



Science

VISION

Our vision at St. Andrew's is to inspire our children to be excited about learning and curious about the world they live in. We aim to provide a science curriculum which offers the children the opportunity to think scientifically and explore the world so that they have a deeper knowledge and understanding of a range of scientific concepts. Science lessons aim to nurture children's curiosity through practical hands-on experiences that inspire questions and inquiry.

How do we plan and teach Science?

A science unit is taught every half term. Teachers plan sequences of lessons across the unit that will build on and develop the children's knowledge and skills. Each unit of learning has a strong foundation in new knowledge, linked to prior knowledge, that will support the children to understand increasingly complex scientific phenomena and processes. Scientific vocabulary is mapped and taught rigorously to ensure that children can both recognise, understand and use scientific terminology accurately and confidently. Opportunities to learn outdoors and explore our natural environment are embedded throughout our science curriculum. Carefully selected skills are planned to best match each unit of knowledge and progress year on year. Opportunities to practise and embed skills are planned for so that they are revisited and refined over time. The knowledge and skills that children will develop throughout each science topic are mapped across each year group and across the school to ensure progression.

How do we evaluate learning in Science?

The impact of our science curriculum can be seen in the children's books, by talking with the children and through our environment. At the beginning of each unit, a detailed overview outlines the main learning objective alongside the skills that the children will build on and those which will follow. Children also complete a KWL grid which they revisit at the end of the unit. Class teachers then use the children's class learning and assessments, along with observations of their skills when carrying out experiments and investigations, to make a judgement as to whether each child is working towards, at or above the expected level.

Reception: Understanding the World

ELG: Communication and Language (Speaking)

-Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate

ELG: Understanding the World (The Natural World)

- 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.

Ongoing throughout the year

Children will:

- Comment on what they notice about the environment where they live
- Describe what they see hear and feel whilst outside
- Understand the effect of the changing seasons on the natural world around them
- Select and resource desired materials
- Explore changing states of matter - water, playdough, sand, paint and colour mixing

Topic	Me	The Wild	The World
Overview	<p>Children will:</p> <ul style="list-style-type: none"> - Label the different body parts and their functions. - Know that we use our senses to hear, see, smell, touch and taste. - Understand all humans (including themselves) begin life as a baby and grow. - Talk about looking after our bodies - Talk about good oral health - Understand the effect of changing seasons on the natural world around them (Autumn) 	<p>Children will:</p> <ul style="list-style-type: none"> - Identify which animals live in each habitat: the woods, the jungle and the polar regions - Understand that some animals are nocturnal. - Know that some animals are endangered - linking specifically to polar bears. - Talk about the features of different animals e.g. 'fur, scales, feathers'. - Observe changing states of matter - To conduct a test to understand changes in solids that become liquids e.g. ice, dissolving 	<p>Children will:</p> <ul style="list-style-type: none"> - Talk about and compare weather in two different countries (England + Kenya) - Compare different materials – specifically linking to how houses are made in different countries. - Revisit animals and their habitats. - Learn about how to look after our world – specifically relating to recycling - Begin to understand that humans can have a negative impact on the world and environment
Topic	Food Glorious Food	Superheroes	Under the Sea
Overview	<p>Children will:</p> <ul style="list-style-type: none"> - Recognise and name some common trees and plants. - Know what a plant needs to help it to grow - Know that some environments are not suitable to grow certain plants/food in e.g. why can we not grow pineapples in England? - Observe the life cycle of plants, caterpillars and chicks. Compare this to our own life cycle and gain a deeper understanding of growing. 	<p>Children will:</p> <ul style="list-style-type: none"> - Describe what they see hear and feel whilst outside - Understand the effect of the changing seasons on the natural world around them - Continue to grow plants and vegetables in the outdoor area 	<p>Children will:</p> <ul style="list-style-type: none"> - Identify animals that live in an ocean habitat. - Recognise that they ocean animals have features that support them to live there. Would we be able to live under the sea? - Compare living in the city to living at the beach (contrasting environments) - Understand the impact of humans on the ocean environment and begin to recognise ways we can change this (specifically relating to 'clean up'). -

