



**Friskney All Saints  
Church of England  
Primary School**

## **Friskney All Saints Church of England Primary School**

### **Curriculum for Science**

#### **Science Curriculum Intent**

At Friskney All Saints Primary School, we are **all scientists!**

We want our children to love science! Our aim is, through the teaching of science, to stimulate a child's curiosity in finding out why things happen in the way that they do. We want to ensure that where possible children learn to ask scientific questions and begin to appreciate the way in which science will affect the future on a personal, national and global level. Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying their skills from and to other areas of the curriculum. We want to prepare our children for life in an increasingly scientific and technological world which includes fostering concern about, and active care for, our environment. We live in a world where science is the key to solving some of the biggest issues our planet has ever faced. Climate change. Global pandemics. Feeding 10 billion people. Access to clean drinking water. Marine and wildlife conservation. The list goes on. We want our children, who live in a county of scientific innovation, not only in agriculture, to be prepared to be part of the solution. So, at Friskney, we help them develop the skills and knowledge to go on and change the world through science.

At Friskney we aim to encourage and foster the development of positive attitudes to science where we build on our children's natural curiosity and support them to develop a scientific approach to problems. This includes building our children's self-confidence to enable them to work

independently, appropriate to their age group and task, and to develop their social skills in order to work cooperatively with others. We aim to provide our children with an enjoyable learning experience of science, so that they will develop a deep and lasting interest and may be motivated to study or work in a science related job/ career in the future.



**Inspiration** – Our exciting and engaging curriculum seeks to encourage children’s curiosity, inspiring a lifelong love of learning that sparks creativity and prepares our students for a future that demands adaptability and innovation. Learning opportunities are skilfully adapted to inspire and support all pupils, especially those with **SEND**, removing barriers and igniting interest. **Enrichment opportunities** are carefully planned to engage learners beyond the academic. Our curriculum is designed to be irresistible so that pupils are encouraged to *realise their gifts* in every area of the curriculum.



**Excellence** - Our ambitious curriculum is designed to ensure that every child reaches their full potential and always *striving for excellence*. Each year, the children’s identified learning builds upon previously taught content through **clearly mapped out, sequential units** which detail the **substantive and disciplinary knowledge**. We prioritise **vocabulary** acquisition, employing a systematic and explicit approach to the teaching of vocabulary in every subject and timely **retrieval** opportunities are carefully planned and scaffolded throughout our curriculum enabling children to strengthen and remember previously taught knowledge.



**Exploration** –We encourage pupils to explore what it means to be part of Friskney, as well as Modern Britain and the wider world. Helping our children to be inquisitive and questioning of their learning enables inquisitive thinking, investigation, independence and problem solving. Curriculum design is focussed on developing **oracy** and **reading**, allowing pupils to explore and strengthen *existing and new* knowledge across all aspects of the curriculum. Through a strong framework of personal development, we ensure pupils understand who they are and are well prepared and eager for the next stage of their education.

