

## **Science at Springfield**

### **Our vision**

At Springfield, we value science as a subject which stimulates awe and wonder in our everyday lives. We believe science can have a transformative effect on children, helping them to become curious and inspired by the world around them. We believe that a high-quality science education should engage, stimulate and challenge pupils, equipping them with the knowledge and skills to better understand their life and their planet. We encourage children to learn from and be inspired by the work of great scientists and understand the contribution science has made to society, both past and present. As pupils progress, we support them to be able to pose increasingly complex scientific questions and carry out experiments to work accurately and analytically.

### **How we plan for and teach Science**

At Springfield, science 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 we evaluate learning in Science**

The impact of our science curriculum can clearly be seen in the children's books. 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. On completion of the unit of work, key assessment targets are identified and the children are able to self-assess against them. 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.

# Nursery

Seasonal change	Forces	Humans and Senses	Materials and changes	Living things and their habitats	Plants
<p>Across Nursery, children <b>observe</b> the changes across the four seasons. They do this through a book-based curriculum, which uses 'The Leaf Man', 'The Snowy Day' and 'Oscar's Tower of Flowers' and 'Billy's Bucket' to explore Autumn, Winter, Spring and Summer respectively. This learning is also delivered through Forest School sessions, which are woven throughout the week and provide hands-on exploration of the seasonal changes, enabling children to <b>compare</b> and <b>pattern seek</b> across seasons.</p>	<p>Across the year, Nursery children <b>observe</b> forces at play during their explorations of the continuous provision which is carefully planned to ensure opportunities to discuss water resistance, gravity, magnetism and simple mechanics such as pulleys and levers. In particular, through their 'The Little Red Runaway Train' unit, Nursery will develop a foundational understanding of magnetism, and <b>observe</b> and <b>compare</b> objects for this property. Later, during their 'Billy's Bucket' core text, Nursery explores water resistance and floating and sinking in more detail.</p>	<p>Across Nursery, children begin to make sense of themselves as a human. This is achieved through a rich curriculum of hands-on experiences which allow for exploration using all five senses. Sensory experience is at the heart of all Nursery learning. Children begin to build on this sense of self through carefully selected and diverse core texts such as 'So Much!', 'Through My Window' and 'Anna Hibiscus Song', which support children to place themselves within their own life-story and family history and <b>observe</b> and <b>compare</b> similarities and differences about appearances and family units.</p>	<p>Across Nursery, children begin their learning about materials and the changes that can occur to them. Our hands-on curriculum provides sensory opportunities to handle, <b>observe</b> and manipulate materials, watching the changes which occur in processes such as adding water to the mud kitchen or sand pit or adding powder paint into our water tray. A key experience through which children build these <b>observational</b> and <b>comparison</b> skills is through half termly cooking and weekly playdough making sessions. In Spring 1, Nursery also explores melting in an alternative context, through their text 'Snowy Day'.</p>	<p>Across Spring 2, Nursery children begin to understand the key features of the life cycle of an animal through <b>observing</b> the metamorphosis of caterpillars into butterflies. Through this, they begin to understand the need to respect and care for the natural environment and all living things. Alongside real-life experience, links are made to the text 'The Very Hungry Caterpillar'. At several other points during the year, Nursery learns about animals, their habitats and how to care for them, through the core texts 'Lulu Gets a Cat', 'Goldilocks and the 3 bears', 'What the ladybird heard' and 'Billy's Bucket'. Across the year, the children begin to develop <b>classifications</b> for these groups of animals, for example by where in the world they live.</p>	<p>Across Spring and Summer, Nursery children begin to understand the key features of a life cycle of a plant through planting seeds and caring for and <b>observing</b> growing plants. Through this, they begin to understand the need to respect and care for the natural environment and all living things. They do this through hands-on experiences linked to the book-based curriculum, in particular 'Oscar's Tower of Flowers'. Learning about plants is also woven into weekly Forest school sessions, exploring the plant-life in our Forest across the year.</p>
<p>Knowledge: Season names; Autumn, Winter, Spring, Summer. Weather-type words I can notice and describe a change in our Forest e.g. leaves fall off trees in Autumn, bulbs shoot up in Spring.</p>	<p>Knowledge: I can work and describe a pulley. I can work and describe cogs. I know the word 'magnetic' and explore with materials in relation to this property. I can describe the behaviour of objects on water and say what I feel when pushing down.</p>	<p>Knowledge: I have senses through which I observe and perceive the world. I am a person, and all people are different in their appearance and in other ways.</p>	<p>Knowledge: Dry materials change when water is added. Heating in the oven changes materials. Steps to make playdough. Water freezes in the cold. Ice melts in the warmth.</p>	<p>Knowledge: The life cycle of a butterfly including scientific names for stages. Animal names (pets) and how to care for a pet. Animal names (breeds of bear) and where they live. Animal names (farm animals) and how to care for them. Animal names (sea creatures) and where they live.</p>	<p>Knowledge: The steps for planting and caring for a seed. The name of gardening equipment. Some parts of a plant- roots, stem, flower, shoots. Some plant names; daffodil, green bean, fern, forget-me-not, sunflower, grape hyacinth, cherry blossom.</p>

