



# Science

## Progressive and Sequential Curriculum



Opportunity



Enquiry



Language

## Science in the Early Years Foundation Stage

This table demonstrates which statements from the 2020 Development Matters are prerequisite skills for Science within the national curriculum. The table below outlines the most relevant statements taken from the Early Learning Goals in the EYFS statutory framework and the Development Matters age ranges for Three and Four-Year-Olds and Reception to match the programme of study for Science.

<b>Three and Four Year Olds</b>	Communication and Language		<ul style="list-style-type: none"> <li>Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"</li> </ul>
	Personal, Social and Emotional Development		<ul style="list-style-type: none"> <li>Make healthy choices about food, drink, activity and toothbrushing.</li> </ul>
	Understanding the World		<ul style="list-style-type: none"> <li>Use all their senses in hands-on exploration of natural materials.</li> <li>Explore collections of materials with similar and/or different properties.</li> <li>Talk about what they see, using a wide vocabulary.</li> <li>Begin to make sense of their own life-story and family's history.</li> <li>Explore how things work.</li> <li>Plant seeds and care for growing plants.</li> <li>Understand the key features of the life cycle of a plant and an animal.</li> <li>Begin to understand the need to respect and care for the natural environment and all living things.</li> <li>Explore and talk about different forces they can feel.</li> <li>Talk about the differences between materials and changes they notice.</li> </ul>
<b>Reception</b>	Communication and Language		<ul style="list-style-type: none"> <li>Learn new vocabulary.</li> <li>Ask questions to find out more and to check what has been said to them.</li> <li>Articulate their ideas and thoughts in well-formed sentences.</li> <li>Describe events in some detail.</li> <li>Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.</li> <li>Use new vocabulary in different contexts.</li> </ul>
	Personal, Social and Emotional Development		<ul style="list-style-type: none"> <li>Know and talk about the different factors that support their overall health and wellbeing:                             <ul style="list-style-type: none"> <li>➤ regular physical activity</li> <li>➤ healthy eating</li> <li>➤ toothbrushing</li> <li>➤ sensible amounts of 'screen time'</li> <li>➤ having a good sleep routine</li> <li>➤ being a safe pedestrian</li> </ul> </li> </ul>
	Understanding the World		<ul style="list-style-type: none"> <li>Explore the natural world around them.</li> <li>Describe what they see, hear and feel while they are outside.</li> <li>Recognise some environments that are different to the one in which they live.</li> <li>Understand the effect of changing seasons on the natural world around them.</li> </ul>
<b>Early Learning Goal</b>	Communication and Language	Listening, Attention and Understanding	<ul style="list-style-type: none"> <li>Make comments about what they have heard and ask questions to clarify their understanding.</li> </ul>

	Personal, Social and Emotional Development	Managing Self	<ul style="list-style-type: none"> <li>Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</li> </ul>
	Understanding the World	The Natural World	<ul style="list-style-type: none"> <li>Explore the natural world around them, making observations and drawing pictures of animals and plants.</li> <li>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.</li> <li>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</li> </ul>

## Science Units in Years 1-6




<b>Year 1/2 Cycle A</b>	Seasonal changes		Human senses and Human survival		Plant parts and plant survival	
<b>Year 1/2 Cycle B</b>	Uses of materials and Everyday materials		Animal parts and Animal survival		Habitats	
<b>Year 3</b>	Forces and magnets	Skeleton and muscular systems	Plant nutrition and reproduction	Rocks		Light and shadows
<b>Year 4</b>	States of matter	Grouping and classifying	Digestive system	Sound		Electrical circuits and conductors
<b>Year 5</b>	Properties and changes of materials	Forces and mechanisms		Human reproduction and aging		Earth and space
<b>Year 6</b>	Evolution and inheritance	Electrical circuits and components		Circulatory system		Light theory



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## Science - Medium Term Plan Year 1/2 – Seasonal changes

<p><b>Opportunity:</b></p> 	<p>Observe the local environment throughout the year and ask and answer questions about living things and seasonal change. Explore the different types of trees and plants in the local area Carry out investigations to explore different types of weather i.e. wind, temperature and precipitation</p>	
<p><b>Enquiry:</b></p> 	<p>'Do all the animals have their young in spring? Which animals hibernate? Why do you think these animals hibernate and others don't?'  Is today's weather forecast, correct? Could the Sun burn me on a cloudy day? Does it rain the same amount every week? Does it rain more in the mornings? Is the wind strength different in different parts of the playground? Do all sun creams block the Sun's rays? Where is the coldest part of the playground?</p>	
<p><b>Language:</b></p> 	<p>Animal, plants, <b>deciduous, evergreen, blossom, buds, breeze</b>, wind, sun, <b>cloud, fog, gale, hail</b>, snow, <b>sleet, storm</b>, rain, <b>temperature, precipitation, rainfall, winter, summer, autumn, spring, seasons, Beaufort scale, dark</b>, daytime, nighttime, <b>hibernate, leaf, migrate, rain gauge, seasonal change, weather, sunrise, sunset, windsock</b></p> <p><b>Block graph, compare, observe, data, describe, equipment, measure, millimetre (mm), question, record, prediction, results, table.</b></p>	
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• Observe changes across the 4 seasons</li> <li>• observe and describe weather associated with the seasons and how day length varies</li> </ul>	
<p><b>Prior Learning:</b> <b>EYFS:</b> The Natural World ELG, children at the expected level of development will: - Explore the natural world around them, making observations and drawing pictures of animals and plants. Understand some important processes and changes in the natural world around them, including the seasons and changing states.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• I know there are four seasons – Autumn, Winter, Spring and Summer</li> <li>• Seasons are different times in the year when the weather changes.</li> <li>• The seasons have an effect on plant and animal life.</li> </ul> <p><b>Skills:</b> Children will be able to:</p> <ul style="list-style-type: none"> <li>• Observe changes across the four seasons.</li> <li>• Observe changes in plants and trees across the different seasons</li> <li>• Identify different types of weather</li> <li>• Observe, describe and measure different types of weather.</li> </ul> <p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"> <li>• In the UK the days are longer in the summer and shorter in the winter</li> <li>• The day is shorter in the winter because the northern hemisphere is tilted away from the sun</li> <li>• The day is longer in the summer because the northern hemisphere is tilted towards the sun</li> <li>• How the seasons affect animals, trees and plants</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect willing on their experiences</li> <li>• Sense enjoyment and fascination when learning about the world around them.</li> <li>• Explore nature and how it is affected by the seasons</li> </ul>






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## Science - Medium Term Plan

### Year 1/2- Human survival and human senses

<b>Opportunity:</b> 	Children have the opportunity to carry out tests to explore their 5 senses. Children carry investigations to show the impact exercise has on the body. Children consider the importance of hygiene and carry out an investigation to observe how easily germs can spread from person to person.
<b>Enquiry:</b> 	Can you find the elbow on your outline? Is the shoulder above or below the head? Is the wrist on the arm or the leg? Can they identify the benefits of having two eyes? Ask, 'What can we do with two eyes that we can't do with one? Can you think of some everyday tasks that need two eyes? 'When should we wash our hands? What things might be on our hands that we cannot see? For how long should you brush your teeth? Which body parts need cleaning more than others?'
<b>Language:</b> 	Abdomen, ankle, arm, calf, chest, chin, ear, elbow, eye, finger, foot, forearm, forehead, hand, head, knee, leg, limb, mouth, neck, nose, pelvis, shoulder, skin, thigh, toe, wrist, tongue, sense, hearing, sight, smell, touch, taste,  Adult, aerobic exercise, air, balancing exercise, balanced diet, birth, elderly, embryo, human, life cycle, co-ordination, energy, carbohydrates, fats, fruit and vegetables, food group, germs, growth, heart, lungs, healthy, hydrate, hygiene, offspring, proteins, survive
<b>Scientific Strands (from National Curriculum):</b>	Pupils should be taught about: <ul style="list-style-type: none"> <li>• notice that animals, including humans, have offspring which grow into adults</li> <li>• find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</li> <li>• describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</li> <li>• identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</li> </ul> Working scientifically: <ul style="list-style-type: none"> <li>• ask simple questions and recognise that they can be answered in different ways</li> <li>• observe closely, using simple equipment</li> <li>• perform simple tests</li> <li>• identify and classify</li> <li>• gather and record data to help answer questions</li> </ul>

<p><b>Prior Learning:</b></p> <p><b>EYFS – Ready, steady grow</b> Children learn about food and farming, including where food comes from, what plants and animals need to grow and survive and what constitutes a healthy lifestyle.</p> <p><b>Next steps in learning:</b></p> <p><b>Year 3: Animal nutrition and the skeletal system</b> Children learn about the importance of nutrition for humans and other animals. They learn about the role of a skeleton and muscles and identify animals with different types of skeletons.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge</b></p> <ul style="list-style-type: none"> <li>• To stay alive humans, need water, food, air and shelter</li> <li>• Regular exercise makes us stronger and faster.</li> <li>• It is important that humans eat a balanced diet which includes fruit and vegetables.</li> <li>• I can name the five senses – taste, smell, touch, hearing, sight.</li> </ul> <p><b>Skills:</b> Children will be able to:</p> <ul style="list-style-type: none"> <li>• Draw and label the main parts of the human body and say which body part is associated with which sense.</li> <li>• Gather and record simple data in a range of ways</li> <li>• Talk about what they have done and say, with help, what they think they have found out.</li> <li>• Perform simple tests</li> <li>• Describe the stages of human development (baby, toddler, child, teenager, adult and elderly).</li> <li>• Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</li> </ul> <p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"> <li>• That humans have 5 senses</li> <li>• The senses associated with each body part</li> <li>• That humans have offspring</li> <li>• That humans need food, water, sleep, and air to survive</li> <li>• Exercise and personal hygiene is important for keeping our bodies healthy</li> <li>• That humans can spread germs and investigate ways to prevent this</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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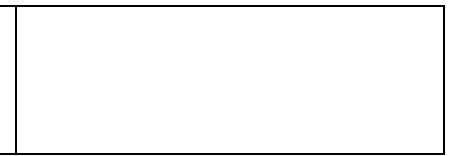
## Science - Medium Term Plan