Year 1: Science Curriculum Map

Unit	A1: Seasonal Changes	A2: Animals, including humans	Sp1: Animals, including humans	Sp2: Everyday Materials	Su1: Everyday Materials	Su2: Plants
National Curriculum	<ul style="list-style-type: none"> observe changes across the four seasons observe and describe weather associated with the seasons, including how day length varies 	<p>PARTS OF ANIMALS</p> <ul style="list-style-type: none"> identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense 	<p>TYPES OF ANIMALS</p> <ul style="list-style-type: none"> describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals identify and name a variety of common animals that are carnivores, herbivores and omnivores 	<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 wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees 	
Key Knowledge	<p>UK has 4 seasons</p> <p>Autumn: leaves falling, increased rainfall, temperatures dropping, days shorter</p> <p>Winter = colder, snow and ice, days even shorter</p> <p>Spring = days begin to lengthen, warmer temperatures, growth</p> <p>Summer = longer days, more hours of sunlight, warmer temperatures</p>	<p>Body parts: head, eyes, nose, mouth, ears, neck, shoulders, arms, elbows, hands, fingers, thumb, chest, stomach, legs, thighs, shins, ankles, toes</p> <p>Senses: smell, sight, hearing, touch, taste</p>	<p>There are many different animals with different characteristics.</p> <p>Animals have senses to help individuals survive. When animals sense things they are able to respond.</p> <p>Animals need food to survive (Carnivores = meat-eating Herbivores = plant-eating Omnivores = eat both meat and plants)</p>	<p>There are different materials</p> <p>Materials have describable properties.</p> <p>Different materials have different properties</p> <p>Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass).</p> <p>The properties of a material determine whether they are suitable for a purpose</p>	<p>Plants usually grow from seeds and bulbs.</p> <p>Plants need warmth, light and water to grow and survive.</p> <p>Flowering plants make seeds to reproduce and make more plants.</p> <p>Some plants die after producing seeds and others live for many generations.</p>	

Key Skills	<p>Observing: Take weather measurements and make observations over time (photos of what children are wearing through the year). Record time it gets dark each day.</p> <p>Pattern seeking: Look for patterns in evidence e.g. <i>Does it rain more in spring? Do we have sunnier days in the summer? Which was the coldest month? Do trees with bigger leaves lose their leaves first in autumn? How is Autumn different to the other seasons? Why does our clothing change between the seasons?</i></p>	<p>Pattern seeking: Children generate questions for investigation such as: <i>do people with longer arms have longer legs? Can more people identify prawn cocktail crisps than cheese and onion?</i></p> <p>Comparative/fair testing: <i>Can I taste the difference between different flavoured crisps/skittles/smarties? Do all animals have the same senses as humans?</i></p>	<p>Classifying: Classify animals, choosing their own criteria to do so. Classify animals based on physical structure. Classify animals of based on what they eat (plants, other animals, both). <i>How can we organise zoo animals?</i></p> <p>Observing: Observe animals in the local environment.</p> <p>Researching: Use secondary sources to name animals seen in the local environment that they may not currently be able to name (e.g. birds: magpie, blackbird) and compare to Australia. <i>Can all animals live together?</i></p>	<p>Classifying: Classify objects made from the same material (e.g. lots of things made from plastic). Classify one object made from different materials (e.g. cups made of different materials). Classify paper/plastics/fabrics.</p>	<p>Comparative/fair testing: Test objects made of different materials to see how effective they are e.g. umbrellas/hats/coats for waterproofness, cloths/nappies for absorbency, socks for elasticity etc. <i>Which materials are the most flexible? Which materials could you make a boat from? Why? Which materials are suitable for X? Why?</i></p>	<p>Classifying: classify leaves, flowers, and seeds, choosing their own criteria.</p> <p>Observing: Observe a tree through the year. <i>How do cress seeds change through the week?</i></p> <p>Pattern seeking: children to identify patterns e.g. after comparing the size of leaves on different plants, chn may suggest “bigger plants, bigger leaves.</p> <p>Researching: Use secondary sources to name plants (including trees) (Leafsnap UK)</p>
	Vocabulary	<p>Weather (sunny, rainy, windy, snowy etc.), seasons (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length, hibernate, grow, change,</p>	<p>Body parts: head, eyes, nose, mouth, teeth, ears, body, neck, shoulders, arms, elbows, hands, fingers, thumb, chest, stomach, legs, thighs, shins, ankles, toes Senses: smell, sight, hearing, touch, taste</p>	<p>Common animals: fish goldfish, cod, shark, salmon, amphibians (frog, toad, newt), reptiles (reptiles: snake, lizard, crocodile), birds (birds: robin, sparrow, owl, woodpecker) and mammals (cat, dog, horse sheep including pets) Carnivores, Herbivores, Omnivores = tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves</p>	<p>Materials: wood, plastic, glass, metal, water, and rock Properties: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent</p>	<p>Plants dandelion, daisy, thistle, water lily, buttercup, heather, fern, Deciduous – oak, ash, willow, beech, maple Evergreen – pine, spruce and holly trees. Structure roots, trunk, branches, leaves stem, petals, leaves, blossom, buds, bulb, evergreen, garden plants, deciduous, wild plants, seeds, wild plants, garden plants.</p>
Working Scientifically question, answer, observe, observing, equipment, identify, sort, group, compare, differences, similarities, describe, measurements, test, results, secondary sources record – diagram, chart						
Threads	PHYSICS: Earth and Space	BIOLOGY: Animals and Humans Parts of Animals	BIOLOGY: Animals and Humans Types of Animals	CHEMISTRY: Materials and Changes of State Describing materials	CHEMISTRY: Materials and Changes of State Using materials	BIOLOGY: Plants