## Reception

Seasonal change	Forces	Humans and Senses	Materials and changes	Living things and their habitats	Plants
<p>Across Reception, children continue to <b>observe</b> the changes across the four seasons. They do this through a book-based curriculum , which uses ‘Stanley’s stick’, ‘Blue Penguin’ ‘Errol’s Garden’ and ‘Anna Hibiscus, Splash!’ to explore Autumn, Winter, Spring and Summer respectively. This learning is also delivered through Forest School sessions, which are woven throughout the week and provide hands-on exploration of the seasonal changes, enabling children to <b>compare</b> and <b>pattern seek classifications</b> for seasonal weather patterns. In particular, children increase their focused observations of the natural world during Reception, supporting their ability to describe the natural world using all their senses, build descriptive vocabulary, and begin to make some <b>shared recordings</b> about what they observe.</p>	<p>Across the year, Reception children continue to <b>observe</b> forces at play during their explorations of the continuous provision which is carefully planned to ensure opportunities to discuss water resistance, gravity, magnetism and simple mechanics such as pulleys and levers. Children begin explore magnetism, and <b>observe</b> and <b>compare</b> objects for this property.</p>	<p>Across Reception, children continue to make sense of themselves as a human. This is achieved through a rich curriculum of hands-on experiences which allow for exploration using all five senses. Sensory experience is still at the heart of all Reception learning. Children begin to build on this sense of self through carefully selected and diverse core texts such as ‘Astro Girl’, ‘The Everywhere Bear’ and ‘Anna Hibiscus, Splash!’; which support children to place themselves within their immediate family and wider community, <b>observing</b> and <b>comparing</b> similarities and differences about appearances and family units.</p>	<p>Across Reception, children continue their learning about materials and the changes that can occur to them. Our hands-on curriculum provides sensory opportunities to handle, <b>observe</b> and manipulate materials, watching the changes which occur in processes such as adding water to the mud kitchen or sand pit or adding powder paint into our water tray. A key experience through which children build these <b>observational</b> and <b>comparison</b> skills is through half termly cooking sessions. Through ‘Blue Penguin’, Reception revisits their learning about melting.</p>	<p>Across the Reception year, children further their understanding of key features of the life cycle of an animal through <b>observing</b> the hatching and growth of chicks in the classroom. Through this, they learn ways they themselves can care for the environment and all living things. At this stage in their animals learning, children also learn to make <b>observational drawings</b> of the natural world and undertake their first <b>research</b> project, through shared reading, into chicks. At several other points during the year, Reception learns about animals, their habitats and how to care for them, through the core texts ‘The Gruffalo’, ‘Bog Baby’ and ‘Blue Penguin’. They compare habitats from around the world, and learn the names of specific features of different environments as well as a basic understanding of hibernation.</p>	<p>Across Spring and Summer, Reception children continue to explore the natural world by revisiting the key features of a life cycle of a plant through planting seeds and caring for and <b>observing</b> growing plants, linked to ‘Erol’s Garden’. Through this, they learn ways they themselves can care for the environment and all living things. At this stage in their plants learning, children also learn to make <b>observational drawings</b> of the natural world and identify parts of a plant using scientific language. Learning about plants is also woven into weekly Forest school sessions, exploring the plant-life in our Forest across the year.</p>

