

Offenham CE First School



Science Curriculum Overview

SCIENCE AT OFFENHAM SCHOOL WILL:

- Involve ownership of learning, working collaboratively and discussing ideas and findings
- Have clear and challenging sequences for learning
- Be enquiry based and engaging
- Lead to a knowledge of the contribution of science, inspired by science professionals and making links with everyday life.
- Be practical and 'hands on' with children discovering for themselves

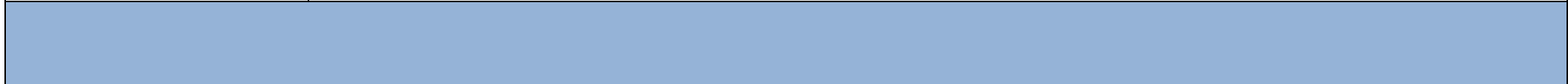
Our vision is for science to inspire awe and wonder for our natural world and through those experiences to develop an enthusiasm and passion for science. All children will have the opportunity to develop their natural curiosity and build on prior learning for understanding the world around them in a variety of ways. This will take place through the development of scientific vocabulary and language, first hand experiences, enquiry, discovery and investigations. Children will gain an understanding of the role of scientists, how science has changed our lives and the vital role it plays in securing the future health and prosperity of the world and its inhabitants.

<p>Year 1</p>	<p>Seasonal Changes Autumn and Winter</p> <p>Key Learning: In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again. The weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer. The change in weather causes many other changes. Some examples are: numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people.</p> <p>Context: Children will learn what the word weather means and find out how different types of weather can be measured. Children will use a class weather station to observe, measure and record the weather across the seasons. They will also observe changes across the seasons by exploring the signs of autumn and winter through nature and wildlife.</p> <p>NC Link:</p>	<p>Everyday Materials</p> <p>Key Learning: All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons. Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties.</p> <p>Context: Children will learn to identify and name everyday materials and will have the opportunity to explore the properties of these materials. Children also will carry out a simple investigation to help them decide which material would be most suitable to use for an umbrella. At the end of the unit children apply their knowledge of everyday materials to sort objects by their properties.</p> <p>NC Link:</p> <ul style="list-style-type: none"> distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties 	<p>Animals Including Humans</p>		<p>(i) Animals</p> <p>Key Learning: Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them. Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals.</p> <p>Context: Children learn about animal bodies and consider similarities and differences between them. Children engage in a variety of activities including drawing and labelling the body, using their senses to conduct an investigation, describing animal bodies and sorting animals into groups.</p> <p>NC Link:</p> <ul style="list-style-type: none"> identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates identify and name a variety of common animals that are carnivores, herbivores and omnivores 	<p>(ii) Humans</p> <p>Key Learning: Humans have key parts in common, but these vary from person to person. Humans (and other animals) find out about the world using their senses. Humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body</p> <p>Context: Children learn about human and bodies and consider similarities and differences between them and animal bodies. Children engage in a variety of activities including drawing and labelling the body, using their senses to conduct an investigation.</p> <p>NC Link:</p> <ul style="list-style-type: none"> identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. <p>Vocabulary: Head, body, eyes, ears... senses, see, hear, taste, smell, feel, carnivores, herbivores, omnivores</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can use first-hand close observations to make detailed drawings Can name body parts correctly when talking about measurements and comparisons e.g. “My arm is x straws long.” “My arm is x 	<p>Seasonal Changes Spring and Summer</p> <p>Key Learning: In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again. The weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer. The change in weather causes many other changes. Some examples are: numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people.</p> <p>Context: Children will continue to use a class weather station to observe, measure and record the weather in different seasons and will start to make comparisons between two seasons, as well as across all four seasons. They will also observe changes across the seasons by exploring the signs of spring and summer through nature and wildlife. A range of learning activities are used in this unit, including observation, discussion and learning outside.</p> <p>NC Link:</p> <ul style="list-style-type: none"> observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies. <p>Vocabulary:</p>	<p>Plants</p> <p>Key Learning: Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.</p> <p>Context: This unit introduces the structure of plants and trees and what they need to grow well. Children engage in a variety of activities including identifying common plants and trees in the garden and in the wild, sorting deciduous and evergreen leaves, and crafting labelled plant collage pictures. Children will plant their own bean in lesson 1 and observe it closely over the coming weeks by measuring and recording its growth.</p> <p>NC Link:</p> <ul style="list-style-type: none"> identify and name a variety of common plants, including garden plants, wild plants and trees, and those classified as deciduous and evergreen identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers. <p>Vocabulary: Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk</p> <p>Names of wild plants and garden plants in the locality, garden deciduous, evergreen, bean plant, planting, growing</p> <p>Assessment: possible evidence:</p>