Year 2: Science Curriculum Map

Unit	A1: Uses of Everyday Materials	A2: Uses of Everyday Materials	Sp1: Animals including humans	Sp2: Plants	Su1: Living things and their habitats	Su2: Living things and their habitats
National Curriculum	<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"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	<ul style="list-style-type: none"> 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"> explore and compare the differences between things that are living, dead, and things that have never been alive identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food 	
Key knowledge	<p>Materials can be changed by physical force (twisting, bending, squashing and stretching)</p> <p>Squashing = to crush or squeeze something with force so that it comes flat, soft or out of shape</p> <p>Bending = applying force to shape something into a curved shape</p> <p>Twisting = applying force in opposite directions to form something into a curled shape</p> <p>Stretching = applying force to make something longer or wider without tearing or breaking</p>		<p>Different animals move in different ways to help them survive.</p> <p>Reproduction and growth in animals including humans</p> <p>Animals grow until maturity and then don't grow any larger and all animals eventually die.</p> <p>Exercise keeps animal's bodies in good condition and increases survival chances.</p> <p>Basic needs of animals water, food and air</p> <p>Different types of food</p> <p>Hygiene: handwashing, teeth brushing, face washing, changing clothes</p>	<p>Plants usually grow from seeds and bulbs.</p> <p>Plants need warmth, light and water to grow and survive.</p> <p>Flowering plants make seeds to reproduce and make more plants.</p> <p>Some plants die after producing seeds and others live for many generations.</p> <p>Seeds and bulbs have a store of food inside them.</p>	<p>Some things are living some were once living but now dead and some things never lived.</p> <p>There is variation between living things.</p> <p>Different animals and plants live in different places.</p> <p>Living things are adapted to survive in different habitats.</p> <p>Environmental change can affect plants and animals that live there.</p>	

Key Skills	<p>Classifying: Based on the children’s own criteria, classify materials e.g. samples of wood, metal, plastic, etc.</p> <p>Comparative/fair testing: Test materials for different uses e.g. <i>Which material can you use to make an aeroplane? Which fabric would you use for curtains? Which materials are best for Cinderella’s mop? Which fabric would you choose for Elastigirl’s costume? Which material could be used to make a waterproof hat for playtime? Which plastic would be flexible enough to make a belt?</i> (link to Fashion topic).</p>	<p>Classifying: Based on the children’s own criteria: classify food items classify animals.</p> <p>Observing over time: Observe a life cycle (e.g. caterpillars, chicks, farm animals). Observe how their body changes during/after exercise.</p> <p>Researching: Research adult animals and their young</p>	<p>Classifying: Based on the children’s own criteria: classify seeds classify bulbs.</p> <p>Observing over time: Plant seeds and bulbs and observe how they grow</p> <p>Pattern seeking: Children generate questions for investigation such as: Do big seeds germinate more quickly?</p>	<p>Observing: Explore plants and animals in microhabitats (under a rock, in a pond, in a meadow), mini-beasts found in the environment based on physical structure, find things that are living/ dead /have never been alive and classify them.</p> <p>Researching: Research what animals they have first-hand experience of eat.</p>
Vocabulary	<p>Names of materials – increased range from year 1 Properties of materials - as for year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/puling, twist/twisting, squash/squashing. Bend/bending, stretch/stretching</p>	<p>Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby, toddler, teenager and adult. child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (dairy, carbohydrates, protein, fruit and vegetables, fat/sugar)</p>	<p>Observation, growth, compare, record, seeds, bulbs, temperature, roots, stem, predict, leaf, flower, measure, diagram, measure, comparative tests, life cycle, life process, germinate, grain.</p>	<p>Living, dead, never been alive, suited, suitable, basic needs, names of local habitats e.g. pond, woodland names of other habitats: Antarctic, desert, savannah grassland, farmland, forest, sea, rockpool, Tropical rainforest food, food chain, shelter, move, feed, names of micro-habitats e.g. under logs, in bushes etc</p>
Working Scientifically question, answer, observe, observing, equipment, identify, sort, group, compare, differences, similarities, describe, measurements, test, results, secondary sources record – diagram, chart				
Threads	<p>CHEMISTRY Materials and Changes of State: Changing materials Uses of materials</p>	<p>BIOLOGY Animals and Humans: Living Things and Feeding and Exercise</p>	<p>BIOLOGY Plants: Growing plants</p>	<p>BIOLOGY Living Things: Habitats</p>

Year 3: Science Curriculum Map

Unit	A1: Animals including humans	A2: Rocks	Sp1: Forces and magnets	Sp2: Light	Su1: Plants	Su2: Plants
National Curriculum	<ul style="list-style-type: none"> identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat identify that humans and some other animals have skeletons and muscles for support, protection and movement 	<ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter 	<ul style="list-style-type: none"> compare how things move on different surfaces notice that some forces need contact between 2 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 2 poles predict whether 2 magnets will attract or repel each other, depending on which poles are facing 	<ul style="list-style-type: none"> recognise that they need light in order to see things and that dark is the absence of light notice that light is reflected from surfaces recognise that light from the sun can be dangerous and that there are ways to protect their eyes recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change 	<ul style="list-style-type: none"> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 	