## Science Implementation

### EYFS

Educational Programme	<p data-bbox="976 355 1509 384"><b>Understanding the World</b> – statutory framework</p> <p data-bbox="331 424 2136 638">Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children’s personal experiences increases their knowledge and sense of the world around them – from local farms, school field and village field/ play area to meeting important members of society such as vicars, firefighters and RAF pilots. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across many areas. Enriching and widening children’s vocabulary will support later reading comprehension.</p>
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<p>Development Matters Reception Statements (Examples of what this could look like)</p>	<p><b>Name and describe themselves and people who are familiar to them</b>  <i>(describe changes to their growing bodies, look at pictures of themselves as babies and notice and describe changes that have taken place;</i></p> <p><b>Compare and contrast characters from stories</b>  <i>(Frequently share fictional and non-fictional texts, images and tell oral stories that help children begin to deepen their understanding)</i></p> <p><b>Explore the natural world around them</b>  <i>(provide children with frequent opportunities for outdoor play and exploration, encourage interactions with the outdoors, to foster curiosity and give children freedom to touch, smell and hear the natural world around them. Create opportunities to discuss how we care for the natural world, offer opportunities to sing songs and join in with rhymes and poems about the natural world. After close observation draw pictures of the natural world including animals and plants. Observe and interact with natural processes such as ice melting, sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object and a boat floating on water.)</i></p> <p><b>Describe what they see, hear and feel whilst outside</b>  <i>(Encourage focused observation of the natural world. Listen to children describing and commenting on things that have seen whilst outside including plants and animals. Encourage positive interaction with the outdoor world, offering children a chance to take supported risks, appropriate to themselves and the environment in which they are in. Name and describe some plants and animals which the children are likely to see, encouraging children to recognise familiar plants and animals whilst outside.)</i></p> <p><b>Recognise some environments that are different to the one in which they live</b>  <i>(Teach children about a range of contrasting environments within both their local or national region. Model the vocabulary needed to name specific features of the natural world both natural and man-made. Share non-fiction texts that offer an insight into contrasting environments. Listen to how children communicate their own understanding of contrasting environments through conversations and play e.g. role play/small world play.)</i></p> <p><b>Understand the effects of changing seasons on the natural world around them.</b>  <i>(Guide children's understanding by drawing children's attention to the weather and seasonal features. Provide opportunities for children to note and record the weather. Select texts to share with the children about the changing seasons. Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change. Look for children incorporating their understanding through play.)</i></p> <p><b>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</b>  <i>(provide children with frequent opportunities exploration with a range of materials, to foster curiosity and give children freedom to touch, smell and investigate a range of different materials including, water, sand, cornflour etc. Create opportunities to discuss how we use materials in different ways and how they change or can be changed including natural changes in everyday life such as water, snow, ice, bread , toast, cake mixtures, cake etc.)</i></p>
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<p>End of year Expectations: (ELG)</p>	<p style="text-align: center;"><b>Understanding the World</b>  <b>ELG: People, Culture and Communities</b>  <i>Children at the expected level of development will:</i></p> <ul style="list-style-type: none"> <li>- Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps;</li> </ul> <p style="text-align: center;"><b>ELG: The Natural World</b>  <i>Children at the expected level of development will:</i></p> <ul style="list-style-type: none"> <li>- Explore the natural world around them, making observations and drawing pictures of animals and plants; Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;</li> <li>- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</li> </ul>
<p>Vocabulary:</p>	<p style="text-align: center;">Vocabulary – enriching and widening (subject specific relating to overarching topics)  Scientific vocabulary children will be exposed to:</p> <p>Experiment, predict, science, test, group, sort, observe, investigate, explore, compare, describe  plant, tree, bush, flower, vegetable, herb, weed, names of plants, young, plants, flowers, soil, leaves, petals, bud, stem, roots, trunk, branch, seed,  names of animals, lifecycle, live, on land, in water, jungle, desert, North Pole, South Pole, sea, hot, cold, wet, dry, snow, ice, hair (black, brown, dark,  light, blonde, ginger, grey, white, long, short, straight, curly), eyes (blue, brown, green, grey), skin (black, brown, white), big/tall, small/short,  bigger/smaller, baby, toddler, child, adult, old person, old, young, brother, sister, mother, father, aunt, uncle, grandmother, grandfather, cousin, friend,  family, boy, girl, man, woman  ice, water, frozen, icicle, snow, melt, wet, cold, slippery, smooth, big, bigger, biggest, smaller, smaller, smallest, hard, soft, bendy, rigid, wood, plastic,  paper, card, metal, magnets, magnetic, strong, weak, hot, apply heat, waterproof, soggy, not waterproof, best, change, change back, mix, float, sink  spring, summer, autumn, winter, seasons, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles,  windy, rainbow,</p>