# Year 1: Science Curriculum Map

Unit	Seasonal Change Autumn 1	Everyday Materials Autumn 2	Animals including Humans Spring 1 (our bodies)	Seasonal Change Spring 2	Animals, including Humans Summer 1	Plants Summer 2
<b>National Curriculum</b>	In this unit, the children will observe changes across the four seasons. They will also observe and describe weather associated with the seasons and how day length varies. Much of this learning will take place outdoors. This unit will run across the year and culminate in the comparative element in the summer term, when observations have been made in autumn, winter, spring and now summer.	In this unit, the children will learn to distinguish between an object and the material from which it is made. They will also learn to identify and name a variety of everyday materials and describe their simple physical properties. Using this knowledge, they will compare and group together a variety of everyday materials on the basis of their simple physical properties.	Identifying, naming, drawing and labelling the basic parts of the human body and saying which part of the body is associated with each sense.	Revisit: The children will observe changes across the four seasons. They will also observe and describe weather associated with the seasons and how day length varies. Much of this learning will take place outdoors. This unit will run across the year and culminate in the comparative element in the summer term, when observations have been made in autumn, winter, spring and now summer.	In this unit, the children will learn to identify and name a variety of common animals. They will also learn to say whether some are carnivores, herbivores or omnivores. The children will describe and compare the structure of a variety of these common animals that they identify.	In this unit, the children will learn to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. They will also identify and describe the basic structure of a variety of common flowering plants, including trees. Children will sketch common plants and observe them to identify similarities and differences.
<b>Key Knowledge</b>	Seasons: autumn, winter, spring, summer Autumn: leaves falling, increased rainfall, temperatures dropping, days shorter Winter = colder, snow and ice, days even shorter Spring = days begin to lengthen, warmer temperatures, growth Summer = longer days, more hours of sunlight, warmer temperatures	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	Body parts: head, eyes, nose, mouth, ears, neck, shoulders, arms, elbows, hands, fingers, thumb, chest, stomach, legs, thighs, shins, ankles, toes  Senses: smell, sight, hearing, touch, taste	Seasons: autumn, winter, spring, summer Autumn: leaves falling, increased rainfall, temperatures dropping, days shorter Winter = colder, snow and ice, days even shorter Spring = days begin to lengthen, warmer temperatures, growth Summer = longer days, more hours of sunlight, warmer temperatures	Common animals: fish, amphibians, reptiles, birds and mammals (including pets)  Carnivores = meat-eating Herbivores = plant-eating Omnivores = eat both meat and plants <i>Beginning of concepts for food chains</i>	Plants dandelion, daisy, thistle, water lily, buttercup, heather, fern Deciduous – oak, ash, willow, beech, maple Evergreen – leaves are small, narrow, thick and waxy. Examples: pine, spruce and holly trees. Structure roots, trunk, branches, leaves stem, petals
<b>Key Skills</b>	<b>Observing</b> Take weather measurements and make observations over time (photos of what children are wearing through the year). Record time it gets dark each day. (This gathers evidence, over time, that day length changes and so do activities.) <b>Pattern seeking</b> At the end of the year, look for patterns in evidence e.g. Does it rain more in spring? Do we have more sunny days in the summer? Which was the coldest month?	<b>Classifying</b> 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. <b>Comparative/fair testing</b> 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.	<b>Pattern seeking</b> Children generate questions for investigation such as: do people with longer arms have longer legs? Can more people identify prawn cocktail crisps than cheese and onion? Do all animals with ... have ...? <b>Comparative/fair testing</b> Can I taste the difference between different flavoured crisps/skittles/smarties?	<b>Observing</b> Take weather measurements and make observations over time (photos of what children are wearing through the year). Record time it gets dark each day. (This gathers evidence, over time, that day length changes and so do activities.) <b>Pattern seeking</b> At the end of the year, look for patterns in evidence e.g. Does it rain more in spring? Do we have more sunny days in the summer? Which was the coldest month?	<b>Classifying</b> Classify animals they have seen/have first-hand experience of, choosing their own criteria to do so. Classify animals based on physical structure. Classify animals they have first-hand experience of based on what they eat (plants, other animals, both). (Complete this after the research.) <b>Observing</b> Observe animals in the local environment throughout the year. <b>Researching</b> 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).	<b>Classifying</b> Allow children to classify leaves, flowers, and seeds, choosing their own criteria. <b>Observing</b> Observe a tree through the year. Observe a trail/patch to identify how plants change through year. <b>Pattern seeking</b> Based on observations, encourage children to identify patterns e.g. after comparing the size of leaves on different plants, chn may suggest "bigger plants, bigger leaves." <b>Researching</b> Use secondary sources to name plants (including trees) based on observations of leaves, seeds, flowers, buds, and bark (Leafsnap UK)