Key Knowledge	<p>Different animals are adapted to eat different foods.</p> <p>Many animals have skeletons to support their bodies and protect vital organs.</p> <p>Muscles are connected to bones and move them when they contract.</p> <p>Movable joints connect bones</p> <p>Animals with skeletons = vertebrates</p> <p>Animals without skeletons = invertebrates</p>	<p>There are different types of rock and soil.</p> <p>Soils change over time.</p> <p>Different plants grow in different soils.</p> <p>Fossils tell us what has happened before.</p> <p>Palaeontologists use fossils to find out about the past.</p> <p>Sedimentary rocks – contain fossils</p> <p>Igneous rocks (granite and basalt) – formed when magma or lava from volcanoes cools.</p> <p>Metamorphic rocks – formed when other rocks are changed due to heat or pressure</p>	<p>Magnets exert attractive and repulsive forces on each other.</p> <p>Magnets exert non-contact forces, which work through some materials.</p> <p>Magnets exert attractive forces on some materials.</p> <p>Magnets can be different strengths. This will affect how far away an object can be for attraction to be felt. Magnet forces are affected by magnet strength, object mass, distance from object and object material</p>	<p>We need light to see things even shiny things. Without light it is dark.</p> <p>Transparent materials let light through them and opaque materials don't let light through.</p> <p>Beams of light bounce off some materials (reflection).</p> <p>Shiny materials reflect light beams better than non-shiny materials.</p> <p>Light comes from a source</p> <p>Shadows = formed when light is blocked</p>	<p>Plants make their own food in their leaves to provide them with energy, growth, repair and reproduce.</p> <p>Leaves absorb sunlight and carbon dioxide.</p> <p>Plants have roots to provide support and to draw moisture from the soil, through stems to take water to the rest of the plant.</p> <p>The plant makes its food from water and carbon dioxide, using sunlight as energy, in the green parts of plants (mainly leaves).</p> <p>Flowering plants have evolved specific parts to carry out pollination, fertilization and seed growth.</p> <p>Seed dispersal improves chances of enough seeds germinating and growing to mature.</p> <p>Seeds and bulbs need the right conditions to germinate. They contain a food store for the first stages of growth (i.e. until the plant is able to produce its own food).</p>
Key Skills	<p>Pattern seeking: <i>Do 'healthy' drinks have less sugar? Do people with long arms throw further? Can people with short legs jump higher?</i></p> <p>Classifying animals: Classify and sorting based on whether they are vertebrates or invertebrates</p> <p>Researching: Look at food packaging to identify the amount of nutrients in different food items. Asking questions: what would happen if humans did not have skeletons?</p>	<p>Classifying: Based on the children's own criteria, classify rocks based on physical properties. Look at different soils and discuss how they are similar/different</p> <p>Observing over time: Observe how soil separates into different layers in water</p> <p>Comparative/ fair testing: Test what happens when rocks are put in water. Test how quickly water runs through different types of soil.</p> <p>Researching: <i>How were fossils formed?</i></p>	<p>Classifying: Based on the children's own criteria: sort materials (metal/non-metal and magnetic/not magnetic) sort toys (what makes them move e.g. push/pull)</p> <p>Comparative/fair testing: Test the strength of different magnets.</p> <p>Researching: Find out how magnets are used in everyday life</p> <p>Pattern seeking: Does the size and shape of a magnet affect how strong it is?</p>	<p>Comparative/fair testing: Test materials for reflectiveness and transparency Investigate shadows (size and shape)</p> <p>Classifying: Based on children's own criteria: Classify light sources (lead to manmade/natural) Classify materials (lead to reflective/non-reflective or transparent, translucent or opaque)</p>	<p>Observing over time: Observing celery (with roots and leaves) in coloured water. Gathering seeds and photographic evidence of blossoms/flowers and berries on a particular trail throughout the year</p> <p>Pattern seeking: Investigate what happens when conditions are changed e.g. more/less light/water, change in temperature, nutrients. Recording findings – tables</p> <p>Research: Researching functions of parts of flowering plants and different methods of seed dispersal/pollination</p>