## KS1 and KS2 Curriculum Year A

Class 2 Year 1/2 2023-2024	Term 1+2 History – The first flight (Focus on materials for airplanes)	Term 3 Geography – Weather	Term 4/5 Geography- Links to Australia	Term 6
<b>Science Knowledge</b>	<ul style="list-style-type: none"> <li>distinguish between an object and the material from which it is made (1)</li> <li>identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock (1)</li> <li>describe the simple physical properties of a variety of everyday materials (1)</li> <li>compare and group together a variety of everyday materials on the basis of their simple physical properties (1)</li> <li>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses (2)</li> <li>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (2)</li> </ul>	<ul style="list-style-type: none"> <li>identify and describe the basic structure of a variety of common flowering plants, including trees. (1)</li> <li>identify and name a variety of common wild and garden plants, including deciduous and evergreen trees (1) (focus on differences between the deciduous and evergreen and any plants you can see such as snowdrops etc.)</li> </ul>	<ul style="list-style-type: none"> <li>identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</li> <li>identify and name a variety of plants and animals in their habitats, including micro-habitats</li> <li>describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</li> </ul>	<ul style="list-style-type: none"> <li>identify and name a variety of common wild and garden plants, including deciduous and evergreen trees (1) (focus on how the deciduous and evergreen look the same now and any plants you can see such as daisies etc)</li> <li>observe and describe how seeds and bulbs grow into mature plants, (2)</li> <li>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (2)</li> </ul>
<b>What the pupils need to understand. Substantive</b>	<p>All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons.</p> <p>Materials can be described by their properties e.g. shiny, stretchy, rough etc.</p> <p>Some materials e.g. plastic can be in different forms with very different properties.</p> <p>All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water.</p> <p>When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be</p>	<p>Growing locally, there will be a vast array of plants which all have specific names.</p> <p>These can be identified by looking at the key characteristics of the plant.</p> <p>Plants have common parts, but they vary between the different types of plants.</p> <p>Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.</p>	<p>All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.)</p> <p>An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels).</p> <p>Animals and plants live in a habitat to which they are suited, which means that animals have suitable features</p>	<p>Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc.</p> <p>Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates.</p> <p>Some plants are better suited to growing in full sun and some grow better in partial or full shade.</p> <p>Plants also need different amounts of water and space to grow well and stay healthy.</p>

	<p>suitable for different purposes and an object can be made of different materials.</p> <p>Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness.</p>		<p>that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water.</p> <p>Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain.</p>	
<b>What knowledge the pupils need apply in familiar contexts with aspects of Disciplinary</b>	<p>Classify objects made of one material in different ways e.g. a group of object made of metal.</p> <p>Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials.</p> <p>Classify materials based on their properties.</p> <p>Test the properties of objects e.g. absorbency of cloths, strength of planes made of different papers, stiffness of plane wings, waterproofness of clothing.</p> <p>Classify materials.</p> <p>Make suggestions about alternative materials for a purpose that are both suitable and unsuitable</p> <p>Test the properties of materials for particular uses e.g. compare the stretchiness of fabrics to select the most appropriate for pilot's uniform, test materials for waterproofness to select the most appropriate for a pilot's uniform.</p>	<p>Make close observations of leaves, seeds, flowers etc.</p> <p>Compare two leaves, seeds, flowers etc.</p> <p>Classify leaves, seeds, flowers etc. using a range of characteristics.</p> <p>Identify plants by matching them to named images.</p> <p>Make observations of how plants change over a period of time. When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them.</p>	<p>Explore the outside environment regularly to find objects that are living, dead and have never lived.</p> <p>Classify objects found in the local environment.</p> <p>Observe animals and plants carefully, drawing and labelling diagrams.</p> <p>Create simple food chains for a familiar local habitat from first-hand observation and research.</p> <p>Create simple food chains from information given e.g. in picture books</p>	<p>Make close observations of seeds and bulbs.</p> <p>Classify seeds and bulbs.</p> <p>Research and plan when and how to plant a range of seeds and bulbs.</p> <p>Look after the plants as they grow – weeding, thinning, watering etc.</p> <p>Make close observations and measurements of their plants growing from seeds and bulbs.</p> <p>Make comparisons between plants as they grow.</p>
<b>Why this? Why now?</b>	<ul style="list-style-type: none"> <li>Progression in materials with a first time visit for Year 1 children whilst allowing the Year 2 children as they visit materials for the second time to apply their understanding in a new context as looking at</li> </ul>	<ul style="list-style-type: none"> <li>Progression in plants with a first time visit for Year 1 children whilst allowing the Year 2 children as they visit</li> </ul>	<ul style="list-style-type: none"> <li>Teaching of Living things and their habitats with opportunities to link into the book Meerkat Mail and the geography of Australia.</li> </ul>	<ul style="list-style-type: none"> <li>Progression in plants with a first time visit for Year 1 children whilst allowing the Year 2 children as they visit aspects of plants for</li> </ul>