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<ul style="list-style-type: none"> observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies. <p>Vocabulary: autumn, winter, weather, temperature, rainfall, wind direction, animals, adapt</p> <p>Science capital - Science in the workplace: Weather based careers – Meteorologist Climatologist Environmental scientist</p>	<ul style="list-style-type: none"> of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. <p>Vocabulary: materials, wood, plastic, glass, metal, water, rock, properties, sort</p> <p>Science capital - Science in the workplace: Material based careers – Research scientist Inventor Quality manager Project manager Analytical scientist CAD technician Design engineer Materials engineer.</p>	<ul style="list-style-type: none"> describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, and including pets) <p>Vocabulary: Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, senses, see, hear, taste, smell, feel, animal groups, carnivores, herbivores, omnivores</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can sort and group animals using similarities and differences Can use simple charts etc. to identify unknown animals Can create a drawing of an imaginary animal labelling its key features Can use secondary resources to find out what animals eat, including talking to experts e.g. pet owners, zookeepers etc. Can use first-hand close observations to make detailed drawings <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> only four-legged mammals, such as pets, are animals insects are not animals all 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group 	<p>straws long and my leg is y straws long. My leg is longer than my arm." "We both have hands, but his are bigger than mine." "These people have brown eyes and these have blue."</p> <ul style="list-style-type: none"> Can talk about their findings from investigations using appropriate vocabulary e.g. "My fingers are much better at feeling than my toes" "We found that the crisps all taste the same. <p>Common misconceptions:</p> <ul style="list-style-type: none"> humans are not animals <p>Science capital - Science in the workplace: Human and animal based careers - Doctor Vet Physiotherapist Physiologist Ophthalmologist Zoologist Conservationist Sports scientist Pathologist Nutritionist (humans or other animals) Conservationist Nature warden/ranger Environmental scientist Water quality officer Ecotourism Researcher Field survey worker Entomologist Marine biologist</p>	<p>spring, summer, changes, weather, day length, trees, clothes, sun safety</p> <p>Science capital - Science in the workplace: Weather based careers – Meteorologist Climatologist Environmental scientist</p>	<ul style="list-style-type: none"> Can name trees and other plants that they see regularly Can describe some of the key features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom Can point out trees which lost their leaves and those that kept them the whole year Can point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green Can sort and group parts of plants using similarities and differences Can use simple charts etc. to identify plants Can collect information on features that change during the year Can use photographs to talk about how plants change over time <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> plants are flowering plants grown in pots with coloured petals and leaves and a stem trees are not plants all leaves are green all stems are green a trunk is not a stem blossom is not a flower. <p>Science capital - Science in the workplace: Plant based careers - Farmer Agronomist Botanist Horticultural scientist Pathologist Plant breeder Garden designer Propagation scientist Conservationist Nature warden/ranger Environmental scientist Ecotourism Researcher Field survey worker Entomologist</p>
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			<ul style="list-style-type: none"> • amphibians and reptiles are the same. <p>Science capital - Science in the workplace: Human and animal based careers - Doctor Vet Physiotherapist Physiologist Ophthalmologist Zoologist Conservationist Sports scientist Pathologist Nutritionist (humans or other animals) Conservationist Nature warden/ranger Environmental scientist Water quality officer Ecotourism Researcher Field survey worker Entymologist Marine biologist</p>			Biologist