### Year 1/2 Plant Parts and Plant Survival

<p><b>Opportunity:</b></p> 	<p>Children will explore plants and trees in their local environment. Children will have the opportunity to grow various types of plants i.e. bulbs, seeds and grass. Children will make observations over several weeks and will be encouraged to create their own questions based on their observations. Children will have the opportunity to create investigations about plants and what they require to survive.</p>	
<p><b>Enquiry:</b></p> 	<p>'Where did the grass grow well? Did grass grow in the shade? Did any other plants grow in the shade? Did any grass grow where it was dry? Why do you think this is the case?' How do plants take food from other plants? Why do some plants take their nutrients from animals? What is a pitcher plant? Why do some plants grow on other plants instead of in the soil? How do plants live in cold temperatures? How does lucky bamboo grow without soil? How do plants grow underwater? Can plants grow in the dark? How does a lithops plant survive without much water?</p>	
<p><b>Language:</b></p> 	<p>Bark, branch, bulb, deciduous, evergreen, seed, plant, flower, flower bud, fruit, germinate, germination, root, stem, leaf, nutrient, habitat, shade, soil, sunlight, survive, temperature, tree, trunk, warmth, water, blossom, garden plant, meadow, hedgerow, petal, season, shelter, vein, wild plant, woodland</p>	
<p><b>Scientific Strands (from National Curriculum):</b></p>	<ul style="list-style-type: none"> <li>• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</li> <li>• Identify and describe the basic structure of a variety of common flowering plants, including trees.</li> <li>• Observe and describe how seeds and bulbs grow into mature plants</li> <li>• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</li> </ul>	
<p><b>Prior Learning:</b></p> <p><b>EYFS: Sunshine and sunflowers</b> Children learn how to care for plants in their local environment.</p> <p><b>EYFS: Ready, steady grow</b> Children learn about food and farming and explores themes, including where food comes from, what plants need to grow and survive.</p> <p><b>Next steps in learning:</b> <b>Year 3: Plant nutrition and reproduction</b> Children learn about the requirements of plants for growth and survival. They describe the parts</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• I know that plants have a stem, roots, leaves, and petals.</li> <li>• I know that plants need water, light and the right temperature to grow.</li> <li>• I can name some common plants and trees – sunflower, Oak tree, daffodil</li> </ul> <p><b>Skills:</b> Children will be able to:</p> <ul style="list-style-type: none"> <li>• Describe, following observation, how plants and animals change over time.</li> <li>• Observe the local environment throughout the year and ask and answer questions about living things and seasonal change.</li> <li>• Identify, compare, group and sort a variety of common wild and garden plants, including deciduous and evergreen trees, based on observable features</li> </ul> <p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"> <li>• Plants are important because they provide food, shelter and materials for animals, including humans.</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect willing on their experiences</li> <li>• Sense enjoyment and fascination when learning about themselves, others, and the world around them.</li> </ul>

of flowering plants and relate structure to function, including the roots and stem for transporting water, leaves for making food and the flower for reproduction.

- Plants need water, sunlight, and a suitable temperature to survive










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## Science - Medium Term Plan

### Year 3 – Forces and magnets

<p><b>Opportunity:</b></p> 	<p>investigate and compare the frictional forces between a shoe and five different surfaces.          Explore the magnets and magnetic attraction and repulsion between pairs of the same magnets.          Explore friction through investigations and the word around them          Investigate magnetic strength          Create their own scientific questions to explore such as: Why do people change their car tyres in winter? Why are bowling alleys slippery?          How do you make the soles of shoes less slippery?</p>
<p><b>Enquiry:</b></p> 	<p>Do you know what causes magnetic attraction and repulsion?          What will happen to the ball after it has been kicked?          What is a force?          How can force be measured?          What happens when you put different poles together?          What happens when you put like poles together? How do you know?</p>
<p><b>Language:</b></p> 	<p><b>Attract, repel, magnet, force, force meter, friction, magnetic field, iron filings, magnetic force, magnetise, newton, north pole, south pole,</b> push, pull, <b>tread pattern,</b> rough, surface, smooth.</p> <p><b>Bar chart, compare,</b> conclusion, data, describe, diagram, equipment, measurement, investigation, method, prediction, observe, results, table</p>
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• forces need contact between 2 objects, but magnetic forces can act at a distance</li> <li>• magnets attract or repel each other and attract some materials and not others</li> <li>• 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</li> <li>• magnets as having 2 poles</li> <li>• whether 2 magnets will attract or repel each other, depending on which poles are facing</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• Set up simple practical enquiries, comparative, and fair tests</li> <li>• Making systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers.</li> <li>• Gathering, recording, classifying, and presenting data in a variety of ways to help in answering questions</li> <li>• Recording findings using simple scientific language, drawings, labelled diagrams, graphs, and tables</li> <li>• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> </ul>

<p><b>Prior Learning:</b></p> <p><b>Year 1: Everyday materials</b> Objects are made from materials. Identify a range of everyday materials and their sources. Investigate the properties of materials and begin to recognise that a material's properties define its use.</p> <p><b>Year 2: Uses of materials</b> Uses of everyday materials and how materials' properties make them suitable or unsuitable for specific purposes. Know how materials can be changed.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Magnets create a 'magnetic force' – this is a force that causes objects to attract (pull closer together) or repel (push further apart).</li> <li>• A magnet has 2 poles</li> <li>• A magnet can attract some objects and not others</li> <li>• Magnets can act at a distance</li> <li>• A force is the push or pull of an object in a particular direction.</li> </ul> <p><b>Skills:</b> Children will be able to:</p> <ul style="list-style-type: none"> <li>• Use a force meter</li> <li>• Sort materials into magnetic and non-magnetic</li> <li>• Identify contact and non-contact forces, including friction and magnetism.</li> <li>• investigate frictional and magnetic forces and identify parts of a magnet and magnetic materials.</li> </ul> <p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"> <li>• That an object will not move unless a push or pull force is applied</li> <li>• A force meter is a piece of equipment that measures a force or mass.</li> <li>• Forces are measured in newtons (N). Mass is measured in kilograms (kg).</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Sense enjoyment and fascination when learning about themselves, others and the world around them.</li> <li>• Reflect willingly on their experiences.</li> </ul>
<p><b>Next steps in learning:</b></p> <p><b>Year 5: Properties and changes of materials.</b> wider properties of materials and their uses. They learn about mixtures and how they can be separated using sieving, filtration, and evaporation. Reversible and irreversible changes and use common indicators to identify irreversible changes.</p>		






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## Science - Medium Term Plan

### Year 3 – Animal nutrition and the skeletal system

<p><b>Opportunity:</b></p> 	<p>To know that animals including humans need food for survival and nutrition.          To know that muscles, bones and joints are key parts of our body.          Carry out experiments to make conclusions about a research question of their choosing          Plan and carry out investigations to make own conclusions.          Set pupils the challenge of carrying out further investigations in their environment during break and lunch times.          Explore the world around them to learn about animals with an endoskeleton and exoskeletons.</p>
<p><b>Enquiry:</b></p> 	<p>Do all vertebrates have the same number of bones? Why do babies have more bones than adults? How do bones repair after a break? Do all mammals have the same bone types as humans? How many joints do we have in our fingers/thumbs/arms/legs/body? Is a thumb a finger? What happens when you pull or tear a muscle? Why are the biggest land animals' herbivores? Are there 'good' and 'bad' foods? How do invertebrates shed the exoskeletons? Why is it important to warm up my muscles before doing exercise?</p>
<p><b>Language:</b></p> 	<p><b>Invertebrate, vertebrate, carnivore, herbivore, omnivore. carbohydrates, diet, nutrient nutrition, malnutrition, fibre, calcium, protein, fats, minerals, vitamins. Skeleton, ball and socket joint, joint, hinge joint, hip flexors, pivot joint, pectoral, pelvis, ligament, spine, sternum, muscle, gluteus maximus, quadricep, triceps, hamstrings, biceps, limb, cranium femur, fibula, endoskeleton, exoskeleton, mandible, ribcage, tibia, tendon.</b></p>
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p><b>Pupils should be taught about:</b></p> <ul style="list-style-type: none"> <li>• 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</li> <li>• Humans and some other animals have skeletons and muscles for support, protection, and movement.</li> </ul> <p><b>Working scientifically:</b></p> <ul style="list-style-type: none"> <li>• Children should have scientific experiences that enable them to raise their own questions about the world around them.</li> <li>• Children should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions i.e., research or an investigation</li> <li>• They should recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.</li> <li>• Use relevant scientific language to discuss their ideas and communicate their findings.</li> </ul>