	<p>fabric type materials compared to the more construction type materials from last year.</p> <ul style="list-style-type: none"> <li>• Taught here as opportunity to explore many WS opportunities for all children in both year groups.</li> <li>• Links into the history area of First Flight with links to materials for planes but also appropriate use of materials to wear as well.</li> </ul> <p><b>NOTE: Plant bulbs during early November to watch their growth over the winter , spring and summer.</b></p>	<p>aspects of plants for the second time to apply their understanding from what they identified last year during Seasonal change but begin to focus in on plant parts , structure and simple ID using ID charts etc.</p> <ul style="list-style-type: none"> <li>• Taught here as opportunity to explore the types of trees – deciduous and evergreen.</li> <li>• Links into the geography area of weather so can draw on and compare their understanding of seasons from last year either when in Yr 1 or more simplified view of EYFS.</li> </ul>	<ul style="list-style-type: none"> <li>• Taught here as opportunity to explore many WS opportunities in outside environment due to time of year.</li> </ul>	<p>the second time to apply their understanding from what they identified last year and begin to compare the differences between seeds and bulbs.</p> <ul style="list-style-type: none"> <li>• WS investigations into requirements for plant growth.</li> <li>• Observing over time with bulbs planted in November through to flowering and dying back into bulb in summer.</li> </ul>
<p><b>Working Scientifically</b> Red= that area MUST be done linked to the subject knowledge aspect but the other areas can be chosen to suit investigations</p>	<ul style="list-style-type: none"> <li>• Ask their own simple questions about what they notice and recognising that they can be answered in different ways</li> <li>• Observing closely, using simple equipment</li> <li>• Performing simple tests</li> <li>• Identifying and classifying</li> <li>• Using their observations and ideas to suggest answers to questions</li> <li>• Gathering and recording data to help in answering questions</li> </ul>	<ul style="list-style-type: none"> <li>• Ask their own simple questions about what they notice and recognising that they can be answered in different ways</li> <li>• Observing closely, using simple equipment</li> <li>• Performing simple tests</li> <li>• Identifying and classifying</li> <li>• Using their observations and ideas to suggest answers to questions</li> <li>• Gathering and recording data to help in answering questions</li> </ul>	<ul style="list-style-type: none"> <li>• Ask their own simple questions about what they notice and recognising that they can be answered in different ways</li> <li>• Observing closely, using simple equipment</li> <li>• Performing simple tests</li> <li>• Identifying and classifying</li> <li>• Using their observations and ideas to suggest answers to questions</li> <li>• Gathering and recording data to help in answering questions</li> </ul>	<ul style="list-style-type: none"> <li>• Ask their own simple questions about what they notice and recognising that they can be answered in different ways</li> <li>• Observing closely, using simple equipment</li> <li>• Performing simple tests</li> <li>• Identifying and classifying</li> <li>• Using their observations and ideas to suggest answers to questions</li> <li>• Gathering and recording data to help in answering questions</li> </ul>
<p><b>WS Enquiry types</b> Red= that enquiry type MUST be done linked to the subject knowledge aspect but the other enquiry types</p>	<ul style="list-style-type: none"> <li>• observing changes over a period of time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative tests</li> <li>• and finding things out using secondary sources of information</li> </ul>	<ul style="list-style-type: none"> <li>• observing changes over a period of time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative tests,</li> </ul>	<ul style="list-style-type: none"> <li>• observing changes over a period of time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative tests,</li> </ul>	<ul style="list-style-type: none"> <li>• observing changes over a period of time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative tests,</li> </ul>



