversible changes Explain that some changes result in the formation of new materials, and that change is not usually reversible: changes from burning and the action of acid on bicarbonate of soda 	<ul style="list-style-type: none"> Describe the differences in the life cycle of a mammal, an amphibian, an insect and a bird Describe the life process of reproduction in some plants and animals Find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals 	<ul style="list-style-type: none"> Describe the changes as humans develop to old age Learn about the changes experienced in puberty
Key Knowledge	<ul style="list-style-type: none"> Know that the universe comprises all matter and space in existence 	<ul style="list-style-type: none"> Know that a force is measured in a unit called Newtons, named after a 	<ul style="list-style-type: none"> Know materials have different uses depending on their properties and state (liquid, solid, 	<ul style="list-style-type: none"> Know and can describe the differences in the life cycles 	<ul style="list-style-type: none"> Know that humans go through stages of development; they begin

	<ul style="list-style-type: none"> • Know that a celestial body is a large object in the universe • Know the Sun is a star. It is at the centre of our solar system. There are 8 planets. These travel around the Sun in fixed orbits • Know that a star is an exceptionally hot ball of gas, originally made from hydrogen and helium • The Sun and the objects that orbit it are collectively known as our Solar System • Know that all the planets in the solar system orbit the sun and that the further away they are from the sun, the longer their orbits • Know the Earth takes 365 ¼ days to complete its orbit around the Sun • Know the Earth rotates (spins) around an imaginary line through its centre called its axis every 24 hours and that this axis is tilted relative to the Earth's orbit • Know 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 • Know that the tilt of the Earth towards and away from the Sun's light as the Earth orbits the Sun leads to the seasons as during winter the light is 	<p>British scientist called Sir Isaac Newton</p> <ul style="list-style-type: none"> • Know that pull forces can be measured using a device called a force meter • Know that the amount of matter (stuff) in an object is its mass • Know that gravity is a force that acts between all objects in the universe, but that it acts much more strongly between objects that have more mass and that are close together • Know that unsupported objects fall to Earth because of the force of gravity acting between the earth and the falling object • Know that acceleration is a change in speed and that unbalanced forces acting on an object cause it to accelerate • Know that air resistance is a force felt by an object as it moves through the air • Know that water resistance is a force felt by an object as it moves through water; it is caused by the object bumping into the water particles • Know and can identify the effects of air resistance, water resistance and friction, that act between moving surfaces • Know that a lever is a rigid length pivoting around a fulcrum • Know that a pulley is a wheel with a fulcrum that supports a moving cable or belt • Know that a gear is a rotating wheel with cut teeth that mesh with the teeth of 	<p>gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets</p> <ul style="list-style-type: none"> • Know that in some solid materials the bonds between particles break when surrounded by a liquid; this allows the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution; when a solid does dissolve in a liquid it is described as being soluble in that solvent (e.g. sugar in water); when it cannot it is insoluble (e.g. sand in water) • Know that a given amount of solvent can only absorb a certain amount of solid before no more will dissolve; when this happens the liquid is said to be saturated • Know that when a solvent is evaporated from a solution, the original solute is left behind • Know mixtures can be separated by filtering, sieving and evaporation • Know that a reversible change is one that can be reversed and that examples of this are mixing, dissolving and changes of state where no chemical reaction takes place • Know that an irreversible change is one that cannot be reversed and that examples of this often involve a chemical change where a new material is made, often a gas (e.g. burning, boiling an egg, the reaction of bicarbonate of soda and acid) • Know which materials are used for insulation 	<p>of a mammal, an amphibian, an insect and a bird</p> <ul style="list-style-type: none"> • Know and can describe the life processes of reproduction in some plants (including the pollination process) and animals • Know that bulbs, tubers, runners and plantlets are examples of plant reproduction involving only one parent 	<p>as fertilized eggs and then develop into embryos before developing into babies; once they are born, these newborn babies become infants (roughly 2 months to 2 years), then into young children (roughly 2-12); children develop into adults during adolescence (roughly 12-16 years) at which age they become physically capable of reproduction; as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently</p> <p>NB the changes of adolescence in humans is taught as part of mandatory sex and relationship education; it must be taught with due sensitivity to children's backgrounds and must reflect the PSHE curriculum</p>
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	<p>spread over a wider area</p> <ul style="list-style-type: none"> • Know that a satellite orbits a planet and that moons are natural satellites • Know the moon orbits the Earth. It takes about 28 days to complete its orbit. • Know that as the moon orbits the Sun, different parts of it are lit up by the Sun, which is why we see a different shape lit up on the moon as the lunar cycle progresses; these are called the phases of the moon • Know that a solar eclipse occurs when the moon is between the Sun and the Earth, casting a shadow on the Earth; a lunar eclipse occurs when the Earth is between the sun and the moon, casting a shadow on the moon • Know that humans have sent man-made satellites into orbit that assist with telecommunications • Know the Sun, Earth and moon are approximately spherical 	<p>another gear so that turning one gear turns an adjacent gear in the opposite direction</p> <ul style="list-style-type: none"> • Know that gears, levers and pulleys are simple machines that are used to allow a smaller force to have a greater effect; they do this by moving a smaller force over a longer distance at one end of the machine, which the machine turns into a larger force over a small distance at the other end 			
Key Vocabulary	Universe, orbit, solar system, axis, spherical, planet, revolve/rotate, gravitational pull, solar/lunar eclipse, satellite	Air resistance, water resistance, up thrust, friction, Newton, mass, lever/pulley, fulcrum, buoyancy, pivot, weight	Sieve, filter, evaporate, polymers, dissolve, distilling, separate, solution, chemical change, physical change, particle, substance, reversible, irreversible, formation, reaction	Gestation, sexual, asexual, pollination, lifecycle, offspring, naturalist, fertilisation	Puberty, reproduce, adolescence, hormone, chromosome, dormant, development, stages
Key Enquiry Approach	<ul style="list-style-type: none"> • Research • Identifying, grouping and classifying 	<ul style="list-style-type: none"> • Pattern seeking • Research • Identifying, grouping and classifying • Comparative testing • Fair testing 	<ul style="list-style-type: none"> • Identifying, grouping and classifying • Comparative testing • Fair testing 	<ul style="list-style-type: none"> • Observing over time • Pattern seeking • Identifying, grouping and classifying 	<ul style="list-style-type: none"> • Observing over time • Identifying, grouping and classifying