<p><b>Prior Learning:</b></p> <p><b>Year 1 – Human senses</b> Children have learnt that humans are a type of animal known as a mammal. They have named and counted body parts, identifying similarities and differences. They have learnt about the senses, the body parts associated with each sense and their role in keeping us safe.</p> <p><b>Year 2 – Human survival</b> Children have learnt about the basic needs of humans for survival, including the importance of exercise, nutrition and good hygiene such as handwashing and how germs are spread. Children have looked at the human life cycle and the importance and characteristics of a healthy lifestyle.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Humans have a system of bones called a skeleton.</li> <li>• Skeletons and muscles support the body, allow for movement and protect important organs</li> <li>• Humans cannot make their own food</li> <li>• Humans get their nutrition from what they eat – carbohydrates, fat, protein, fruit and vegetables</li> </ul> <p><b>Skills:</b> Children will be able to:</p> <ul style="list-style-type: none"> <li>• Explain the importance and characteristics of a healthy, balanced diet.</li> <li>• Describe how humans need the skeleton and muscles for support, protection, and movement.</li> <li>• Identify and group animals that have no skeleton, an endoskeleton, and an exoskeleton.</li> <li>• Research a question using reliable sources</li> <li>• Use scientific vocabulary to draw conclusions</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Sense enjoyment and fascination when learning about themselves, others and the world around them.</li> <li>• Reflect willingly on their experiences.</li> </ul>
<p><b>Next steps in learning</b></p> <p><b>Year 4: Human digestion</b> Children learn about the human digestive system. They explore the main parts, starting with the mouth and teeth, identifying tooth types and their functions. They link this learning to animals' diets and construct food chains.</p> <p><b>Year 5: Human ageing</b> Children learn about animal life cycles, including the human life cycle. They explore human growth and development to old age.</p> <p><b>Year 6: Circulatory system</b> Children about the transport role of the human circulatory system, its main parts and primary functions. They learn about healthy lifestyle choices and the effects of harmful substances on the body.</p>	<p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"> <li>• What constitutes a healthy diet</li> <li>• Humans and animals need food for nutrition.</li> <li>• Joints, bones, and muscles have different roles within the body, but all are important.</li> <li>• Animals, including humans have different diets</li> </ul>	






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## Science - Medium Term Plan

### Year 3 – Plant Nutrition and Reproduction

<b>Opportunity:</b> 	Explore different root types through hands on experience by observing potted plants and root vegetables. Children to use hand lenses to look closely at the different roots. Children will be able to carry out experiments to see how water is transported through the stem. Growing plants and observing first hand their life cycle.	
<b>Enquiry:</b> 	What would happen to a plant that cannot transport water through its vessels? What is a pollinator? Which animals are pollinators? Why are pollinators important? How do plants encourage pollinators to visit their flowers? What would happen if there were no pollinators? Can people pollinate flowers? How big is a pollen grain? Can pollination happen between different species of plants? What is a seed? What seeds do you know?	
<b>Language:</b> 	<b>Anchor, anther, blade, bud, carbon dioxide, carpel, fibrous root system, filament, flower, fruit, germination, growth, lateral root, leaf, life cycle, nectar, nutrient, offspring, petal, phloem, photosynthesis, pollen, pollination, pollinator, pore, reproduction, root, seed, seed dispersal, seedling, sepal, stem, trunk, stamen, taproot system, transpiration, vascular plant, vein, vessel, xylem.</b>	
<b>Scientific Strands (from National Curriculum):</b>	Pupils should be taught to: <ul style="list-style-type: none"> <li>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</li> <li>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.</li> <li>Investigate the way in which water is transported within plants</li> <li>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li> </ul>	
<b>Prior Learning:</b>  <b>Year 1: Plant parts</b> Children learn about wild and garden plants by exploring the local environment. They will identify and describe the parts of plants and observe changes over time.  <b>Year 2: Plant Survival</b> Children learn about the growth of plants from seeds and bulbs. They observe the growth of plants first hand recording changes over time and identifying what plants need to grow and stay healthy.	<b>Endpoints:</b>  <b>Knowledge:</b> <ul style="list-style-type: none"> <li>Plants need air, light, water, nutrients, temperature and space in order to live and grow.</li> <li>Leaves are responsible for catching sunlight.</li> <li>The petals of a flower attract insects for pollination.</li> <li>The stem/trunk carries the water and nutrients up to the leaves.</li> <li>The roots grow into the ground. They are responsible for pulling water and minerals to the plant.</li> </ul> <b>Skills:</b> Children will be able to: <ul style="list-style-type: none"> <li>Investigate how water is transported within plants</li> <li>Describe the requirements of plants for life and growth and how they vary from plant to plant</li> <li>Make careful observations, identifying similarities and differences</li> <li>Gather and record findings in a variety of ways</li> </ul>	<b>Opportunities for Spirituality:</b> <ul style="list-style-type: none"> <li>Reflect willing on their experiences</li> <li>Sense enjoyment and fascination when learning about themselves, others, and the world around them.</li> </ul>

<p><b>Next steps in learning:</b></p> <p><b>Year 4: Grouping and classifying</b>  Children learn about grouping living things known as classification They study plant kingdoms and use classification keys to identify living things.</p>	<ul style="list-style-type: none"> <li>• Set up fair enquiries</li> <li>• Draw and label life cycles of plants</li> <li>• Identify different parts and functions of plants</li> <li>• Identify methods of dispersal</li> </ul> <p><b>Understanding Scientific Concepts:</b>  Children will understand:</p> <ul style="list-style-type: none"> <li>• There are two main types of root systems – taproot and fibrous</li> <li>• How water is transported within a plant</li> <li>• All plants have a life cycle</li> <li>• A life cycle is a series of changes that happen to a living thing during its lifetime</li> <li>• Seed dispersal is the movement of seeds away from the parent plant.</li> <li>• How to set up and carry out simple investigation with a fair test.</li> </ul>	
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## Science - Medium Term Plan

### Year 3 – Rocks

<p><b>Opportunity:</b></p> 	<p>Children will explore rocks and soil through practical enquiries. Children will handle and explore different types of rocks. The children will look closely at the rocks to compare and group them. Children will investigate soil in the local area.</p>	
<p><b>Enquiry:</b></p> 	<p>Explore the type of soil in the school ground and wider local area make comparisons between the two. Explore the types of rocks and how they are formed.</p>	
<p><b>Language:</b></p> 	<p>Sedimentary, metamorphic, igneous, rocks, fossils, fossilisation, geologist, geology, sediment lava, earth crust, magma, particles, properties. soil, clay, sand, silt, organic matter</p>	
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</li> <li>• Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</li> <li>• Recognise that soils are made from rocks and organic matter.</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• Identifying differences, similarities or changes related to simple scientific ideas and processes</li> </ul>	
<p><b>Prior Learning:</b></p> <p><b>Year 1: Everyday materials</b> Children learn that objects are made from materials. They identify a range of everyday materials and their sources. Children investigate the properties of materials and begin to recognise that a material's properties define its use.</p> <p><b>Year 2: Uses of materials</b> Children learn about the uses of everyday materials and how materials' properties</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• A fossil is the preserved remains of something that was once living. The process in which fossils are formed is called fossilization.</li> <li>• Soil is a combination of a range of materials, including ground up pieces of rock, particles from dead plants and animals, air and soil.</li> <li>• identify different types of rocks – igneous, metamorphic and sedimentary.</li> </ul> <p><b>Skills:</b> Children will be able to:</p> <ul style="list-style-type: none"> <li>• Name and describe the types, appearance and properties of rocks.</li> <li>• Compare and group rocks based on their appearance, properties or uses.</li> <li>• Recognise that soils are made from rocks and organic matter</li> </ul> <p><b>Understanding Scientific Concepts:</b></p>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>

<p>make them suitable or unsuitable for specific purposes. They begin to explore how materials can be changed</p>	<p>Children will understand:</p> <ul style="list-style-type: none"><li>• There are three different rock types: sedimentary, igneous and metamorphic.</li><li>• Sedimentary rocks are formed from mud, sand and particles that have been squashed together over a long time to form rock.</li><li>• Metamorphic rocks are formed when existing rocks are heated by the magma under the Earth's crust or squashed by the movement of the Earth's tectonic plates.</li><li>• Igneous rocks are formed from cooled magma or lava.</li><li>• Soils are made from tiny pieces of eroded rock, air and organic matter.</li></ul>	
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## Science - Medium Term Plan