can be chosen to suit investigations		• and finding things out using secondary sources of information	• and finding things out using secondary sources of information	• and finding things out using secondary sources of information
WS ongoing	<ul style="list-style-type: none"> <li>• Be curious and ask questions about what they notice /asking simple questions and recognising that they can be answered in different ways</li> <li>• Begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.</li> </ul>			
Scientific knowledge ongoing	<ul style="list-style-type: none"> <li>• observe and describe how seeds and bulbs grow into mature plants, (2)</li> </ul> Plant the bulbs in November and monitor at least on a monthly basis over the year.			
WS Enquiry types ongoing	<ul style="list-style-type: none"> <li>• observing changes over time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative tests</li> <li>• and finding things out using secondary sources of information</li> </ul>			

Year 3/4 23-24 Cycle A	Term 1/2 Geography- Volcanoes	Term 2/3	Term 4	Term 5	Term 6
Science Knowledge	<u>Rocks and soils</u> <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>	<u>Magnets and friction</u> <ul style="list-style-type: none"> <li>• compare how things move on different surfaces</li> <li>• notice that some forces need contact between two objects, but magnetic forces can act at a distance</li> <li>• observe how 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>• describe magnets as having two poles</li> <li>• predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul>	<u>Animals Including humans</u> <ul style="list-style-type: none"> <li>• identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat</li> <li>• identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul>	<u>Light</u> <ul style="list-style-type: none"> <li>• recognise that they need light in order to see things and that dark is the absence of light</li> <li>• notice that light is reflected from surfaces</li> <li>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>• recognise that shadows are formed when the light from a light source is blocked by a solid object</li> <li>• find patterns in the way that the size of shadows change.</li> </ul>	<u>Plants</u> <b>This is a long unit.</b> <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 (Autumn term- tree examples).</li> </ul>

<p><b>What the pupils need to understand</b></p> <p><b>Substantive</b></p>	<p>Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.</p>	<p>A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract.</p>	<p>Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.</p>	<p>We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface</p>	<p>Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.</p>
<p><b>What knowledge the pupils need apply in familiar contexts with aspects of Disciplinary</b></p>	<p>Observe rocks closely. Classify rocks in a range of ways, based on their appearance. Devise a test to investigate the hardness of a range of rocks. Devise a test to investigate how much water different rocks absorb. Observe how rocks change over time e.g. gravestones or old building. Research using secondary sources how fossils are formed. Observe soils closely. Classify soils in a range of ways based on their appearance. Devise a test to investigate the water retention of soils. Observe how soil can be separated through sedimentation. Research the work of Mary Anning.</p>	<p>Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. Explore what materials are attracted to a magnet. Classify materials according to whether they are magnetic. Explore the way that magnets behave in relation to each other. Use a marked magnet to find the unmarked poles on other types of magnets. Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table. Devise an investigation to test the strength of magnets.</p>	<p>Classify food in a range of ways. Use food labels to explore the nutritional content of a range of food items. Use secondary sources to find out the types of food that contain the different nutrients. Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? Plan a daily diet to contain a good balance of nutrients. Explore the nutrients contained in fast food. Use secondary sources to research the parts and functions of the skeleton. Investigate patterns asking questions such as:</p> <ul style="list-style-type: none"> <li>▪ Can people with longer legs run faster?</li> <li>▪ Can people with bigger hands catch a ball better?</li> </ul>	<p>Explore how different objects are more or less visible in different levels of lighting. Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. Explore how shadows vary as the distance between a light source and an object or surface is changed. Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground. Choose suitable materials to make shadow puppets. Create artwork using shadows.</p>	<p>Observe what happens to plants over time when the leaves or roots are removed. Observe the effect of putting cut white carnations or celery in coloured water. Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. Spot flowers, seeds, berries and fruits outside throughout the year. Observe flowers carefully to identify the pollen. Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. Observe seeds being blown from the trees e.g. sycamore seeds.</p>