## Year 2: Science Curriculum Map

Animals including humans Autumn 1	Uses of Everyday Materials Autumn 2	Living things and their habitats Spring 1	Uses of Everyday Materials Spring 2	Plants Summer 1 + 2
<p>In this unit, the children will notice that animals, including humans, have offspring which grow into adults. They will find out about and describe the basic needs of animals, including humans, for survival.</p> <p>The children will also describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<p>In this unit, the children will identify and compare the suitability of a variety of everyday materials for particular uses</p>	<p>In this unit, the children will explore and compare the differences between things that are living, dead, and things that have never been alive. The children will 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. Children will identify and name a variety of plants and animals in their habitats, including microhabitats. Finally, the children will describe how animals obtain their food from plants and other animals and begin to use the idea of a simple food chain. They will identify and name different sources of food.</p>	<p>In this unit, the children will find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p>	<p>In this unit, the children will observe and describe how seeds and bulbs grow into mature plants. They will find out and describe what plants need to grow and stay healthy. Children will plant their own flowers and vegetables to observe changes and learn how to keep them alive and healthy.</p>
<p>Reproduction and growth in animals: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep.</p> <p>Reproduction and growth in humans: baby, toddler, child, teenager and adult.</p> <p>Basic needs of animals (including humans) – water, food and air</p> <p>Different types of food dairy, carbohydrates, protein, fruit and vegetables, fat/sugar</p> <p>Hygiene handwashing, bathing, teeth brushing, face washing, changing clothes</p>	<p>Materials: wood, metal, plastic, glass, brick, rock, paper and cardboard</p>	<p>Living – animals and plants Once living – fallen leaves Never living – stones Living: reacts to surroundings, needs air, feeds, grows, reproduces and gets rid of waste. 'Habitat' (a natural environment or home of a variety of plants and animals) and 'microhabitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter).</p>	<p>Squashing: sponge Bending: wire Twisting: wire (compare to twisting) Stretching: balloons and rubber bands Squashing = to crush or squeeze something with force so that it comes flat, soft or out of shape Bending = applying force to shape something into a curved shape Twisting = applying force in opposite directions to form something into a curled shape= Stretching = applying force to make something longer or wider without tearing or breaking</p>	<p>Needs of plants: water, light and a suitable temperature</p> <p>Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.</p>
<p><b>Classifying</b> Based on the children's own criteria: classify food items classify animals.</p> <p><b>Observing over time</b> Observe a life cycle (e.g. caterpillars, chicks, farm animals). Observe how their body changes during/after exercise.</p> <p><b>Researching</b> Research adult animals and their young</p>	<p><b>Classifying</b> Based on the children's own criteria, classify materials e.g. samples of wood, metal, plastic, etc.</p> <p><b>Comparative/fair testing</b> Test materials for different uses (e.g. Which material can you use to make an aeroplane? Which fabric would you use for curtains?</p>	<p><b>Classifying</b> Find things that are living/ dead /have never been alive and classify them. Classify minibeasts found in the environment based on physical structure.</p> <p><b>Observing</b> Explore plants and animals in micro-habitats (under a rock, in a pond, in a meadow throughout the year.</p>	<p><b>Comparative/fair testing</b> Which materials are best for Cinderella's mop? Which fabric would you choose for Elastigirl's costume?</p>	<p><b>Classifying</b> Based on the children's own criteria: classify seeds classify bulbs.</p> <p><b>Observing over time</b> Plant seeds and bulbs and observe how they grow</p> <p><b>Pattern seeking</b> Children generate questions for investigation such as: Do big seeds germinate more quickly? Does it matter which way round you plant a bulb or seed? Which comes first, the root or the shoot?</p>

		<b>Researching</b> Research what animals they have first-hand experience of eat.		
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## Year 3: Science Curriculum Map