<p>Key Skills</p>	<ul style="list-style-type: none"> • 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 observations 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 • Make first-hand observations of the phases of the moon 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 tests and record 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) 	<ul style="list-style-type: none"> • Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes • Organise mammals into different groups and use scientific evidence to refute/support correct/incorrect statements e.g. dolphins are fish • Compare and contrast the life cycles of different living things and present findings • 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 • Identify which insects complete which type of metamorphosis and present findings • Identify the key differences between some amphibians e.g. frog and toad, and present findings in different forms • Use data to compare and find patterns, e.g. to compare the gestation times for mammals and look for patterns 	<ul style="list-style-type: none"> • Use data to compare and find patterns, e.g. 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 • Compare and contrast the life cycles of different living things and present findings
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Year 6 Science Overview

Term	Autumn		Spring	Summer	
Overview	Evolution and inheritance	Animals, including humans: circulatory system	Light	Electricity	Living things and their habitats
Key Scientists	Charles Darwin Mary Anning Alfred Russell Wallace	Leonardo Da Vinci Dr Katherine Dobb Sir Richard Doll	Thomas Edison Ibn al-Haytham Percey Shaw	Alessandro Volta Edith Clarke Thomas Edison	Carl Linneus Libby Hyman Jane Goodhall
Big Question	Why do different species of the same animal look different?	Is our heart rate always the same? What can affect it?	Why can I hear around corners but not see around corners?	Is it possible to change how loud a buzzer is?	How and why do we classify living things?
NC Content	<ul style="list-style-type: none"> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution 	<ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans 	<ul style="list-style-type: none"> Recognise that light appears to travel in straight lines Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into our eyes Explain that we see things because light travels from light sources to our eyes or from the light source to objects and then to our eyes Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them Extend their experience of light by looking at 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) 	<ul style="list-style-type: none"> Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Use recognised symbols when representing a simple circuit in a diagram 	<ul style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics Know that broad groups, such as micro-organisms, plants and animal can be sub-divided Be able to classify animals into commonly found vertebrates and invertebrates
Key Knowledge	<ul style="list-style-type: none"> Know that all life on Earth began from a single point around 4.5 thousand million years ago 	<ul style="list-style-type: none"> Know that the heart and lungs are organs protected by the ribcage and understand this is a part of the skeleton 	<ul style="list-style-type: none"> Know light appears to travel in straight lines Know and can explain that objects are seen because 	<ul style="list-style-type: none"> Know how to draw simple circuit diagrams using recognised symbols for a battery, bulb, motor, buzzer and wire 	<ul style="list-style-type: none"> Know living things are classified into broad groups according to common observable characteristics and based on similarities and