Vocabulary	Exoskeleton, endoskeleton, Muscles, protection, nutrition, support, movement, vitamins, nutrition, minerals, fat, protein, water, diet, carbohydrates, fruit, vegetables, dairy, sugar, muscles, exoskeleton, brain, rib cage heart, lungs, joints, skull, spine, pelvis, bone, socket, femur, collar bone, herbivores, omnivores, carnivores, amphibians, birds, mammals, reptiles, fish, common animals, vertebrates, invertebrates, insects, minibeasts	soils, organic matter, fossil, crystal, sandstone, granite, marble, pumice absorbent, crumble sedimentary, layer, sediment igneous, magma, lava, gas bubbles (tiny holes/spaces) metamorphic, change, squeeze, pressure	Force, air resistance, water resistance, friction, gravity, pull, push, motion, surface, magnetism, magnets, repel, poles, attract, north pole, south pole, magnetic field, metal, compass	transparent, translucent, opaque, shadow, light source, dark, light rays, reflection, reflect, reflective, refraction, artificial light, natural light, Sun, Moon, periscope, sunlight, pupil, eyes, retina, iris	Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower. Photosynthesis, Energy, Growth, Carbon dioxide, Oxygen, Sugar, material
	Working Scientifically oral and written explanations, conclusion, predictions, criteria, classify, changes, data, contrast, evidence, improve, secondary sources, guides, keys, construct, interpret research – relevant question equipment – thermometer, data – gather, standard units, record, classify, present record – drawings, labelled diagrams, keys, bar charts, tables				
Threads	BIOLOGY Animals and Humans: Movement and Feeding	CHEMISTRY Rocks and Soils	PHYSICS Forces: Magnets and Forces	PHYSICS Light: Light and Shadows	BIOLOGY Plants: What Plants Need and Parts of Plants

Year 4: Science Curriculum Map

Unit	A1: Living Things and their Habitats	A2: States of Matter	Sp1: Sound	Su1: Electricity	Su2: Animals, including humans
National Curriculum	<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"> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature 	<ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases 	<ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors 	<ul style="list-style-type: none"> describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey

Key knowledge

<p>Living things can be divided into groups based upon their characteristics.</p> <p>Environmental change affects different habitats differently.</p> <p>Different organisms are affected differently by environmental change.</p> <p>Different food chains occur in different habitats.</p> <p>Human activity significantly affects the environment</p> <p>Positive impact on the environment: nature reserves, ecologically planned parks, or garden ponds,</p> <p>Negative effects on the environment: population and development, litter or deforestation.</p>	<p>Solids: hold their shape, Liquids: form a pool not a pile, Gases: escape from an unsealed container</p> <p>Different substance change state at different temperatures but the temperatures at which given substances change state are always the same.</p> <p>Heating causes solids to melt into liquids and liquids to evaporate to gases.</p> <p>Cooling causes gases to condense to liquids and liquids to freeze to solids.</p> <p>Water freezes at 0 degrees Celsius and boils at 100 degrees Celsius.</p> <p>Different materials have different melting, freezing and boiling points.</p> <p>Water cycle: Precipitation (rain) – evaporation – condensation</p>	<p>Sound travels from its source in all directions and we hear it when it travels to our ears.</p> <p>Sound travel can be blocked.</p> <p>Sound spreads out as it travels.</p> <p>Changing the shape, size and material of an object will change the sound it produces.</p> <p>Sound is produced when an object vibrates.</p> <p>Sound moves through all materials by making them vibrate.</p> <p>Changing the way an object vibrates changes its sound.</p> <p>Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds.</p> <p>Faster vibrations (higher frequencies) produce higher pitched sounds.</p>	<p>A source of electricity (battery) is needed for electrical devices to work.</p> <p>Electricity sources push electricity round a circuit.</p> <p>More batteries will push the electricity round the circuit faster.</p> <p>A complete circuit is needed for electricity to flow and devices to work. Basic parts of a simple series electrical circuit: cells, wires, bulbs, switches and buzzers. Simple series circuits have one path around which a current can flow.</p> <p>Some materials allow electricity to flow easily: conductors (metal).</p> <p>Water can conduct electricity which is why water and electricity are dangerous.</p> <p>Materials that don't allow electricity to flow easily are called insulators (e.g. wood and plastic).</p>	<p>Animals have teeth to help them eat. Different types of teeth do different jobs. Molars = crushing and grinding food Canines =tearing and ripping food Incisors = biting off and chewing food</p> <p>Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. The blood takes nutrients around the body.</p> <p>Nutrients produced by plants move to primary consumers then to secondary consumers through food chains</p> <p>Types of teeth: Molars, canines and incisors</p>
--	--	---	---	--