Unit	Rocks and Fossils Autumn 1	Animals, including humans Autumn 2	Plants Spring 1+2	Light Summer 1	Forces Summer 2
<b>National Curriculum</b>	In this unit, the children will compare and group different kinds of rocks on the basis of their appearance and simple physical properties. They will also compare and describe in simple terms how fossils are formed when things that have lived are trapped within rock. They will recognise that soils are made from rocks and organic matter.	In this unit, the children will 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. They will also identify that humans and some other animals have skeletons and muscles for support, protection and movement.	In this unit, the children will identify and describe the functions of different parts of flowering plants. They will explore the requirements of plants for life and growth and how they vary between plants. The children will investigate how water is transported within plants. The children will also explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	In this unit, the children will learn that light is needed to see things and that dark is absence of light. The children will notice that it is reflected from surfaces and recognise light from the sun can be dangerous so eye protection is needed. The children will also learn how shadows are formed and find patterns in the way that size of shadows change.	In this unit, the children will compare how things move on different surfaces and notice that some forces need contact between two objects, but magnetic forces can act at a distance. They will observe how magnets attract or repel each other and attract some materials and not others. Building on their understanding of materials and properties from KS1, they will 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. They will make predictions about whether two magnets will attract or repel each other, depending on which poles are facing.
<b>Key Knowledge</b>	Sedimentary rocks – contain fossils Igneous rocks – formed when magma or lava from volcanoes cools. Examples include granite and basalt. Metamorphic rocks – formed when other rocks are changed due to heat or pressure	Skeletons and muscles: support, protection and movement Muscles are attached to bones and enable movement when they contract and relax Every movement involves muscles Animals with skeletons = vertebrates Animals without skeletons = invertebrates	Functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Nutrition and support -roots and stem Nutrition – leaves Flowers – reproduction Requirements of plants for life and growth: air, light, water, nutrients from soil, and room to grow	Light =reflects from surfaces and is needed to see  Dark = absence of light  Shadows = formed when light is blocked	Attract -north + south Repel – south + south or north + north  Magnetic – iron, steel (because it contains iron), nickel Non-magnetic – aluminium, copper and gold Common uses of magnets include Magnets can be different strengths. This will affect how far away an object can be for attraction to be felt.
<b>Key Skills</b>	<b>Classifying</b> Based on the children's own criteria, classify rocks. (Likely to be by appearance at beginning and based on physical properties at end.) Look at different soils and discuss how they are similar/different <b>Observing over time</b> Observe how soil separates into different layers in water <b>Comparative/ fair testing</b> Test what happens when rocks are put in water. Test how quickly water runs through different types of soil. <b>Researching</b> How were fossils formed?	<b>Pattern seeking</b> Do 'healthy' drinks have less sugar? Do people with long arms throw further? Can people with short legs jump higher? <b>Classifying animals</b> Classify and sorting based on whether they are vertebrates or invertebrates <b>Researching</b> 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?	<b>Observing over time</b> 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 <b>Pattern seeking</b> Investigate what happens when conditions are changed e.g. more/less light/water, change in temperature, nutrients. Recording findings – tables <b>Research</b> Researching functions of parts of flowering plants and different methods of seed dispersal/pollination.	<b>Comparative/fair testing</b> Test materials for reflectiveness and transparency Investigate shadows (size and shape)  <b>Classifying</b> Based on children's own criteria: Classify light sources (lead to man-made/natural) Classify materials (lead to reflective/non-reflective or transparent, translucent or opaque)	<b>Classifying</b> Based on the children's own criteria: sort materials (leading towards metal/non-metal and magnetic/not magnetic) sort toys (leading to what makes them move e.g. push/pull) <b>Comparative/fair testing</b> Test the strength of different magnets. Setting up a simple practical enquiry Recording data - table Recording findings using simple scientific language and labelled diagrams Reporting on findings Drawing simple conclusions <b>Researching</b> Find out how magnets are used in everyday life