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Scientific enquiry	<ul style="list-style-type: none"> • Asking simple questions and recognising that they can be answered in different ways • Making observations and taking measurements - Observing closely, using simple equipment • Engaging in practical enquiry to answer questions - Performing simple tests, Identifying and classifying • Recording and presenting evidence - Gathering and recording data to help in answering questions • Answering questions and concluding -Using their observations and ideas to suggest answers to questions
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Year 2	Uses of Everyday Materials	The Environment	Living Things and Their Habitats	Animals Including Humans	Scientists and Inventors	Plants
	<p>Key Learning: 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</p>	<p>Context: This Environment Unit introduces children to the ecological challenges that face the modern world. Children undertake a range of activities that challenge them to engage with environmental issues.</p>	<p>Key Learning: 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</p>	<p>Key Learning: Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults.</p>	<p>Context: Children will learn about famous scientists and inventors linked to the Year 2 science curriculum, including Elizabeth Garrett Anderson (first woman doctor in Britain), Louis Pasteur, Charles</p>	<p>Key Learning: 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>because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. 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 suitable for different purposes and an object can be made of different materials. 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>Context: The uses of everyday materials including wood, plastic, metal, glass, brick, paper and cardboard. Children go on to compare the suitability of different everyday materials for different purposes. They explore how objects made of some everyday materials can change shape and how the recycling process is able to reuse some everyday materials numerous times.</p> <p>NC Link:</p> <ul style="list-style-type: none"> • identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard <p>Vocabulary: Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard</p>	<p>NC Link: Working scientifically:</p> <ul style="list-style-type: none"> • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions. <p>Vocabulary: Climate change, recycle, energy, rainforest, water, endangered animals</p> <p>Science capital - Science in the workplace: Environmental based careers Conservationist Nature warden/ranger Environmental scientist Water quality officer Ecotourism Researcher Field survey worker Entymologist Marine biologist</p>	<p>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.) 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). Animals and plants live in a habitat to which they are suited, which means that animals have suitable features 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. 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> <p>Context: Children will learn about a variety of habitats and the plants and animals that live there. They learn to tell the difference between things that are living, dead and things that have never been alive, and apply this in a range of contexts.</p> <p>NC Link:</p>	<p>In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles.</p> <p>All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To grow into healthy adults, they also need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses.</p> <p>Context: Children learn about how humans and other animals are born, grow and change, and what we need to survive and be healthy.</p> <p>NC Link:</p> <ul style="list-style-type: none"> • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. <p>Vocabulary: Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types</p>	<p>Macintosh, Isaac Newton and Thomas Edison</p> <p>NC Link:</p> <ul style="list-style-type: none"> • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. • 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. <p>Vocabulary: scientists, inventors, doctors, exercise, Louis Pasteur, germs, Charles Macintosh, waterproof, wind power, graity, electricity,</p>	<p>Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy.</p> <p>Context: Children closely study plants and trees in the natural environment, taking measurements and making observational drawings. Children plant a seed and a bulb and compare them as they grow. Children set up a comparative experiment to observe what plants need to grow well, and watch the germination process firsthand.</p> <p>NC Link:</p> <ul style="list-style-type: none"> • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. <p>Vocabulary: plants, trees, seeds, bulbs, life cycle, seedlings, cress, healthy</p> <p>Assessment: possible evidence: Can describe how plants that they have grown from seeds and bulbs have developed over time</p> <ul style="list-style-type: none"> • Can identify plants that grew well in different conditions <p>Common misconceptions: Some children may think:</p>