Key Skills	<p>Observing over time: Making systematic and careful observations of living things in local environments Classifying living things in our environment based on our own criteria Recording findings charts and bar charts (living things found) Reporting on findings – presentations</p> <p>Researching: Researching how environmental issues impact on living things</p>	<p>Observing: Observe water as a solid, liquid and gas. Watch it being heated and cooled. Observe puddle over time.</p> <p>Comparative/fair testing: What affects melting rate of chocolate/ice? What affects rate of evaporation? Recording data Using results to draw simple conclusions Using evidence to support findings.</p> <p>Researching: Research the water cycle or stages of the melting points of metals</p>	<p>Comparative/fair testing: Compare volume from different instruments. Compare how volume changes away from a source. Taking accurate measurements – volume Recording data and reporting on findings Using scientific evidence to support findings</p>	<p>Classifying: Household appliances as electrical/ not electrical or batteries/ mains</p> <p>Comparative/fair testing: Asking relevant questions – will this circuit work? Using results to draw simple conclusions and make predictions – would this bulb light in this circuit? Using scientific evidence to support findings</p>	<p>Classifying: Compare and contrast different types of teeth. Recording finding using drawing and labelled diagrams. Comparing the teeth of carnivores and herbivores</p> <p>Researching: Asking relevant questions – why are teeth different? Researching the different parts of the digestive system. Researching what different animals eat within a specific environment, e.g. coral, polar, African grasslands, to construct food chains</p>
	Vocabulary	<p>Classification, keys, fish, amphibians, reptiles, birds, mammals, carnivores, herbivores, vertebrates, invertebrates, omnivores, characteristics environment, natural events, earthquakes, storms, fires, floods, droughts, deforestation, pollution, urbanisation, environment, tsunamis, volcanoes, tornadoes, earthquakes, hurricanes, man made, oil slicks</p>	<p>solid, liquid, gas, evaporation, condensation, particle, temperature, freezing, heating, melt, degree Celsius, boil, freeze, solidify, semisolids, materials, Water cycle, rain, water, evaporation, condensation, precipitation, heat, cool, collection, water vapour</p>	<p>vibration, wave, volume, pitch, tone, insulation sound waves, vibration, amplitude, louder, high pitch, quieter, lower pitch, vacuum, particles, volume, pitch, sound source, distance, fainter, outer ear, pinna, eardrum, ear canal, inner ear, balance, middle ear, ear canal, auditory</p>	
<p>Working Scientifically: oral and written explanations, conclusion, predictions, criteria, classify, changes, data, contrast, evidence, improve, secondary sources, guides, keys, construct, interpret research – relevant question equipment – thermometer, data – gather, standard units, record, classify, present record – drawings, labelled diagrams, keys, bar charts, tables</p>					
Threads	<p>BIOLOGY Living Things: Grouping Living Things Dangers to Living Things</p>	<p>CHEMISTRY Materials and Changes of State: Changes of State</p>	<p>PHYSICS Sound</p>	<p>PHYSICS Electricity</p>	<p>BIOLOGY Animals and Humans: Human Nutrition</p>

Year 5: Science Curriculum Map

Unit	A1: Properties and changes of Materials	A2: Properties and changes of Materials	Sp1: Forces and Magnets	Sp2: Animals including humans	Su1: Living Things and their Habitats	Su2: Earth and Space
National Curriculum	<ul style="list-style-type: none"> ● compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets ● 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 this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda 		<ul style="list-style-type: none"> ● explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object ● identify the effects of air resistance, water resistance and friction, that act between moving surfaces ● recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect 	<ul style="list-style-type: none"> ● describe the changes as humans develop to old age 	<ul style="list-style-type: none"> ● describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird ● describe the life process of reproduction in some plants and animals 	<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

Key knowledge

When two or more substances are mixed and remain present the mixture can be separated. Some changes can be reversed and some can't. Burning is an irreversible change - once toast is burned, for example, this cannot be undone and a new product has been formed. Some changes result in the formation of new materials. Materials change state by heating and cooling. Separating mixtures: filtering, sieving and evaporating. Reversible changes: filtering, sieving, dissolving, melting and changing states. Melting and dissolving – difference. Dissolving occurs at a greater rate at higher temperatures. Dissolving is a reversible change. If the liquid (a solvent) evaporates, the salt or sugar can be recovered.

Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. Friction is a force against motion caused by two surfaces rubbing against each other and slows objects down. Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move. Streamlining reduces the surface area of an object so that it moves more quickly and efficiently through air or water. Gravity is a force which pulls unsupported objects towards the Earth. The greater an object's mass, the stronger the gravitational pull. Galileo Galilei and Isaac Newton helped develop the theory of gravitation.

Different animals mature at different rates and live to different ages. Baby, toddler, child, teenager, adult. Puberty in males: Pubic hair growth, voice deepens, body odour, sweat, penis enlarges. Puberty in females: Pubic hair growth, hips widen, breasts develop, periods (menstrual cycle) begins. Human gestation = approximately 9 months. Timeline from gestation to puberty.

Sexual reproduction: pollen from one flower fertilising the egg of another to produce a seed. Asexual reproduction: only one parent is needed in asexual reproduction and the offspring are exact copies. Different types of organisms have different lifecycles: Mammals produce live young, Amphibians, reptiles, insects and birds produce eggs. Some organisms reproduce sexually where offspring inherit information from both parents. Some organisms reproduce asexually by making a copy of a single parent. Environmental change can affect how well an organism is suited to its environment.