			Compare, contrast and classify skeletons of different animals.		Research different types of seed dispersal. Classify seeds in a range of ways, including by how they are dispersed. Create a new species of flowering plant.
<b>Why this? Why now?</b>	<p>This area can be taught at anytime of the year but is a great starting point as it allows a range of hands-on opportunities with WS observing using a range of basic but essential equipment such as hand magnifiers and pipettes etc.</p> <p>Easier opportunities to visit the church yard for observing the rocks (gravestones) for weathering and hardness this term.</p> <p>Looking at soils prior to teaching plants allows those links to be made.</p> <p>Good opportunity to revisit materials vocabulary from KS1.</p> <p>Links with Geography – volcanoes with rock type links.</p> <p><b>NOTE:</b> Seed dispersal looked at in Autumn term (acorns/oak, keys/ash, conkers/ horse chestnut ) and then revisited in Summer Term.</p>	<p>This area can be taught at any time of the year but is a point for a wide range of WS skills and enquiry types as it allows a range of hands-on opportunities with WS recording in tables, graphs etc but also using a range of basic but essential equipment such as tape measures, magnets and use of question spinners to set up fair tests etc – first time for the Year 3 children.</p>	<p>This area can be taught at any time of the year the aspects of different ways to ask and answer questions using all 5 enquiry types can be used here. This then allows the following terms to revisit them.</p> <p>Substantive knowledge from KS1 can be revisited with regards to food groups and healthy eating habits established- good links into PSHE and DT- food tech.</p>	<p>This area needs to be taught during a term when there is plenty of sunlight to allow for investigations such as dangers of sun – UVA beads, shadows etc</p> <p>Revisit use of vocab from materials in KS1- transparency etc.</p> <p>Use of dataloggers</p>	<p>This area needs to be taught during a term when there is plenty of sunlight/warmth etc to allow for investigations such as plant growth/ reproduction.</p> <p><b>NOTE:</b> Seed dispersal looked at in Autumn term (acorns/oak, keys/ash, conker/horse chestnut) and then revisited in Summer Term.</p> <p>Revisit use of vocab from plants/ seasonal change etc in KS1.,</p>

<p><b>Working Scientifically</b></p> <p><b>Red= must be done</b></p> <p><b>Amber = this will be an easy link</b></p>	<ul style="list-style-type: none"> <li>• setting up simple practical enquiries, comparative and fair tests</li> <li>• making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and dataloggers.</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, keys, bar charts, and tables</li> <li>• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>• identifying differences, similarities or changes 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<p><b>Enquiry types</b></p> <p>Red= that enquiry type MUST be done linked to the subject knowledge aspect but the other methods can be chosen to suit investigations</p>	<ul style="list-style-type: none"> <li>• observing changes over time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative and fair tests</li> <li>• and finding things out using secondary sources</li> </ul>	<ul style="list-style-type: none"> <li>• observing changes over time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative and fair tests</li> <li>• and finding things out using secondary sources</li> </ul>	<ul style="list-style-type: none"> <li>• observing changes over time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative and fair tests</li> <li>• and finding things out using secondary sources</li> </ul>	<ul style="list-style-type: none"> <li>• observing changes over time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative and fair tests</li> <li>• and finding things out using secondary sources</li> </ul>	<ul style="list-style-type: none"> <li>• observing changes over time,</li> <li>• noticing patterns,</li> <li>• grouping and classifying things,</li> <li>• carrying out simple comparative and fair tests</li> <li>• and finding things out using secondary sources</li> </ul>