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<p>Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> • Can sort materials using a range of properties • Can explain using the key properties why a material is suitable or not suitable for a purpose • Can begin to choose an appropriate method for testing a material for a particular property • Can use their test evidence to select appropriate material for a purpose e.g. Which material is the best for a rain hat? <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • only fabrics are materials • only building materials are materials • only writing materials are materials • the word rock describes an object rather than a material • solid is another word for hard. <p>Science capital - Science in the workplace: Research scientist Inventor Quality manager Project manager</p>		<ul style="list-style-type: none"> • explore and compare the differences between things that are living, dead, and things that have never been alive • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • identify and name a variety of plants and animals in their habitats, including micro-habitats describe how 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. <p>Vocabulary: habitat, living, dead, never been alive, animals, food chain, suited, suitable, basic needs, food, food chain, shelter, move, feed Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc.</p> <p>Assessment: possible evidence: Can find a range of items outside that are living, dead and never lived</p> <ul style="list-style-type: none"> • Can name a range of animals and plants that live in a habitat and micro-habitats that they have studied • Can talk about how the features of these animals and plants make them suitable to the habitat 	<p>(examples – meat, fish, vegetables, bread, rice, pasta)</p> <p>Assessment: possible evidence: Can describe how animals, including humans, have offspring which grow into adults, using the appropriate names for the stages</p> <ul style="list-style-type: none"> • Can state the basic needs of animals, including humans, for survival • Can state the importance for humans of exercise, eating the right amounts of different types of food, and hygiene • Can name foods in each section of the Eatwell Guide <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • an animal’s habitat is like its ‘home’ • all animals that live in the sea are fish • respiration is breathing • breathing is respiration. <p>Science capital - Science in the workplace: Animal and animal based careers - Doctor Vet Physiotherapist Physiologist Ophthalmologist Zoologist Conservationist Sports scientist pathologist Nutritionist (humans or other animals)</p>		<ul style="list-style-type: none"> • plants are not alive as they cannot be seen to move • seeds are not alive • all plants start out as seeds • seeds and bulbs need sunlight to germinate. <p>Science in the workplace: Plant based careers - Farmer Agronomist Botanist Horticultural scientist Pathologist Plant breeder Garden designer Propagation scientist Conservationist Nature warden/ranger Environmental scientist Water quality officer Ecotourism Researcher Field survey worker Entomologist Marine biologist</p>
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<p>Analytical scientist CAD technician Design engineer Materials engineer.</p>			<ul style="list-style-type: none"> • Can talk about what the animals eat in a habitat and how the plants provide shelter for them • Can construct a food chain that starts with a plant and has the arrows pointing in the correct direction <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • an animal's habitat is like its 'home' • plants and seeds are not alive as they cannot be seen to move • fire is living • arrows in a food chain mean 'eats'. <p>Science capital - Science in the workplace: Plant based careers - Farmer Agronomist Botanist Horticultural scientist Pathologist Plant breeder Garden designer Propagation scientist</p>			
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Scientific enquiry

- **Asking simple questions and recognising that they can be answered in different ways**
- **Making observations and taking measurements** - Observing closely, using simple equipment
- **Engaging in practical enquiry to answer questions** - Performing simple tests, Identifying and classifying
- **Recording and presenting evidence** - Gathering and recording data to help in answering questions
- **Answering questions and concluding** -Using their observations and ideas to suggest answers to questions



<p>Year 3</p>	<p>Amazing Bodies (Animals including humans)</p> <p>Key Learning: Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a</p>	<p>The Power of Forces (Forces)</p> <p>Key Learning: 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</p>	<p>Rock Detectives (Rocks)</p> <p>Key Learning: Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which</p>	<p>How Does Your Garden Grow? (plants)</p> <p>Key Learning: Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients</p>	<p>Can You See Me? (Light)</p> <p>Key Learning: 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,</p>	<p>Our Changing World</p> <p>Context: In this module children will build on work in the Year 3 Plants module (How does your garden grow?). NC Link:</p>