## Year 4: Science Curriculum Map

Unit	States of matter Autumn 1	Electricity Autumn 2	Sound Spring 1	Living things and their habitats Spring 2	Animals, including humans  Summer 1 + 2
<b>National Curriculum</b>	In this unit, the children will compare and group materials into solids, liquids and gases. They will observe how materials change state when they are heated and cooled and measure the temperature at which changes take place. The children will understand the processes of evaporation and condensation on the context of the water cycle and make links between the rates of evaporation with the change in temperature.	In this unit, the children will identify common appliances that run on electricity. They will construct a simple series electrical circuit, identifying and naming its basic parts, including switches and use their knowledge of complete circuits to identify whether or not a lamp will light. They will recognise some common conductors and insulators, and associate metals with being good conductors.	In this unit, the children will learn how sounds are made and make links to vibrations travelling through a medium to the ear. They will explore patterns between pitch and the object that produced the sound as well as volume and the strength of the vibrations. The children will understand why sounds are fainter as the distance from the source increases.	In this unit, the children will recognise that living things can be grouped in a variety of ways. Through exploring and using classification keys, they will group, identify and name a variety of living things in the local and wider environment and begin to understand how changes in environments can pose dangers to living things.	In this unit, the children will understand the functions of the basic parts of the digestive system. They will learn that human have different types of teeth for different functions and what the differences between them are. The children will also construct and interpret a variety of food chains, identifying producers, predators and prey.
<b>Key Knowledge</b>	<p>Water cycle: Precipitation (rain) – evaporation – condensation</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>Solids- hold their shape Liquids - form a pool not a pile Gases - escape from an unsealed container</p>	<p>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. Common appliances that run on electricity include toasters, lamps and computers. Components of electrical circuits include: cells, wires, bulbs, switches and buzzers. An insulator does not allow electricity to flow through (e.g. wood and plastic) whereas a conductor does (like metal) Water can conduct electricity which is why it is dangerous to touch an electrical appliance or light switch with wet hands</p>	<p>Bigger vibrations = greater amplitude = louder sound</p> <p>Pitch = how high or low a sound is</p> <p>Greater distance = fainter sound</p>	<p>Vertebrate animal: fish, amphibians, reptiles, birds, and mammals Invertebrates: snails and slugs, worms, spiders, and insects Flowering plants include grass Non-flowering plants include ferns and mosses Positive impact on the environment: nature reserves, ecologically planned parks, or garden ponds, Negative effects on the environment: population and development, litter or deforestation.</p>	<p>Types of teeth: Molars, canines and incisors</p> <p>Molars = crushing and grinding food Canines =tearing and ripping food Incisors = biting off and chewing food</p> <p>Parts of the digestive system: mouth, tongue, teeth, oesophagus, stomach, and small and large intestine</p>
<b>Key Skills</b>	<p><b>Observing</b> Observe water as a solid, liquid and gas. Watch it being heated and cooled. Observe puddle over time.</p> <p><b>Comparative/fair testing</b> 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><b>Researching</b> Research the water cycle or stages of the melting points of metals</p>	<p><b>Classifying</b> Household appliances as electrical/ not electrical or batteries/ mains</p> <p><b>Comparative/fair testing</b> 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><b>Comparative/fair testing</b> 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><b>Observing over time</b> 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><b>Researching</b> Researching how environmental issues impact on living things</p>	<p><b>Classifying</b> Compare and contrast different types of teeth. Recording finding using drawing and labelled diagrams. Comparing the teeth of carnivores and herbivores</p> <p><b>Researching</b> 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>