The sun is a star at the centre of our solar system and that it has 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). A moon is a celestial body that orbits a planet (Earth has 1 moon). Earth, moon and sun are all roughly spherical. Gravity is a force which pulls unsupported objects towards the Earth. There are 8 phases of the moon. Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance. Objects with larger masses exert bigger gravitational forces. Objects like planets, moons and stars spin. Smaller mass objects like planets orbit large mass objects like stars. Stars produce vast amounts of heat and light. All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.

Key Skills	<p>Comparative/ fair testing: Test solids for solubility and compare rates of solubility Taking measurements, with a range of scientific equipment accurately and precisely and, taking repeat readings Recording data and results using tables, scatter graphs, bar and line graphs Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations. Was the change reversible or irreversible e.g. melting vs burning? Which materials would be good for a tent? Good to make a tea bag from? Good to keep things warm/cold? Observing over time: Observing rusting and uncoated nails in different liquids (remove coating with sandpaper) Classifying: After observing what happens when solids are added to liquids, classify the materials based on the outcomes.</p>	<p>Comparative/fair testing: Carrying out a scientific enquiry into air resistance (paper aeroplane shapes): identifying and controlling variables, taking measurements, recording data and results using scientific diagrams, tables and graphs. Using results to make predictions to set up further comparative and fair tests. Planning a scientific enquiry into water resistance; identifying and controlling variables Compare fiction by using a force meter: trainers or weighted match box to pull along surfaces</p>	<p>Researching: Researching characteristics of humans at different points in development. Writing questions for an expert like a doctor, nurse or health visitor.</p>	<p>Classifying: Classify animals according to their life cycle Observing over time: Grow from cuttings/bulbs and observe whether they grow roots/stem/leaf/flower. Observe plants through the year. Pattern seeking: Children generate questions such as: Do larger mammals have longer gestation periods? Do smaller animals lay more eggs? Observing over time: Observing changes in an animal over a period of time by hatching chicks Researching: Research how gardeners asexually reproduce plants.</p>	<p>Researching: Identifying scientific evidence that has been used to support or refute ideas or arguments – models of the solar system Researching to compare the time of day at different places on the Earth through internet links and direct communication Observing over time: Measure shadows throughout the day</p>
	Vocabulary	<p>hardness, transparency, conductivity (electrical, thermal) solubility, solution dissolve, filter, evaporate, sieve, reversible, irreversible</p>	<p>gears. push, pull, cogs, magnetism, water resistance, air resistance, Isaac Newton, friction, pulleys, levers, mechanisms, gravitational pull, weight, mass, streamlines, buoyancy, newtons Water resistance, Gravity, Newton, Gears, force, opposing, streamline, brake, cog, machine,</p>	<p>Fertilisation, male sex cell, female sex cell, sexual reproduction, foetus, baby, gestation, prenatal, uterus, growth, child, young, childhood, adolescence, teenager, puberty, adult, adulthood, lifestyle, health, parent, life cycle, life expectancy Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty</p>	<p>bird, mammal, amphibian, insect, life process, plants, animals, sexual reproduction, pollination, asexual reproduction, life cycle, fertilisation, gestation, offspring, metamorphosis, baby, sperm, egg, female sex</p>
<p>Working Scientifically plan, variables, measurements, accuracy, precision, repeat readings, predictions, further comparative and fair test, identify, classify and describe, patterns, systematic, quantitative measurements report data – scientific diagrams, labels, classification keys, tables, scatter graphs, bar graph and line graphs report and present – conclusions, casual relationships, explanations, degree of trust, oral and written display and presentation evidence – support, refute, ideas or arguments biology, physics, chemistry</p>					
Threads	<p>CHEMISTRY Materials and Changes of State</p>	<p>PHYSICS Forces</p>	<p>BIOLOGY Animals and Humans: Life Cycles</p>	<p>BIOLOGY Living Things: Grouping Living Things Dangers to Living Things</p>	<p>PHYSICS Earth and Space</p>

Year 6: Science Curriculum Map

Unit	A1: Animals including Humans	A2: Evolution and Inheritance	Sp1: Living Things and their Habitats	Sp2: Light and how it travels	Su1:	Su2: Electricity
National Curriculum	<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 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"> 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 	<ul style="list-style-type: none"> recognise that light appears to travel in straight lines use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them 	<ul style="list-style-type: none"> associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram 	<ul style="list-style-type: none">

Key knowledge

The heart pumps blood around the body.
 Oxygen is breathed into the lungs where it is absorbed by the blood.
 Muscles need oxygen to release energy from food to do work.
 (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood.)
 platelets = blood clotting
 white blood cells = immunity
 red blood cells = carry oxygen
 arteries = carry blood away from the heart
 veins = carry blood to the heart
 capillaries =

Evolution occurs over millions of years
 Life cycles have evolved to help organisms survive to adulthood
 Over time the characteristics that are most suited to the environment become increasingly common.
 Organisms best suited to their environment are more likely to survive long enough to reproduce.
 Organisms are best adapted to reproduce are more likely to do so.
 Organisms reproduce and offspring have similar characteristic patterns.
 Variation exists within a population
 Competition exists for resources and mates

Aristotle – classification system
 Microorganisms are too small to see with the human eye. They include bacteria, viruses, yeast and fungus

Light travels in straight lines
 Light travels from a light source like the sun or a torch
 The moon is NOT a light source – it reflects light from the sun
 Animals see light sources when light travels from the source into their eyes.
 Animals see objects when light is reflected off that object and enters their eyes.
 Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light so we don't see the beam.