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<p>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>Context: Children will build on their knowledge of the human body developed in Key Stage 1. They will revisit the importance of eating the right amounts of different types of food but will extend this knowledge to understand that the food we eat provides us with the nutrition that our bodies require to remain healthy.</p> <p>NC Link:</p> <ul style="list-style-type: none"> • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some animals have skeletons and muscles for support, protection and movement. <p>Vocabulary: stay alive, survive, food, balanced diet, nutrition, nutrients, fruit and vegetables, carbohydrates, protein, roughage, fibre, sugar, fat, dairy, skeleton, bones, protect, support,</p>	<p>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>Context: Children will explore how forces can make objects start to move, speed up, slow down or change direction. They will compare how things move on different surfaces. This idea will be developed further in Year 5 when they will learn about friction.</p> <p>NC Link:</p> <ul style="list-style-type: none"> • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles • predict whether two magnets will attract or 	<p>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>Context: This module will establish core knowledge and understanding of rocks, their relationship to soils and how fossils have formed over time.</p> <p>NC Link:</p> <ul style="list-style-type: none"> • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter. <p>Vocabulary: sandstone, granite, chalk, limestone, marble, pumice, slate, soil, peat, sandy, clay,</p>	<p>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>Context: In this module children will build on their experiences of identifying and growing plants in Key Stage 1. They will revise the names of the main parts of a plant (root, stem/trunk, leaf and flower) introduced in Year 1, learning their functions and how these relate to their appearance and structure. They will also learn about the parts of the flower, their roles in plant reproduction and the stages of the life cycle of a flowering plant, building on observations of growth of seeds and bulbs in Year 2. They will learn more about different types of plant reproduction in Year 5.</p> <p>NC Link:</p> <ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: 	<p>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>Context: In this module children start their formal look at light, and whilst they will have some prior experience at home, this has not been covered in school before.</p> <p>NC Link:</p> <ul style="list-style-type: none"> • notice that light is reflected from surfaces • find patterns that determine the size of shadows. <p>Vocabulary: light, light source, dark, absence of light, shadow, mirror, bright, dim, shiny, matt, reflect, eye, opaque, transparent, translucent, ultraviolet, ray, beam, absorb, luminous, non-luminous, infrared</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> • Can describe how we see objects in light and can describe dark as the absence of light 	<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. <p>Vocabulary: leaf, deciduous, evergreen, seed, berry, fruit, flower, seedling, seed head, grow, growth, habitat, soil type, variation, season, seasonal change, pollen, insect/wind pollination, seed dispersal (wind dispersal, animal dispersal, water dispersal) pollinate, nectar, honey bee, bumblebee, butterfly – Large White, Tortoiseshell, Peacock.</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> • Can explain the function of the parts of a flowering plant • Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination • Can give different methods of pollination and seed dispersal, including examples • Can explain observations made during investigations
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<p>move, muscles, joints, ribs, heart, skull, brain, backbone, spine, spinal column, vertebrate, footprint, trail, vitamins, minerals</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> • Can name the nutrients found in food • Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients • Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection • Can describe how muscles and joints help them to move <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • certain whole food groups like fats are ‘bad’ for you • certain specific foods, like cheese are also ‘bad’ for you • diet and fruit drinks are ‘good’ for you • snakes are similar to worms, so they must also be invertebrates • invertebrates have no form of skeleton. <p>Science capital - Science in the workplace: Animal and animal based careers - Doctor Vet Physiotherapist Physiologist Ophthalmologist Zoologist Conservationist Sports scientist pathologist</p>	<p>repel each other, depending on which poles are facing.</p> <p>Vocabulary: Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, material, acts at a distance, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, non-metal, iron, steel, poles, north pole, south pole</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> • Can give examples of forces in everyday life • Can give examples of objects moving differently on different surfaces • Can name a range of types of magnets and show how the poles attract and repel • Can draw diagrams using arrows to show the attraction and repulsion between the poles of magnets • Can use their results to describe how objects move on different surfaces • Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface • Can use classification evidence to identify that some metals, but not all, are magnetic • Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles 	<p>rough, smooth, hard, soft, rock, stone, pebble, boulder, grain, layer, texture, absorb water, particle, crystal, granule, properties, soil, clay, sandy, loam, peat, organic material, weather, weathering, frost, beach, cliff, trilobite, starfish, sea