### Year 3 – Light and Shadows

<p><b>Opportunity:</b></p> 	<p>Children will have the opportunity to explore shadows in the environment and will explore practically how shadows change size and form. Children will learn about the dangers of the sun and ways to protect themselves this gives an opportunity to make cross curricular links. Children will learn about reflective materials and how this can be vital for safety.</p>
<p><b>Enquiry:</b></p> 	<p>Children will carry out practical enquiries where they will explore light and how shadows are formed. Through practical enquiries children will explore the changes made when a light source is close to an object and at a distance. Children will finish the unit by exploring shadows at different times of the day and how the impact of the position of the sun. Children will consider what is happening using their knowledge acquired in previous lessons.</p>
<p><b>Language:</b></p> 	<p>Artificial, natural darkness, block, light, light source, mirror, moon, translucent, transparent, shiny, opaque, ray, reflect, reflective, reflector, shadow, sun, sun protection factor (SPF), sunscreen, ultraviolet (UV) light</p>
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• Light is needed in order to see things and that dark is the absence of light.</li> <li>• Light is reflected from surfaces.</li> <li>• Light from the sun can be dangerous and that there are ways to protect their eyes.</li> <li>• Shadows are formed when the light from a light source is blocked by an opaque object.</li> <li>• Find patterns in the way that the size of shadows change.</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• Ask questions and use different types of scientific enquiries to answer them.</li> <li>• Set up simple practical enquiries, and fair tests.</li> <li>• Make careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment.</li> <li>• Gather, record, classify and present data in a variety of ways to help in answering questions.</li> <li>• Record findings using simple scientific language, drawings, labelled diagrams, charts, and tables.</li> <li>• Report on findings from enquiries, including oral and written explanations.</li> <li>• Use results to draw simple conclusions.</li> </ul>

<p><b>Prior Learning:</b></p> <p><b><u>Yr R: Shadows and reflections</u></b>  Children learn about natural phenomena, including shadows, reflections and echoes. They explore how shadows are formed and how they can change.</p> <p><b>Next steps in learning:</b>  <b><u>Year 6: Light theory</u></b>  Children learn about the way that light behaves, travelling in straight lines from a source or reflector, into the eye. They explore how we see light and colours, and phenomena associated with light, including shadows, reflections, and refraction.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Darkness is the absence of light.</li> <li>• Shadows are formed when light is blocked by an opaque object.</li> <li>• Light can <u>reflect</u> off surfaces (e.g. mirrors)</li> <li>• Some types of light (e.g. light from the sun) can be dangerous for our eyes and skin</li> </ul> <p><b>Skills:</b>  Children will be able to:</p> <ul style="list-style-type: none"> <li>• Explain, using words or diagrams, how shadows are formed when a light source is blocked by an opaque object.</li> <li>• Make careful observations, identifying similarities, differences and changes and make simple connections.</li> <li>• Explain why light from the Sun can be dangerous.</li> <li>• Set up and carry out some simple, and fair tests, making predictions for what might happen.</li> <li>• Group and sort materials as being reflective or non-reflective.</li> <li>• Describe the differences between dark and light and how we need light to be able to see.</li> </ul> <p><b>Understanding Scientific Concepts:</b>  Children will understand:</p> <ul style="list-style-type: none"> <li>• Shadows are formed when a light source is blocked by an opaque object</li> <li>• Shadows can change size and why.</li> <li>• Light from the sun can be dangerous.</li> <li>• Materials can be reflective or non-reflective.</li> <li>• Light is a form of energy that travels in straight lines</li> <li>• Dark is the absence of light and we need light to be able to see.</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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## Science - Medium Term Plan

### Year 4 – States of matter

<p><b>Opportunity:</b></p> 	<p>To know that materials are made of particles, how these particles are arranged defines the materials state. Treasure hunt to collect materials to classify into solids, liquids, and gases. Exploring materials of more than one state. Carry out experiments to make conclusions about why a material changes state. Plan and carry out investigations to make own conclusions about factors that impact on how quickly or slowly a material changes state. Set pupils the challenge of carrying out further investigations in their environment during break and lunch times</p>
<p><b>Enquiry:</b></p> 	<p>Why do solids, liquids and gases have different properties? Can materials change from one state to another? What causes some materials to change state? 'How does the temperature of solid water change as it melts?' What affects the rate of melting?</p>
<p><b>Language:</b></p> 	<p>Boiling point, compress, condensation, evaporation, freezing point, condensing point, gas, liquid, solid, heat, melting point, particle, process, property, reversible, irreversible, viscous, volume, water vapour, temperature, steam, state of matter</p> <p>Compare, conclusion, data, describe, diagram, equipment, measurement, estimate, interval, investigation, line graph, method, prediction, observe, variable, table, results, thermometer</p>
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• Compare and group materials together, according to whether they are solids, liquids or gases</li> <li>• 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)</li> <li>• Identify the part played by evaporation and condensation and associate the rate of evaporation with temperature</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• Set up simple practical enquiries, comparative, and fair tests</li> <li>• Making systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers.</li> <li>• Gathering, recording, classifying, and presenting data in a variety of ways to help in answering questions</li> <li>• Recording findings using simple scientific language, drawings, labelled diagrams, graphs, and tables</li> <li>• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> </ul>

<p><b>Prior Learning:</b></p> <p><b>Year 2 : Uses of materials</b> Uses of everyday materials and how materials' properties make them suitable or unsuitable for specific purposes. Know how materials can be changed.</p> <p><b>Year 1: Everyday materials</b> Objects are made from materials. Identify a range of everyday materials and their sources. Investigate the properties of materials and begin to recognise that a material's properties define its use.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• All matter exists in three states: solids, liquids and gases</li> <li>• States of matter can change, depending upon the temperature of the matter</li> <li>• Give examples of solids, liquids and gases</li> <li>• Identify the key parts of the water cycle – evaporation, condensation, precipitation.</li> </ul> <p><b>Skills:</b> Children will be able to:</p> <ul style="list-style-type: none"> <li>• Compare and group materials into liquids, solids, and gases</li> <li>• Identify materials that change state when heated or cooled</li> <li>• Take and record accurate measurements using a thermometer</li> <li>• Make observations about what happens when water is heated and cooled</li> <li>• Plan and set up an investigation, including a prediction and a method</li> <li>• Change a variable in their investigation</li> <li>• Compare their investigation results to the comparative sample.</li> <li>• Record their results using diagrams, tables, and line graphs</li> <li>• Present their findings to the class</li> </ul> <p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"> <li>• That materials are made up of particles and how these particles are arranged defines the state.</li> <li>• That materials can change state when they reach their melting point or boiling point</li> <li>• That materials have different melting and boiling points.</li> <li>• That evaporation occurs when a liquid is heated</li> <li>• That the rate of evaporation depends on the temperature.</li> <li>• That condensation occurs when a gas is cooled</li> <li>• That changing a variable has an impact on the rate the material changes state</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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## Science - Medium Term Plan

### Year 4 – Grouping and classifying

<b>Opportunity:</b>  	Explore the environment around them and use this to classify and group living things.	
<b>Enquiry:</b>  	Research new scientific discoveries and create questions to classify these living things. Create classification keys and present findings to class.	
<b>Language:</b>  	Amphibian, annelid, arachnid, arthropod, bird, classification, classification key, crustacean, exoskeleton, insect, invertebrate, vertebrate, mollusc, mammal, reptile, segmented, animal kingdom, fish, species, backbone, origin, evolution  Classify, describe, compare, diagram, research, question, record	
<b>Scientific Strands (from National Curriculum):</b>	Pupils should be taught about: <ul style="list-style-type: none"> <li>• Recognising that living things can be grouped in a variety of ways</li> <li>• Using classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> <li>• Recognising that environments can change and that this can sometimes pose dangers to living things.</li> </ul>	
<b>Prior Learning:</b> <b>Year2: Habitats</b> Chn have identified and named living things.  <b>Year 2: Use of materials</b> <b>Chn have grouped and classified materials by their observable characteristics i.e. wood, plastic.</b>  <b>Year 3: Rocks</b> Chn have grouped and classified rocks and soils.  <b>Year 4: States of matter</b>	<b>Endpoints:</b>  <b>Knowledge:</b> <ul style="list-style-type: none"> <li>• Living things can be grouped in different ways - mammals, amphibians, birds, fish, reptiles</li> <li>• Mammals have fur and give birth to live young</li> <li>• Reptiles are cold blooded and usually lay eggs</li> <li>• Birds have feathers, wings and a beak</li> <li>• Fish have gills which they use to breathe</li> <li>• A key is a set of questions about the characteristics of living things</li> </ul> <b>Skills:</b> Children will be able to: <ul style="list-style-type: none"> <li>• Group vertebrates into fish, reptiles, mammals, amphibians and birds</li> <li>• Group invertebrates into annelids, molluscs, arachnids, crustaceans, insects and myriapods.</li> <li>• Group plants into three main groups, vascular plants: flowering, cone-bearing and spore-producing plants</li> <li>• Use classification keys to identify living things</li> <li>• Create classification keys to group living things</li> </ul>	<b>Opportunities for Spirituality:</b> <ul style="list-style-type: none"> <li>• Reflect willing on their experiences</li> <li>• Sense enjoyment and fascination when learning about themselves, others, and the world around them.</li> </ul>

<p>Chn grouped solids, liquids and gases according to their characteristics.</p> <p><b>Next steps in learning:</b> <b>Year 6: Evolution</b></p> <p>Chn will learn how living things on Earth have changed over time. They learn how characteristics are passed from parents to their offspring and how variation in offspring can affect their survival.</p>	<p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"><li>• All living things can be grouped and classified by their observable features.</li><li>• Scientists discover new living things every year</li><li>• Classification keys are used to group living things with similar characteristics</li></ul>	
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## Science - Medium Term Plan