**WS  
ongoing**

Ask their own relevant questions about what they observe and using different types of scientific enquiries to answer them.  
Draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

Year 5/6 23-24 Year A	Term 1 Term 2	Term 3	Term 4	Term 5/6	Term 6
<b>Science Knowled ge</b>	<b>Materials</b> <ul style="list-style-type: none"> <li>compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</li> <li>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</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</li> <li>explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</li> </ul>	<b>Earth and Space</b> <ul style="list-style-type: none"> <li>describe the movement of the Earth, and other planets, relative to the Sun in the solar system</li> <li>describe the movement of the Moon relative to the Earth</li> <li>describe the Sun, Earth and Moon as approximately spherical bodies</li> <li>use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul>	<b>Living things and their habitats</b> <ul style="list-style-type: none"> <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>Forces+ DT elements</b> <ul style="list-style-type: none"> <li>explain that 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>	<b>Animals including humans Taught alongside SRE</b> <ul style="list-style-type: none"> <li>Year 5 objective 'describe the changes as humans develop'</li> </ul>
<b>What the pupils need to understand . Substantive</b>	Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.	The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365% days to complete its orbit around	As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring	A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance.	When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops

	<p>Mixtures can be separated by filtering, sieving and evaporation.</p> <p>Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.</p>	<p>the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.</p>	<p>which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.</p>	<p>Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.</p>	<p>primary and secondary sexual characteristics. This enables the adult to reproduce. This needs to be taught alongside PSHE. The new statutory requirements for relationships and health education can be found below:</p> <ul style="list-style-type: none"> <li>• statutory guidance on Physical health and mental wellbeing (primary and secondary).</li> </ul> <p>Other useful guidance includes:</p> <ul style="list-style-type: none"> <li>• Joint briefing on teaching about puberty in KS2 from PHSE Association and Association for Science Education</li> <li>• Briefing on humans development and reproduction in the Primary Curriculum from PSHE Association and ASE.</li> </ul>
<b>What knowledge the pupils need apply in familiar contexts with aspects of Disciplinary</b>	<p>Investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat. Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. Investigate rates of dissolving by carrying out comparative and fair test. Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture.</p>	<p>Use secondary sources to help create a model e.g. role play or using balls to show the movement of the Earth around the Sun and the Moon around the Earth. Use secondary sources to help make a model to show why day and night occur. Make first-hand observations of how shadows caused by the Sun change through the day.</p>	<p>Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals. Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth.</p>	<p>Investigate the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter. Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water. Investigate the effects of air resistance in a range of contexts</p>	<p>This unit is likely to be taught through direct instruction due to its sensitive nature, although children can carry out a research enquiry by asking an expert e.g. nurse to provide answers to questions that have been filtered by the teacher.</p>