<ul style="list-style-type: none"> • Know that living things change over time and that this gradual change is called evolution • Know that natural selection is the cause of this change • Know all living things have offspring of the same kind. The offspring are not identical to their parents and vary • Know plants and animals have characteristics that make them suited (adapted) to their environment. • Know if the 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 • Know over a long period of time these characteristics may be so different that a new species is created. This is evolution • Know fossils give us evidence of what lived on the Earth millions of years ago • Know scientists, such as Darwin and Wallace, observed how living things adapt to different environments 	<ul style="list-style-type: none"> • Know that the heart beats, pumping blood around the body and that blood vessels carry the blood; arteries carry blood away from the heart; veins carry blood towards the heart; capillaries are tiny blood vessels that connect arteries and veins • Know that the heart is composed of 4 chambers: 2 atria and 2 ventricles; the aorta is the largest artery in the body and most major arteries branch off from it • Know that blood travels around the body transporting nutrients that have been absorbed into the bloodstream from digestion; blood also absorbs oxygen from the lungs and carries it around the body which is used to power the body; this use of oxygen to create energy is called respiration • Know that when we exercise, our heart beats more frequently so that the oxygen that is used around the body can be replenished; it returns to a resting heart rate afterwards; fitter people tend to have lower resting heart rates • Know that drugs are chemicals that have an impact on the natural chemicals in a person's body; know that drugs can be harmful or helpful, depending on what they are and how they are used; know that all drugs can be harmful if overused • Know that paracetamol and aspirin are examples of drugs that can be helpful as a painkiller 	<p>they give out or reflect light into the eye</p> <ul style="list-style-type: none"> • 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 that when light reflects off an object, the angle of incidence is equal to the angle of reflection • Know that a periscope takes advantage of the predictable angles of incidence and reflection to allow an image to show to a viewer • Know and can explain, with reference to how light travels, why shadows have the same shape as the objects that cast them • Know that translucent objects allow some light to pass through, but some of the light changes direction as it passes through the object; this means that something seen through a translucent object is not clearly defined • Know that when light passes from one medium to another (e.g. from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media • Know that white light comprises all the colours of light • Know that white light refracted by 2 surfaces in a prism will spread out so that all of its constituent colours can be seen; this array of colours is called a 	<ul style="list-style-type: none"> • Know that voltage is a measure of the power of a cell to produce electricity; it is a measure of the 'push' of electric current, not the size of the electric current • Know that as the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase (though too high a voltage may 'blow' the bulb or buzzer) • Know that 2 bulbs in a circuit can be wired up to create a series circuit or a parallel circuit; if one bulb blows in a series circuit the other will not shine as the circuit has been broken; in contrast, if one bulb blows in a parallel circuit, there will still be a complete circuit for the other bulb so it will continue to shine; know the advantage of using parallel circuits in the home 	<p>differences of plants and animals</p> <ul style="list-style-type: none"> • Know that an arthropod is an invertebrate with a hard, external skeleton and jointed limbs • Know that insects are a type of arthropod; their bodies consist of 6 legs, a thorax and an abdomen; most insects also have a pair of antennae and a pair of wings • Know that an arachnid (e.g. spider) is a type of arthropod with 8 legs and no antennae or wings • Know that a crustacean is a type of arthropod with 2 pairs of antennae (e.g. woodlouse) • Know that a myriapod is an arthropod with a flat and long or cylindrical body and many legs (e.g. centipede) • Know that there are 3 types of micro-organism: viruses, fungi and bacteria; of these 3, viruses are often not really considered to be alive by many scientists mainly because they don't have the 'machinery' to reproduce inside them • Know that germs are disease-causing micro-organisms
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Key Vocabulary	Variation, offspring, ancestor, natural selection, fossilisation, decompose, sediment, inherit, adaptation, traits, evolve, species	Circulation, blood vessels, pulse, BPM, respiration, plasma, blood cells, platelets, digestion, aorta, atrium, artery, vein, capillary, resting heart rate, cranium, mandible, sternum, vertebrae, femur, tibia, fibula, patella, humerus, radius, ulna	Light rays, distort, absorb, transmit, spectrum, variance, obstruct, refraction, reflection, angle of incidence, angle of reflection	Static electricity, charge, electron, insulator, conductor, short circuit, fuse, electromagnet, symbol, voltage, series circuit, parallel circuit, resistance	Classify, identify, conditions, micro-organism, kingdom, vertebrates, invertebrates, vascular, non-vascular, virus, thorax, arthropod, abdomen, arachnid, antenna, jointed limbs
Key Enquiry Approach	<ul style="list-style-type: none"> Pattern seeking Research Identifying, grouping and classifying 	<ul style="list-style-type: none"> Observing over time Pattern seeking Research Comparative testing Fair testing 	<ul style="list-style-type: none"> Observing over time Research Comparative testing Fair testing 	<ul style="list-style-type: none"> Research Identifying, grouping and classifying Comparative testing Fair testing 	<ul style="list-style-type: none"> Observing over time Pattern seeking Research Identifying, grouping and classifying Comparative testing
Key Skills	<ul style="list-style-type: none"> 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 Compare the ideas of Charles Darwin and Alfred Wallace on evolution Research the work of Mary Anning and understand how this provided evidence of evolution Refer to and use examples of fossil evidence that 	<ul style="list-style-type: none"> 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 of the effects of exercise on the body Use scientific equipment to track results and record data using tables and graphs Analyse whole class data after investigation to compare 	<ul style="list-style-type: none"> 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 Draw a diagram to show why the shape of a shadow 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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

	support the theory of evolution	and reflect on findings and draw conclusions <ul style="list-style-type: none">• Use information acquired to write a scientific explanation on how the human circulatory system works	will match the shape of an object	<ul style="list-style-type: none">• Evaluate and explain their investigation, results and conclusions	
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