### Year 4 – Food and the digestive system

<b>Opportunity:</b>  	Dental hygienist visiting the children to discuss how to keep their teeth healthy. Children will have the opportunity to ask questions about teeth and further develop their knowledge. Children will have the opportunity to complete a digestive investigation through cross curricular learning in English.	
<b>Enquiry:</b>  	Teeth investigation focussing on toothpaste and its effectiveness. Children posing what if? Questions and exploring the possibilities 'What might happen if...' questions such as, 'What might happen if a gardener used pesticides in their garden that killed off all the invertebrates?	
<b>Language:</b>  	Abiotic, fluoride, mandible, anus, food chain, maxilla, apex predator, digestion, food energy, digestive acid, food web, molar, biotic, digestive enzyme, canine, digestive organ, herbivore, nutrient, carbohydrate, digestive system, incisor, oesophagus, carnivore, ecosystem, omnivore, consumer, excretion, interdependence, oral hygiene, crown, faeces, large intestine, prey, rectum, tertiary consumer, photosynthesis, primary consumer, saliva, tooth plaque, producer, secondary consumer, tooth enamel, predator, protein, stomach, premolar, pulp, small intestine.	
<b>Scientific Strands (from National Curriculum):</b>	<ul style="list-style-type: none"> <li>Recognise that environments can change and that this can sometimes pose dangers to living things</li> <li>Describe the simple functions of the basic parts of the digestive system in humans</li> <li>Identify the different types of teeth in humans and their simple functions</li> <li>Construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>	
<b>Prior Learning:</b>  <b>Year 2 Habitats</b> Children learn about habitats and what a habitat needs to provide. They explore local habitats to identify and name living things and begin to understand how they depend on one another for food and shelter.  <b>Year 3 Animal nutrition</b> Children learn about the importance of nutrition for humans and other animals.  <b>Next steps in learning:</b>	<b>Endpoints:</b>  <b>Knowledge:</b> <ul style="list-style-type: none"> <li>Humans have up to <u>32 adult teeth</u>, made up of 4 different types – incisors, canines, pre-molars and molars.</li> <li>Food chains show how each living thing gets food, and how nutrients are passed from producers through different consumers.</li> <li>Identify and name consumers, producers and predators – plants, rabbit, fox</li> <li>Food is taken in by the mouth, and broken down by teeth and saliva</li> <li>Food is further broken down in the stomach &amp; intestines.</li> <li>Waste food that the body doesn't need is sent to the anus for excretion</li> </ul> <b>Skills:</b> Children will be able to: <ul style="list-style-type: none"> <li>Gather, record, classify and present observations and measurements in a variety of ways.</li> <li>Construct and interpret a variety of food chains and webs to show interdependence and how energy is passed on over time.</li> <li>Explain how unfamiliar habitats, such as a mountain or ocean, can change over time and what influences these changes</li> </ul>	<b>Opportunities for Spirituality:</b> <ul style="list-style-type: none"> <li>Reflect willing on their experiences</li> <li>Sense enjoyment and fascination when learning about themselves, others, and the world around them.</li> </ul>

- Describe the purpose of the digestive system, its main parts and each of their functions
- Identify the four different types of teeth in humans and other animals, and describe their functions

**Understanding Scientific Concepts:**

Children will understand:

- An ecosystem is a community of living organisms and their environments that interact with each other.
- Human activity, such as deforestation and natural events like wildfires and droughts, can damage ecosystems.
- The parts of the digestive system
- The different types of teeth and how to keep teeth healthy








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## Science - Medium Term Plan

### Year 4 – Sound

<p><b>Opportunity:</b></p> 	<p>Children have the opportunity to practically explore sound through exploration of musical instruments that are played in different ways. Children will use different media to understand the process of sound. Children to explore pitch and volume through practical enquires. Children to create their own ideas for materials that could be used to muffle sound and protect our hearing.</p>
<p><b>Enquiry:</b></p> 	<p>'Children to complete a series of enquirers: How do we hear sounds?' 'Which materials do you think you would use to make noise-cancelling headphones?' , 'How does the volume of a sound change as you move away from a sound source?' how could you change the volume of your instrument's sound?        Children to create their own enquiries and carry out an investigation to explore the question further.</p>
<p><b>Language:</b></p> 	<p>Air, brass instrument, <b>cochlea</b>, <b>cochlea nerve</b>, decibels (dB), <b>ear canal</b>, ear, <b>eardrum</b>, hearing, hertz (Hz), inner ear, medium, muffle, <b>wavelength</b>, woodwind instrument, <b>volume</b>, <b>pitch</b>, <b>vibrate</b>, stringed instrument, <b>sound wave</b>, sound source, <b>pinna</b>, percussion, <b>particle</b>, <b>ossicles</b></p>
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• Identify how sounds are made, associating some of them with something vibrating.</li> <li>• recognise that vibrations from sounds travel through a medium to the ear.</li> <li>• find patterns between the pitch of a sound and features of the object that produced it</li> <li>• find patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>• recognise that sounds get fainter as the distance from the sound source increases.</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• Ask relevant questions.</li> <li>• setting up simple investigations with comparative and fair tests</li> <li>• Make observations, taking accurate measurements using standard units.</li> <li>• Gather, record, and present data in a variety of ways to help in answering questions.</li> <li>• Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• Reporting on findings from investigations, including written explanations, and conclusions</li> <li>• Use results to draw simple conclusions.</li> </ul>

<p><b>Prior Learning:</b></p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Know that sounds are a type of energy. Sounds are created by vibrations.</li> <li>• Know that pitch is a measure of how high or low a sound is</li> <li>• Know that volume is the loudness of a sound. The louder the sound the bigger the vibration.</li> <li>• Know that vibrations travel through a medium to the ear.</li> </ul> <p><b>Skills:</b></p> <p>Children will be able to:</p> <ul style="list-style-type: none"> <li>• Explain how sounds are made and heard using diagrams, models, written methods or verbally.</li> <li>• Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately.</li> <li>• Compare and find patterns in the volume of a sound, using a range of equipment, such as musical instruments.</li> </ul> <p><b>Understanding Scientific Concepts:</b></p> <p>Children will understand:</p> <ul style="list-style-type: none"> <li>• When an instrument is played, the air around or inside it vibrates. These vibrations travel as a sound wave. Sound waves travel through a medium, such as air or water, to the ear.</li> <li>• The volume of sound is measured in decibels (dB).</li> <li>• Loud or continuous noise can damage hearing. Sound can be muffled by inserting a material into the sound wave's path that absorbs sound waves.</li> <li>• Volume is how loud or quiet a sound is. The harder an instrument is hit, plucked, or blown, the stronger the vibrations and the louder the sound.</li> <li>• Pitch is how high or low a sound is.</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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## Science - Medium Term Plan

### Year 4 - Electrical circuits and conductors

<b>Opportunity:</b> 	Children to have an opportunity to investigate conductive and non-conductive materials and record their results in a variety of ways. Children to have the opportunity to carry out investigative enquiries that allow them to ask questions and make changes to their investigation as issues arise.
<b>Enquiry:</b> 	Children will use their knowledge of switches and circuits to design and make a working lamp. The children will also explore circuits making their own simple series circuits. Children will problem solve incomplete circuits and fix issues as they arise.
<b>Language:</b> 	Appliance, battery, buzzer, cell, circuit, battery holder, component, conductor, insulator, mains electricity, crocodile clip, motor, light emitting diode (LED), power station, non-conductive, filament, incomplete circuit, live wire, neutral wire, earth wire, plug, electric current, rechargeable, sensor, source, conductive
<b>Scientific Strands (from National Curriculum):</b>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• Identify common appliances that run on electricity</li> <li>• Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>• 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.</li> <li>• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>• Recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• Asking relevant questions and using different enquiries to answer them</li> <li>• Set up simple practical enquiries, comparative and fair tests</li> <li>• Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment.</li> <li>• Gather, record, classify and present data in a variety of ways to help in answering questions</li> <li>• Record findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables</li> <li>• Report on findings from enquiries, using written explanations, or presentations</li> <li>• Use results to draw simple conclusions, make predictions for new enquiries, and suggest improvements.</li> </ul>

<p><b>Prior Learning:</b>  <b><u>Year 1: Everyday materials</u></b>  Children learn that objects are made from materials. They identify a range of everyday materials and their sources. Children investigate the properties of materials and begin to recognise that a material's properties define its use.</p> <p><b><u>Year 2: Uses of materials</u></b>  Children learn about the uses of everyday materials and how materials' properties make them suitable or unsuitable for specific purposes. They how materials can be changed.</p> <p><b>Next steps in learning:</b>  <b><u>Year 6: Electrical circuits and conductors</u></b>  Children learn about electrical circuits, their components and how they function. They recognise how the voltage of cells affects the output of a circuit and record circuits using standard symbols. children learn about programmable devices, sensors and monitoring.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Electricity is used to power numerous household appliances, for example laptops, TVs, fridges, microwaves, toasters, ovens and lights/ lamps.</li> <li>• Electricity can only flow through a complete circuit</li> <li>• Switches can be used to open or close a circuit</li> <li>• A conductor of electricity is a material that allows electricity to flow through it. Metals are good conductors.</li> <li>• Know how to make a complete circuit</li> </ul> <p><b>Skills:</b>  Children will be able to:</p> <ul style="list-style-type: none"> <li>• Describe materials as electrical conductors or insulators.</li> <li>• Construct operational simple series circuits using a range of components and switches for control.</li> <li>• Predict and describe whether a circuit will work based on whether or not the circuit is a complete loop and has a battery or cell.</li> </ul> <p><b>Understanding Scientific Concepts:</b>  Children will understand:</p> <ul style="list-style-type: none"> <li>• Electrical components include cells, wires, lamps, motors, switches and buzzers. Switches open and close a circuit and provide control.</li> <li>• A circuit is a collection of components connected by wires through which an electric current can flow. A circuit must be a complete loop to work.</li> <li>• A series circuit is a simple loop with only one path for the electricity to flow.</li> <li>• A series circuit must be a complete loop to work and have a source of power from a battery or cell.</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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## Science - Medium Term Plan