	<p>Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced?</p> <p>Research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes).</p>	<p>Make a sundial.</p> <p>Research time zones.</p> <p>Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel.</p>	<p>Look for patterns between the size of an animal and its expected life span.</p> <p>Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes.</p> <p>Take cuttings from a range of plants e.g. African violet, mint. Plant bulbs and then harvest to see how they multiply. (Potato tubers from farm visit)</p> <p>Use secondary sources to find out about pollination.</p>	<p>e.g. parachutes, spinners, sails on boats.</p> <p>Explore how levers, pulleys and gears work.</p> <p>Make a product that involves a lever, pulley or gear. (DT link Lego Wedo resource)</p> <p>Create a timer that uses gravity to move a ball.</p> <p>Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.</p>	
<p><b>Why this?</b></p> <p><b>Why now?</b></p>	<p>This area can be taught at any time of the year but is a great starting point as it allows a range of hands-on opportunities with opportunities to visit and revisit and therefore reinforce the understanding of WS skills and their application with lots of opportunities to develop pupil independence. WS development using a range of essential equipment such as pipettes, dataloggers etc</p> <p>Extended time on this area to allow lots of WS opportunities but also revisiting electrical insulation/ conductors, light vocab and understanding of magnets in order to ensure understanding and / or teach areas if missed in LKS2.</p>	<p>This area needs to be taught around this time of year to allow the pupils to experience first hand the phases of the moon (28day period) so allowing the WS 'observing over different periods of time' to be taught.</p>	<p>This area can be taught at any time of the year but allows the first hand experience of visiting a local farm which grows cereals , vegetables and beef so enabling the children to see a range of lifecycles and also then grow on their own varying plants. This time of year allows the children to see the vegetables etc at different growth stages/ stages of their lifecycle.</p>	<p>This area can be taught at any time of the year but following the last two areas of the science this year which have been very research based with a limited range of enquiry types and WS skills this allows that balance and revisiting of a wider range of enquiry types and WS skills to be taught , reinforced and used in an increasingly independent way.</p>	<p>This links in and is taught alongside the SRE/ PSHE area.</p>
<p><b>Working Scientific ally</b></p> <p><b>Red= must be done</b></p> <p><b>Amber = this will be an easy link</b></p>	<ul style="list-style-type: none"> <li>• Select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources.</li> <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</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources.</b></li> <li>• planning different types of scientific enquiries to answer</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources.</b></li> <li>• planning different types of scientific enquiries to answer</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources.</b></li> <li>• <b>planning different types of scientific enquiries to answer</b></li> </ul>	<ul style="list-style-type: none"> <li>• Select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a</li> </ul>



	<p>and precision, taking repeat readings when appropriate</p> <ul style="list-style-type: none"> <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> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	<p>questions, including recognising and controlling variables where necessary</p> <ul style="list-style-type: none"> <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> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	<p>questions, including recognising and controlling variables where necessary</p> <ul style="list-style-type: none"> <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> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	<p>questions, including recognising and controlling variables where necessary</p> <ul style="list-style-type: none"> <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> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	<p>wide range of secondary sources.</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> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identifying scientific evidence that has been used to support or</li> </ul>
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					refute ideas or arguments.
<b>Enquiry types</b> Red= that enquiry MUST be done linked to the subject knowledge aspect but the other methods can be chosen to suit investigations	<ul style="list-style-type: none"> <li>observing changes over different periods of time,</li> <li>noticing patterns,</li> <li>grouping and classifying things,</li> <li>carrying out comparative and fair tests</li> <li>and finding things out using a wide range of secondary sources.</li> </ul>	<ul style="list-style-type: none"> <li>observing changes over different periods of time,</li> <li>noticing patterns,</li> <li>grouping and classifying things,</li> <li>carrying out comparative and fair tests</li> <li>and finding things out using a wide range of secondary sources.</li> </ul>	<ul style="list-style-type: none"> <li>observing changes over different periods of time,</li> <li>noticing patterns,</li> <li>grouping and classifying things,</li> <li>carrying out comparative and fair tests</li> <li>and finding things out using a wide range of secondary sources.</li> </ul>	<ul style="list-style-type: none"> <li>observing changes over different periods of time,</li> <li>noticing patterns,</li> <li>grouping and classifying things,</li> <li>carrying out comparative and fair tests</li> <li>finding things out using a wide range of secondary sources.</li> </ul>	<ul style="list-style-type: none"> <li>observing changes over different periods of time,</li> <li>noticing patterns,</li> <li>grouping and classifying things,</li> <li>carrying out comparative and fair tests</li> <li>and finding things out using a wide range of secondary sources.</li> </ul>
<b>WS ongoing</b>	<ul style="list-style-type: none"> <li>Ask their own questions about scientific phenomena</li> <li>Draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.</li> </ul>				