The higher the voltage, the louder the volume of a buzzer or the brighter the bulb.
 Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.'
 The greater the current flowing through a device the harder it works.
 Current is how much electricity is flowing round a circuit.
 When current flows through wires heat is released. The greater the current, the more heat is released.
 Knowledge of recognised symbols for: wires, bulbs, buzzers, motors, switches, cells

Key Skills	<p>Comparative/ fair testing: Exercise and pulse experiment. Planning and enquiry to answer a question (recognising and controlling variable for fair test). Taking measurements accurately and precisely and, taking repeat readings. Recording data and results using tables and graphs. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations</p> <p>Observing: Observe pulse rate before, during and after exercise</p> <p>Pattern seeking: Do older people have lower pulse rates?</p>	<p>Researching: Identifying scientific evidence that has been used to support or refute ideas or arguments – evidence for evolution</p> <p>Observing and raising questions about local animals and how they are adapted to their environment</p> <p>Researching how some living things are adapted to survive in their habitats including extreme conditions, for example, cactuses, penguins and camels.</p> <p>Classifying: (to show variation within a species) Classify a species of plant e.g. daffodils, tulips, lilies.</p>	<p>Classifying: Classification of living things in our local environment Classify animals according to Carl Linnaeus' system. Classify plants into flowering, mosses, ferns and conifers, based on specific characteristics. Create a branching database/dichotomous key to classify a set of living things.</p> <p>Researching: Research the difference between bacteria, virus and fungi to give reasons why these are not plants or animals. Research how micro-organisms can be helpful or harmful.</p>	<p>Comparative/ fair testing: Experimenting with voltage – brightness and volume</p> <p>Systematically identifying the effect of changing one component at a time in a circuit</p> <p>Planning an enquiry to answer a question (recognising and controlling variable for fair test)</p> <p>Recording data and results using scientific diagrams and labels (of circuits)</p> <p>Using test results to make predictions for further testing. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations</p>	<p>Comparative/ fair testing: Investigate the shape of shadows and link this to light travelling in straight lines.</p>	
Vocabulary	<p>Oxygenated, Deoxygenated, Valve, Exercise, Respiration</p> <p>Circulatory system, heart, lungs, blood vessels, blood, artery, vein, pulmonary, alveoli, capillary, digestive, transport, gas exchange, villi, nutrients, water, oxygen, alcohol, drugs, tobacco. lifestyle</p>	<p>evolution, inheritance, adaptive traits, inherited traits, genetics, genes, chromosomes, DNA, environmental impact, fossils, natural selection, variations, offspring, adaptation, habitat, environment, Charles Darwin, Alfred Wallace</p>	<p>characteristic, classification, organism, micro-organism, classification characteristics, traits, kingdom, phylum, class, order, family, genus, species, Carl Linnaeus, taxonomist, bacteria, microscope, species, micro organism</p>	<p>electrical safety, circuit, bulb, buzzer, cell, battery, switch, wires, conductor, insulators, brightness, symbols, component, parallel circuit, series circuit, complete circuit, mains, electrical current, direct current, alternating current, electrical charge, ammeter, volume, voltage, components, loudness</p>	<p>spectrum, rainbow transparent, translucent, opaque, shadow, light source, dark, light rays, reflection, refraction, artificial light, natural light, Sun, Moon, periscope, sunlight, pupil, eyes, retina, iris, cornea</p>	<p>Working Scientifically plan, variables, measurements, accuracy, precision, repeat readings, predictions, further comparative and fair test, identify, classify and describe, patterns, systematic, quantitative measurements report data – scientific diagrams, labels, classification keys, tables, scatter graphs, bar graph and line graphs report and present – conclusions, casual relationships, explanations, degree of trust, oral and written display and presentation evidence – support, refute, ideas or arguments biology, physics, chemistry</p>
Threads	<p>BIOLOGY Animals and Humans: Our Bodies</p>	<p>BIOLOGY Animals and Humans: Evolution and Inheritance This unit also links to Y3 Rocks and Soils</p>	<p>BIOLOGY Living Things and their Habitats: Classifying Living Things</p>	<p>PHYSICS Light: Light and Sight</p>	<p>PHYSICS Electricity: Changing Circuits</p>	