### Year 5 – Properties and changes of materials

<p><b>Opportunity:</b></p> 	<p>To know about the wider properties of materials and their uses. Use the environment around them to identify properties of less known materials and why each material has been used.          Carry out experiments to learn about mixtures and how they can be separated using sieving, filtration, and evaporation. Plan, set up and carry out investigations to study reversible and irreversible changes.          Create own scientific questions to investigate the formation of new materials.</p>
<p><b>Enquiry:</b></p> 	<p>What is a mixture?          How much salt can be dissolved in 100ml of water?          Is the saturation points different if the solvent is hot or cold?          How can oil and water be separated?          How many different gases are there in the air?          How can metal alloys be separated?</p>
<p><b>Language:</b></p> 	<p>Absorbent, rusty, bendy, temperature, transparent, <b>chemical change</b>, <b>condense</b>, conductor, insulator, mixture, dissolve, evaporate, magnetic, material, particle, <b>filtration</b>, gas, liquid, <b>homogenous mixture</b>, <b>heterogenous mixture</b>, <b>insoluble</b>, <b>soluble</b>, <b>irreversible changes</b>, <b>reversible changes</b>, <b>sieving</b>, <b>solute</b>, <b>saturated solution</b>, <b>solvent</b></p> <p>Equipment, measurement, <b>fair test</b>, line graph, observe, prediction, method, conclusion, results, data, thermometer, variable, <b>venn diagram</b></p>
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• Compare and group together everyday materials based on their properties.</li> <li>• know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solute</li> <li>• use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> <li>• give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> <li>• 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.</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>• using test results to make predictions to set up further comparative and fair tests</li> </ul>

	<ul style="list-style-type: none"> <li>reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	
<p><b>Prior Learning:</b></p> <p><b>Year 1: Everyday materials</b> Objects are made from materials. Identify a range of everyday materials and their sources. Investigate the properties of materials and begin to recognise that a material's properties define its use.</p> <p><b>Year 2: Uses of materials</b> Uses of everyday materials and how materials' properties make them suitable or unsuitable for specific purposes. Know how materials can be changed.</p> <p><b>Year 4: States of matter</b> Identify solids, liquids and gases and their characteristic properties. Observe how materials change state as they are heated and cooled. Learn particle theory.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>A solution is a specific type of mixture where one substance is dissolved into another</li> <li>A solvent is a substance that dissolves a solid, liquid,.</li> <li>A solute is the substance dissolved in the solvent.</li> <li>Some mixtures and solutions can be separated, e.g. through processes such as sieving, filtering &amp; evaporating.</li> <li>Materials can be changed, for example through heating, cooling, or mixing with other substances.</li> <li>Some changes can be reversed. These are known as reversible changes. An example of this is the freezing of water into ice – it can be melted to become water again.</li> <li>Other changes are irreversible. Examples of this include cooking, baking, frying and burning materials.</li> </ul> <p><b>Skills:</b> Children will be able to:</p> <ul style="list-style-type: none"> <li>Separate mixtures by filtering, sieving, and evaporating.</li> <li>Identify, demonstrate, and compare reversible and irreversible change</li> <li>Compare and group everyday materials by their properties, including hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism.</li> <li>Plan and set up investigations to test their theories</li> </ul> <p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"> <li>Reversible changes include heating, cooling, melting, dissolving and evaporating. Irreversible changes include burning, rusting, decaying and chemical reactions.</li> <li>Different materials have different properties. Materials' properties make them suitable for specific purposes.</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>Sense enjoyment and fascination when learning about themselves, others and the world around them.</li> <li>Reflect willingly on their experiences.</li> </ul>






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## Science - Medium Term Plan

### Year 5 – Forces and Mechanisms

<p><b>Opportunity:</b></p> 	<p>Children have the opportunity to explore gravitational force through a series of experiments. Recreating tests completed by famous scientists such as Galileo Galilei and Sir Isaac Newton. Explore water resistance, air resistance and frictions through simple investigations recording their results and sharing their findings with others. Children will investigate how clothing, helmets and even posture could affect air resistance while cycling. Children will create an investigation to find out which gear requires the greatest number of pedal turns to ride 100m.</p>
<p><b>Enquiry:</b></p> 	<p>Which surface creates the most friction? Which surface creates the least friction? How do different lubricants affect friction? What could increase friction on this surface? What could decrease friction on this surface? On which planet would I weigh the most and least? How does the Sun or the Moon's gravitational force affect the Earth? How did Isaac Newton's theory of gravity change people's understanding of the world? How did Galileo Galilei's Leaning Tower of Pisa experiment challenge scientific thinking?</p>
<p><b>Language:</b></p> 	<p><b>Aerodynamic, air resistance, water resistance, friction, force, gravity, gravitational force, gear, contact force, non-contact force, drag, force meter, fulcrum, lever, lubricant, mechanism, magnetism, mass, weight, newton, particle, pull, pulley, push, surface area</b></p> <p>Prediction, investigation, fair test, measurements variable, results, conclude, diagrams, table, line graph, scatter graph,</p>
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>• identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>• recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• record data and results using scientific diagrams and labels, tables, scatter graphs, bar and line graphs</li> <li>• using test results to make predictions to set up further comparative and fair tests</li> <li>• report and present findings from enquiries, including conclusions, causal relationships, and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identify scientific evidence that has been used to support or refute ideas or arguments</li> </ul>

<p><b>Prior Learning:</b></p> <p><b>Year 3: Forces and magnets</b>  Children learn about contact and non-contact forces, including friction and magnetism. They investigate frictional and magnetic forces and identify parts of a magnet and magnetic materials.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>Identify a number of different forces that affect us in our daily lives such as air resistance, water resistance and friction.</li> <li>Unsupported objects fall towards the Earth because of the force of gravity</li> <li>Simple machines and mechanisms include pulleys, gears and levers. They can be used to turn a small force into larger forces.</li> </ul> <p><b>Skills:</b>  Children will be able to:</p> <ul style="list-style-type: none"> <li>explain that objects fall to Earth due to the force of gravity</li> <li>Compare and describe, using a range of toys, models and natural objects, the effects of water resistance, air resistance and friction.</li> <li>Describe and demonstrate how simple levers, gears and pulleys assist the movement of objects</li> </ul> <p><b>Understanding Scientific Concepts:</b>  Children will understand:</p> <ul style="list-style-type: none"> <li>Gravitational forces</li> <li>The effects of resistance – water, air, and friction</li> <li>Levers, pulleys, and gears are all mechanisms</li> <li>Mechanisms such as levers, pulleys, gears allow a smaller force to have a greater effect.</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>Reflect on their experiences</li> <li>Sense of enjoyment and fascination when learning about the world around them.</li> <li>Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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## Science - Medium Term Plan

### Year 5 Human reproduction and aging

<b>Opportunity:</b> 	Children have the opportunity of inviting parents, grandparent's younger siblings into school to complete investigation on reaction times.	
<b>Enquiry:</b> 	'Do our reactions slow down as we get older?' Children will explore this question by carrying out research enquiry using data collated from around the school.	
<b>Language:</b> 	<b>Cell</b> , foetus, lifespan, <b>adolescent</b> , <b>deterioration</b> , <b>gestation</b> , male, adult, development, growth, mammal, ageing, egg, <b>growth spurt</b> , <b>menopause</b> , embryo, <b>hormone</b> , <b>metamorphosis</b> , amphibian, infant, <b>mood swing</b> , bird, fallopian tube, insect, <b>offspring</b> , birth, female, juvenile, <b>ovary</b> , <b>larva</b> , fish, life cycle, period, reproductive organ, sexual reproduction, uterus, process, <b>reproductive system</b> , puberty, reptile, stage, vertebrate, self-esteem, sweat, warm blooded, pupa, <b>reaction time</b> , <b>umbilical cord</b> , <b>reproduction</b> , <b>sexually mature</b> , <b>urethra</b>	
<b>Scientific Strands (from National Curriculum):</b>	<ul style="list-style-type: none"> <li>Describe the changes as humans develop to old age.</li> <li>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</li> <li>Describe the life process of reproduction in some plants and animals.</li> </ul>	
<b>Prior Learning:</b>  <b>Year 1 human senses</b> Children learn that humans are a type of animal known as a mammal.  <b>Year 2 Human survival</b> Children learn about the basic needs of humans for survival. They learn how human offspring grow and change over time into adulthood.  <b>Next steps in learning:</b> <b>Year 6 Evolution and inheritance</b> Children learn how characteristics are passed from parents to their offspring and how variation in offspring can affect their survival, with changes (adaptations) possibly	<b>Endpoints:</b>  <b>Knowledge:</b> <ul style="list-style-type: none"> <li>Know that as humans age they go through puberty</li> <li>Puberty is when a child's body begins to grow, change, and develop as they become an adult.</li> <li>Girls grow taller develop breasts and start to menstruate.</li> <li>Boys grow taller, grow hair on their face and body and their voice deepens.</li> </ul> <b>Skills:</b> Children will be able to: <ul style="list-style-type: none"> <li>Compare the life cycles of animals, including a mammal, an amphibian, an insect and a bird.</li> <li>Gather and record data and results of increasing complexity, selecting from a range of methods (scientific diagrams, labels, classification keys, tables, graphs and models)</li> <li>Ask a wide range of relevant scientific questions that broaden their understanding of the world around them.</li> <li></li> </ul> <b>Understanding Scientific Concepts:</b> Children will understand: <ul style="list-style-type: none"> <li>Classification keys are used to group living things with similar characteristics</li> <li>The changes humans experience as they develop to old age.</li> </ul>	<b>Opportunities for Spirituality:</b> <ul style="list-style-type: none"> <li>Reflect willing on their experiences</li> <li>Sense enjoyment and fascination when learning about themselves, others, and the world around them.</li> </ul>

leading to the evolution of a species.