## Year 5: Science Curriculum Map

Unit	Earth and Space Autumn 1	Forces Autumn 2	Animals including humans Spring 1	Living things and their habitats Spring 2	Properties and changes of materials Summer 1 + 2
<b>National Curriculum</b>	In this unit, the children will learn to describe the Earth, sun and moon as roughly spherical bodies and describe the movement of Earth and other planets relative to the sun. They will also understand the movement and phases of the moon – why it appears to change shape. They will use their knowledge about how the Earth rotates to understand why we experience day and night.	In this unit, the children will understand the effect of air resistance, water resistance and friction as forces that slow things down. They will build on their understanding of gravity as a force from their learning about the solar system. The children will also understand how mechanisms like levers, pulleys and gears allow a smaller force to have a greater effect.	In this unit, the children will describe the changes that occur in humans as they develop to old age. They will understand key periods in the human life cycle such as puberty and gestation. They will compare different gestation periods in different mammals.	In this unit, the children will learn about the life cycles of mammals, amphibians, insects and birds. They will observe life-cycle changes in a variety of living plants and animals in the local environment. The children will also learn about reproduction (sexual and asexual) in some plants and animals.	In this unit, the children will build on their knowledge of materials and their properties to understand why certain materials are used for different purposes. They will build a deeper understanding of properties such as solubility and conductivity (electrical and thermal) and investigate changes in materials that occur in the process of dissolving to form a solution as well as reversing this process. They will investigate different ways to separate mixtures and understand the difference between reversible and irreversible changes.
<b>Key Knowledge</b>	<p>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).</p> <p>A moon is a celestial body that orbits a planet (Earth has 1 moon)</p> <p>Earth, moon and sun are all roughly spherical</p> <p>Gravity is a force which pulls unsupported objects towards the Earth</p> <p>There are 8 phases of the moon</p> <p>Heliocentric model of solar system = sun at centre (proved)</p> <p>Geocentric model of solar system = Earth at centre (disproved)</p>	<p>Galileo Galilei and Isaac Newton helped develop the theory of gravitation.</p> <p>Friction is a force that slows objects down caused by two surfaces rubbing together</p> <p>Streamlining reduces the surface area of an object so that it moves more quickly and efficiently through air or water</p> <p>Gravity is a force which pulls unsupported objects towards the Earth. The greater an object's mass, the stronger the gravitational pull.</p>	<p>Baby, toddler, child, teenager, adult</p> <p>Puberty in males Public hair growth, voice deepens, body odour, sweat, penis enlarges</p> <p>Puberty in females Public hair growth, hips widen, breasts develop, periods (menstrual cycle) begins</p> <p>Human gestation = approximately 9 months</p> <p>Timeline from gestation to puberty</p>	<p>Sexual reproduction: pollen from one flower fertilising the egg of another to produce a seed.</p> <p>Asexual reproduction: only one parent is needed in asexual reproduction and the offspring are exact copies</p> <p>Mammals produce live young</p> <p>Amphibians, reptiles, insects and birds produce eggs</p>	<p>Separating mixtures: filtering, sieving and evaporating</p> <p>Reversible changes: filtering, sieving, dissolving, melting and changing states.</p> <p>Melting and dissolving – difference.</p> <p>Some changes result in the formation of new materials – they changes are usually irreversible (e.g. changes linked to burning)</p> <p>Some things like salt and sugar dissolve in water. 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.</p> <p>Burning is an irreversible change. Once toast is burned, for example, this cannot be undone and a new product has been formed. Electrical conductivity = allows electricity to flow through</p> <p>Thermal conductivity = allows heat to be passed through (e.g. metals)</p>



<p><b>Key Skills</b></p>	<p><b>Researching</b></p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments – models of the solar system</p> <p>Researching to compare the time of day at different places on the Earth through internet links and direct communication</p> <p><b>Observing over time</b></p> <p>Measure shadows throughout the day</p>	<p><b>Comparative/fair testing</b></p> <p>Air resistance</p> <p>Carrying out a scientific enquiry into air resistance (effective paper aeroplane shapes)– identifying and controlling variables</p> <p>Taking measurements, with a range of scientific equipment accurately and precisely and, taking repeat readings (distance)</p> <p>Recording data and results using scientific diagrams, tables and graphs</p> <p>Using test results from air resistance investigation s to make predictions to set up further comparative and fair tests (water resistance experiment)</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations</p> <p>Water resistance</p> <p>Planning a scientific enquiry into water resistance (boats in gutter of water, plasticine in a cylinder of liquid easier with more viscose liquid e.g. with bubble bath)– identifying and controlling variables</p> <p>Friction</p> <p>Compare fiction by using a forcemeter – trainers or weighted match box to pull along surfaces</p>	<p><b>Researching</b></p> <p>Researching characteristics of humans at different points in development. Writing questions for an expert like a doctor, nurse or health visitor.</p>	<p><b>Classifying</b></p> <p>Classify animals according to their life cycle</p> <p><b>Observing over time</b></p> <p>Grow from cuttings and observe whether they grow roots/stem/ leaf/flower.</p> <p>Grow from, and harvest, bulbs through the year. (Observe strawberry/spider plants through the year.</p> <p><b>Pattern seeking</b></p> <p>Children generate questions such as: Do larger mammals have longer gestation periods?</p> <p>Do larger animals live longer?</p> <p>Do smaller animals lay more eggs?</p> <p><b>Observing over time</b></p> <p>Observing changes in an animal over a period of time by hatching chicks</p> <p><b>Researching</b></p> <p>Research how gardeners asexually reproduce plants.</p>	<p><b>Comparative/ fair testing</b></p> <p>Test solids for solubility and compare rates of solubility</p> <p>Taking measurements, with a range of scientific equipment accurately and precisely and, taking repeat readings</p> <p>Recording data and results using tables, scatter graphs, bar and line graphs</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations. Was the change reversible or irreversible e.g. melting vs burning?</p> <p>Which materials would be good for a tent?</p> <p>Good to make a tea bag from? Good to keep things warm/cold?</p> <p><b>Observing over time</b></p> <p>Observing rusting and uncoated nails in different liquids (remove coating with sandpaper)</p> <p><b>Classifying</b></p> <p>After observing what happens when solids are added to liquids, classify the materials based on the outcomes.</p>
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## Year 6 Science Curriculum Map