- The stages and processes in the human life cycle






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## Science - Medium Term Plan

### Year 5 – Earth and Space

<p><b>Opportunity:</b></p> 	<p>Children will have the opportunity to create sundials to explore day and night. They will complete practical enquiries to explore the movement of the Earth and the movement of the moon relative to Earth. These practical enquires include; Outdoor model of the solar system, creating sundials, a practical model to demonstrates the rotation and orbits of the Earth and the Moon. The children will learn about other planets and will complete a detailed analysis of a planet other that Earth. They will compare other planets to Earth.</p>
<p><b>Enquiry:</b></p> 	<p>Children will explore scientific theory about space, how scientists know Earth is spherical and why it was once believed to be flat. The children will complete enquires to explore day and night by making sundials, and models of the solar system. Children will carry out a detailed written enquiry into another planet.</p>
<p><b>Language:</b></p> 	<p>Atmosphere, axis, constellation, daytime, night-time, dwarf planet, first quarter moon, full moon, new moon, lunar eclipse, solar eclipse, sun, star, galaxy, heliocentric model, goldilocks planet, mass matter, Mercury, Mars, Earth, Jupiter, Uranus, Venus, Saturn, Neptune, Pluto, satellite, space, rotate, waxing crescent moon, waxing gibbous moon, waning crescent moon, waning gibbous moon, the solar system, shadow, seasons, southern hemisphere, northern hemisphere, gravitational force, milky way galaxy, penumbra, phases of the moon.</p>
<p><b>Scientific Strands (from National Curriculum):</b></p>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• The movement of the Earth, and other planets, relative to the Sun in the solar system</li> <li>• The movement of the Moon relative to the Earth</li> <li>• The Sun, Earth and Moon as approximately spherical bodies</li> <li>• The idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• Plan different types of scientific enquiries to answer questions.</li> <li>• Identify scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>

<p><b>Prior Learning:</b></p> <p><b><u>Yr R: Starry night</u></b>  Children explore the differences in the world at night compared to during the day. Children begin to explore what is happening in the world while they are sleeping.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• Earth rotates on its axis. It does a full rotation once every 24 hours</li> <li>• The moon orbits Earth in an oval shaped path while spinning on its axis</li> <li>• The Earth orbits the sun. It takes a little more than 365 days to orbit the sun</li> <li>• As the moon rotates around Earth the sun lights up different parts of it</li> <li>• The moon, Earth and sun are spherical bodies</li> <li>• Daytime occurs when the side of the Earth is facing towards the sun</li> <li>• Nighttime occurs when the side if the Earth is facing away from the sun</li> </ul> <p><b>Skills:</b>  Children will be able to:</p> <ul style="list-style-type: none"> <li>• Ask a wide range of relevant scientific questions that broaden their understanding of the world around them and identify how they can answer them.</li> <li>• Describe or model the movement of the planets in our Solar System, including Earth, relative to the Sun.</li> <li>• Describe the Sun, Earth and Moon as approximately spherical bodies and use this knowledge to understand the phases of the Moon and eclipses.</li> <li>• Describe or model the movement of the Moon relative to Earth.</li> </ul> <p><b>Understanding Scientific Concepts:</b>  Children will understand:</p> <ul style="list-style-type: none"> <li>• The Solar System is made up of the Sun and everything that orbits around it.</li> <li>• There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.</li> <li>• Earth orbits around the Sun and a year (365.25 days) is the length of time it takes for Earth to complete a full orbit.</li> <li>• The Sun, Earth, Moon and the planets in our solar system are roughly spherical.</li> <li>• All planets are spherical because their mass is so large that they have their own force of gravity. This force of gravity pulls all of a planet's material towards its centre, which compresses it into the most compact shape – a sphere.</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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## Science - Medium Term Plan

### Year 6 – Evolution and inheritance

<b>Opportunity:</b> 	Children will look at plants in nature and explore the adaptations they have made to survive Children will carry out investigations to test the theory of evolution Children will learn about the theory of evolution theorists. Share the views and debate the pros and cons of artificial selection	
<b>Enquiry:</b> 	Investigate Holly leaves that have been trimmed and those have not to explore how holly adapts and becomes spikier to survive better in its environment Investigate if 'females are taller than males', 'brown-eyed children also have brown hair' or 'people with larger hand spans also have larger feet'. Investigate how birds beaks have adapted Investigate and collect discontinuous data about their eye colours and continuous data about their heights	
<b>Language:</b> 	Adaption, <b>ancestor, animal kingdom, artificial selection, asexual reproduction</b> , bacteria, characteristic, <b>deoxyribonucleic acid (DNA), evolution, evolve</b> , extinct, fossil, gene, genetics, inheritance, <b>microorganisms, Monera kingdom, natural selection, plant kingdom, pathogen, Protista kingdom</b> , species, variation, virus.  bar chart, <b>scatter graph</b> , variable, <b>theory</b> , results, record, <b>research</b> , question, prediction, method, measurement, line graph, investigation, fair test, <b>hypotheses</b> , equipment, diagram, data, <b>continuous data</b> , conclusion, <b>bias</b>	
<b>Scientific Strands (from National Curriculum):</b>	Pupils should be taught about: <ul style="list-style-type: none"> <li>• how living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li> <li>• that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</li> <li>• how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</li> </ul> Working Scientifically Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary, take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate, record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs, use test results to make predictions to set up further comparative and fair tests, report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results.	
<b>Prior Learning:</b> <b>Year 2: Animal survival</b> Children learn about growth in animals, explore the life cycles of some familiar animals. Identify the basic needs of animals for survival, including food, water, air and shelter.  <b>Year 2: Human survival</b> They learn how human offspring grow and change over time into adulthood.	<b>Endpoints:</b>  <b>Knowledge:</b>  <b>Skills:</b> Children will be able to: <ul style="list-style-type: none"> <li>• Explain that living things have changed over time, using specific examples and evidence.</li> </ul>	<b>Opportunities for Spirituality:</b> <ul style="list-style-type: none"> <li>• Sense enjoyment and fascination when learning about themselves, others and the world around them.</li> </ul>

<p><b>Year 3: Plant nutrition and reproduction</b> Children learn about the requirements of plants for growth and survival. They describe the parts of flowering plants and relate structure to function, including the flower for reproduction.</p> <p><b>Year 3: Rocks</b> Children learn about how fossils are formed.</p> <p><b>Year 4: Grouping and classifying</b> Children learn about grouping living things (classification). They study the animal and plant kingdoms and use and create classification keys to identify living things.</p> <p><b>Year 5: Human reproduction and aging</b> Children learn about animal life cycles, including the human life cycle. They explore human growth and development to old age, including the changes experienced during puberty and human reproduction.</p>	<ul style="list-style-type: none"> <li>• Classify living things, including microorganisms, animals and plants, into groups</li> <li>• Describe some significant changes that have happened on Earth and the evidence, such as fossils, that support this.</li> <li>• Plan and carry out investigations to test hypotheses based on the scientific theory of evolution</li> <li>• Identify how animals and plants are adapted to suit their environment,</li> </ul> <p><b>Understanding Scientific Concepts:</b> Children will understand:</p> <ul style="list-style-type: none"> <li>• how living things on Earth have changed over time and how fossils provide evidence for this.</li> <li>• how characteristics are passed from parents to their offspring and how variation in offspring can affect their survival, with changes (adaptations) possibly leading to the evolution of a species.</li> <li>• Artificial and natural selection</li> </ul>	<ul style="list-style-type: none"> <li>• Reflect willingly on their experiences.</li> </ul>
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## Science - Medium Term Plan

### Year 6 – Electrical circuits and components

<b>Opportunity:</b> 	Children will have the opportunity to explore series circuits and make observation and prediction for what happens when components are added or changed. Children will investigate voltage and the impact this has on the circuit. Children will investigate sensors and how they are used in the home. Children to generate their own questions and research them to find the answers. Children will work in small teams to design a programmable home device that uses a sensor.
<b>Enquiry:</b> 	How do cells work? Who invented the battery? How are rechargeable batteries different to normal cells? What are the different types of cells, and how are they different? How does wireless battery charging work?
<b>Language:</b> 	appliance, battery, battery holder, buzzer, <b>cell</b> , circuit, coding, <b>component</b> , crocodile clip, conductor, insulator, electric current, electricity, lamp, <b>light-emitting diode (LED)</b> , <b>light meter</b> , mains, <b>motor</b> , micro: bit, <b>multi-meter</b> , <b>sensor</b> , <b>series circuit</b> , <b>switch</b> , symbol, <b>terminal</b> , volt, voltage, voltmeter, wire.
<b>Scientific Strands (from National Curriculum):</b>	Pupils should be taught about: <ul style="list-style-type: none"> <li>• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li> <li>• 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</li> <li>• use recognised symbols when representing a simple circuit in a diagram</li> </ul> Working scientifically <ul style="list-style-type: none"> <li>• plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• record data and results using scientific diagrams and labels, tables, scatter graphs, bar and line graphs</li> <li>• using test results to make predictions to set up further comparative and fair tests</li> <li>• report and present findings from enquiries, including conclusions, causal relationships, and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identify scientific evidence that has been used to support or refute ideas or arguments</li> </ul>

<p><b>Prior Learning:</b></p> <p><b>Year 4: Electrical circuits and conductors</b>  Children learn about electrical appliances and safety. They construct simple series circuits and name their parts and functions, including switches, wires and cells. They investigate electrical conductors and insulators and identify common features of conductors.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b></p> <ul style="list-style-type: none"> <li>• When drawing electrical circuits, children should use the standard symbols to show the different components. – bulb (lighting) bulb (indicator) motor, buzzer, switch</li> <li>•</li> </ul> <p><b>Skills:</b>  Children will be able to:</p> <ul style="list-style-type: none"> <li>• create circuits using a range of components and record diagrammatically using the recognised symbols for electrical components.</li> <li>• Compare and give reasons for variations in how components in electrical circuits function (brightness of lamps; volume of buzzers and function of on or off switches)</li> <li>• report on and validate their findings, answer questions and justify their methods, opinions and conclusions, and use their results to suggest improvements to their methodology, separate facts from opinions, pose further questions and make predictions for what they might observe.</li> <li>• take accurate, precise and repeated measurements in standard units, using a range of chosen equipment.</li> <li>• Ask and answer deeper and broader scientific questions</li> <li>• explain how the brightness of a lamp or volume of a buzzer is affected by the number and voltage of cells used in a circuit.</li> <li>• Use a sensor to monitor an environmental variable, such as temperature, sound or light</li> </ul> <p><b>Understanding Scientific Concepts:</b>  Children will understand:</p> <ul style="list-style-type: none"> <li>• Circuit symbols</li> <li>• An electric current is the flow of electric charge around a circuit.</li> <li>• An electric circuit must be complete for electric charge to flow</li> <li>• Specialised equipment is used to take accurate measurements in standard units.</li> <li>• Voltage, what is it, how is it measured and factors that affect it</li> <li>• How to use their scientific knowledge of lights, buzzers, cells and voltage to create a programmable home device that uses a sensor</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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 Our children will be prepared for the next step of their journey as responsible citizens.  
 We aspire for all to flourish.



## Science - Medium Term Plan

### Year 6 Circulatory system

<b>Opportunity:</b> 	Children will have the opportunity to dissect sheep hearts and explore the different elements that make up the heart. Children will experiment with mixtures to create 'blood.' Children will complete investigations that focus on testing their findings and observations. Children will use equipment to carry out investigations and will begin to develop their own enquiry projects to 'investigate' the impact of exercise and heart rate. Children will test out hypotheses and prove or disprove them.	
<b>Enquiry:</b> 	Does my HRR double if I do twice as much exercise? Does drinking water after exercise affect my HRR? Does my resting position after exercise affect my HRR? Does age affect the HRR? Do active people have higher HRRs? 'Children with lower resting heart rates can sprint faster than those with higher resting heart rates. Why do we need exercise?	
<b>Language:</b> 	aerobic exercise carbohydrate excretory system nutrient antibody carbon dioxide haemoglobin organ aorta cell heart oxygen artery cholesterol heart rate oxygenate atrium circulatory system hormone oxygenated blood clot immune system plasma blood pressure deoxygenate immunity platelet blood vessel digestive system lumen processed food bone marrow endocrine system muscular system protein capillary excretion nervous system pulmonary artery pulmonary vein respiratory system skeletal system vein pulse rate resting heart rate tissue vena cava red blood cell saturated fat unsaturated fat ventricle reproductive system septum valve white blood cell	
<b>Scientific Strands (from National Curriculum):</b>	<ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</li> <li>Describe the ways in which nutrients and water are transported within animals, including humans.</li> </ul>	
<b>Prior Learning:</b>  <b>Year 2 Human survival</b> Children learn about the basic needs of humans for survival, including the importance of exercise, nutrition and good hygiene.  <b>Year 3 Animal nutrition and the skeletal system</b> Children learn about the importance of nutrition for humans. They learn about the role of a skeleton and muscles.  <b>Year 4 – digestion</b> This project teaches children about the human digestive system	<b>Endpoints:</b>  <b>Knowledge:</b> see knowledge organiser  <b>Skills:</b> Children will be able to: <ul style="list-style-type: none"> <li>Name and describe the purpose of the circulatory system and the functions of the heart, blood vessels and blood.</li> <li>Explain that the circulatory system in animals transports oxygen, water and nutrients around the body.</li> </ul> <b>Understanding Scientific Concepts:</b> Children will understand: <ul style="list-style-type: none"> <li>Healthy and unhealthy life choices and the impact these have on their body</li> <li>The role of the circulatory system</li> <li>Structure and function of the heart</li> <li>The function of blood</li> </ul>	<b>Opportunities for Spirituality:</b> <ul style="list-style-type: none"> <li>Reflect willing on their experiences</li> <li>Sense enjoyment and fascination when learning about themselves, others, and the world around them.</li> </ul>

<b>Next steps in learning:</b>		
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## Science - Medium Term Plan

### Year 6 – Light Theory

<b>Opportunity:</b> 	Children will have the opportunity to explore light theory through practical investigations that explore how light travels, how we see and how light behaves when reflected off a mirror. Children will have the opportunity to share their results with the class and refute arguments based on scientific theory.
<b>Enquiry:</b> 	Investigating and measuring light, investigating reflections and shadows, creating scientific reports, perceiving colour investigation.
<b>Language:</b> 	Absorb, <b>concave, retina, cornea, lens, prism, spectrum</b> , translucent, transparent, opaque, ultraviolet (UV) light, <b>visible light, wavelength, white light</b> , ray, <b>reflect, refract, scatter</b> , shadow, <b>plane mirror, electromagnetic spectrum, convex, cone, optic nerve, optical fibre</b> , light source, darkness, <b>iris</b>
<b>Scientific Strands (from National Curriculum):</b>	<p>Pupils should be taught about:</p> <ul style="list-style-type: none"> <li>• that light appears to travel in straight lines.</li> <li>• the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</li> <li>• that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</li> <li>• the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul> <p>Working scientifically</p> <ul style="list-style-type: none"> <li>• Plan different types of scientific enquiries to answer questions,</li> <li>• Record data and results of increasing complexity using scientific diagrams and labels.</li> <li>• Report and present findings from enquiries, including conclusions, causal relationships and explanations.</li> <li>• Identify scientific evidence that has been used to support or refute ideas or arguments</li> </ul>

<p><b>Prior Learning:</b></p> <p><b><u>Year R: Shadows and reflections</u></b>  Children learn about natural phenomena, including shadows, reflections and echoes. They explore how shadows are formed and how they can change.</p> <p><b><u>Year 3 – Light and shadows</u></b>  Children learn about light and dark. They investigate the phenomena of reflections and shadows, looking for patterns in collected data. The risks associated with the Sun are also explored.</p>	<p><b>Endpoints:</b></p> <p><b>Knowledge:</b> see knowledge organiser</p> <p><b>Skills:</b>  Children will be able to:</p> <ul style="list-style-type: none"> <li>• Explain that, due to how light travels, we can see things because they give out or reflect light into the eye.</li> <li>• Plan and carry out an enquiry, including writing methods, identifying and controlling variables.</li> <li>• Explain, using words, and diagrams, why shadows have the same shape as the objects that cast them and how shadows can be changed.</li> <li>• Describe, using diagrams, how light behaves when reflected off a mirror (plane, convex or concave) and when passing through a lens (concave or convex).</li> </ul> <p><b>Understanding Scientific Concepts:</b>  Children will understand:</p> <ul style="list-style-type: none"> <li>• The electromagnetic spectrum includes visible light that humans can see and light that humans cannot see.</li> <li>• Visible light is made up of coloured light that when mixed makes white light.</li> <li>• Light sources give out light. They can be natural or artificial.</li> <li>• When light hits an object, it is absorbed, scattered, reflected or a combination of all three.</li> <li>• Light from a source or reflected light enter the eye. Vertebrates, have a cornea and lens that refracts light that enters the eye and focuses it on the nerve tissue at the back of the eye, which is called the retina.</li> <li>• Once light reaches the retina, it is transmitted to the brain via the optic nerve.</li> <li>• A shadow appears when an object blocks the passage of light.</li> <li>• Apart from some distortion or fuzziness at the edges, shadows are the same shape as the object</li> </ul>	<p><b>Opportunities for Spirituality:</b></p> <ul style="list-style-type: none"> <li>• Reflect on their experiences</li> <li>• Sense of enjoyment and fascination when learning about the world around them.</li> <li>• Encourages pupils to explore further changes that occur within the natural world</li> </ul>
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