Unit	Animals, including humans Autumn 1	Living things and their habitats Autumn 2	Evolution and inheritance Spring 1+2	Light Summer 1	Electricity Summer 2
<b>National Curriculum</b>	In this unit, the children will understand the function of the human circulatory system and its component parts. They will understand the role of the heart, blood vessels and the components of blood. They will learn how nutrients and water are transported within animals, including humans. The children will explore the impact of diet, exercise, drugs and lifestyle on health.	In this unit, the children will understand that living things are classified into broad groups according to common observable characteristics and based on similarities and differences.	In this unit, the children will learn about how living things have changed and evolved over time. They will understand that fossils provide information about living things millions of years ago. They will know that living things produce offspring of the same kind but not identical to parents and that this is called variation. They will understand how animals and plants adapt to suit their environment in different ways and that adaptation may lead to evolution.	In this unit, the children will learn that light appears to travel in straight lines. They will understand how we see objects by light travelling from a light source to an object before being reflected to our eye (or directly from a light source to the eye). They will learn why shadows have the same shape as the objects that cast them.	In this unit, the children will learn how the brightness of a lamp or the volume of a buzzer links to the number and voltage of cells used in the circuit. They will be able to give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. They will also begin to use recognised symbols when representing a simple circuit in a diagram.
<b>Key Knowledge</b>	<p>platelets = blood clotting</p> <p>white blood cells = immunity</p> <p>red blood cells = carry oxygen</p> <p>arteries = carry blood away from the heart</p> <p>veins = carry blood to the heart</p> <p>capillaries =</p>	<p>Aristotle – classification system</p> <p>Microorganisms are too small to see with the human eye. They include bacteria, viruses, yeast and fungus</p>	<p>evolution occurs over millions of years</p> <p>living things which are best adapted survive and pass on their genes</p> <p>some living things which are less well-adapted become extinct and cease to exist</p> <p>giraffes – varied neck lengths = survival of the fittest (evolved to have longer necks)</p> <p>moths – spotted ones survived in Victorian times</p>	<p>Light travels in straight lines</p> <p>Light travels from a light source like the sun or a torch</p> <p>The moon is <i>NOT</i> a light source – it reflects light from the sun</p>	<p>The higher the voltage, the louder the volume of a buzzer or the brighter the bulb</p> <p>Knowledge of recognised symbols for: wires, bulbs, buzzers, motors, switches, cells (batteries)</p>

<p><b>Key Skills</b></p>	<p><b>Comparative/ fair testing</b> Exercise and pulse experiment</p> <p>Planning and enquiry to answer a question (recognising and controlling variable for fair test)</p> <p>Taking measurements, with a range of scientific equipment accurately and precisely and, taking repeat readings</p> <p>Recording data and results using tables and scatter graphs and line graphs</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations</p> <p><b>Observing</b> Observe pulse rate before, during and after exercise</p> <p><b>Pattern seeking</b> Do older people have lower pulse rates?</p>	<p><b>Classifying</b> Classification of living things in our local environment</p> <p>Classify animals according to Carl Linnaeus' system.</p> <p>Classify plants into flowering, mosses, ferns and conifers, based on specific characteristics.</p> <p>Create a branching database/dichotomous key to classify a set of living things.</p> <p><b>Researching</b> 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><b>Researching</b> 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><b>Researching</b> Researching how some living things are adapted to survive in their habitats including extreme conditions, for example, cactuses, penguins and camels.</p> <p><b>Classifying (to show variation within a species)</b> Classify a species of plant e.g. daffodils, tulips, lilies.</p>	<p><b>Comparative/ fair testing</b> Investigate the shape of shadows and link this to light travelling in straight lines.</p>	<p><b>Comparative/ fair testing</b> Experimenting with voltage – brightness and volume (adding more bulbs/cells to a circuit)</p> <p>Systematically identifying the effect of changing one component at a time in a circuit</p> <p>Planning and 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 – from lamp to buzzer</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations</p>
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