urchin, ammonite, fossil, fossilise, remains</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> • Can name some types of rock and give physical features of each • Can explain how a fossil is formed • Can explain that soils are made from rocks and also contain living/dead matter • Can classify rocks in a range of different ways, using appropriate vocabulary • Can devise tests to explore the properties of rocks and use data to rank the rocks • Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily • Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc. • Can identify plant/animal matter and rocks in samples of soil • Can devise a test to explore the water retention of soils <p>Common misconceptions:</p>	<p>roots, stem, leaves and flowers</p> <ul style="list-style-type: none"> • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. <p>Vocabulary: plant, roots, stem, trunk, leaf/leaves, flower, leaflet, stalk, veins, surface, edge, lobes, tip, food, root hair, nutrients, anchor, support, seed, germination, seedling, growth, mature plant, flowering, pollination, seed formation, bud, petal, sepal, carpel, stamen, pollen, reproduce, nectar, seed, fruit, dispersal - wind dispersal, animal dispersal, water dispersal)</p> <p>Assessment: possible evidence: Can explain the function of the parts of a flowering plant</p> <ul style="list-style-type: none"> • Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination • Can give different methods of pollination and seed dispersal, including examples • Can explain observations made during investigations • Can look at the features of seeds to decide on their method of dispersal 	<ul style="list-style-type: none"> • Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses • Can define transparent, translucent and opaque • Can describe how shadows are formed • Can describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change • Can clearly explain, giving examples, that objects are not visible in complete darkness • Can describe and demonstrate how shadows are formed by blocking light • Can describe, demonstrate and make predictions about patterns in how shadows vary <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • we can still see even where there is an absence of any light • our eyes ‘get used to’ the dark • the moon and reflective surfaces are light sources • a transparent object is a light source • shadows contain details of the object, such as facial features on their own shadow • shadows result from objects giving off darkness. Apply knowledge <p>Science capital - Science in the workplace: Optical scientist Camera Design Researcher Laser physicist</p>	<ul style="list-style-type: none"> • Can look at the features of seeds to decide on their method of dispersal • Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • plants eat food • food comes from the soil via the roots • flowers are merely decorative rather than a vital part of the life cycle in reproduction • plants only need sunlight to keep them warm • roots suck in water which is then sucked up the stem. <p>Science capital - Science in the workplace: Conservationist Nature warden/ranger Environmental scientist Ecotourism Researcher Field survey worker</p>
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<p>Nutritionist (humans or other animals)</p>	<ul style="list-style-type: none"> • Can use test data to rank magnets <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • the bigger the magnet the stronger it is • all metals are magnetic. <p>Science capital - Science in the workplace: Geomagnetist Magnetic engineer Electromagnetic engineer Radiologist</p>	<p>Some children may think:</p> <ul style="list-style-type: none"> • rocks are all hard in nature • rock-like, man-made substances such as concrete or brick are rocks • materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' • certain found artefacts, like old bits of pottery or coins, are fossils • a fossil is an actual piece of the extinct animal or plant • soil and compost are the same thing. <p>Science capital - Science in the workplace: Research scientist Inventor Quality manager Project manager Analytical scientist CAD technician Design engineer Materials engineer.</p>	<ul style="list-style-type: none"> • Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • plants eat food • food comes from the soil via the roots • flowers are merely decorative rather than a vital part of the life cycle in reproduction • plants only need sunlight to keep them warm • roots suck in water which is then sucked up the stem. <p>Science in the workplace: Plant based careers - Farmer Agronomist Botanist Horticultural scientist Plant breeder Garden designer Propagation scientist Conservationist Nature warden/ranger Environmental scientist Ecotourism Researcher Field survey worker</p>			
<p>Scientific enquiry</p>		<ul style="list-style-type: none"> • Asking simple questions and recognising that they can be answered in different ways - Asking relevant questions and using different types of scientific enquiries to answer them • Making observations and taking measurements - Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Engaging in practical enquiry to answer questions - Setting up simple practical enquiries, comparative and fair tests • Recording and presenting evidence - Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Answering questions and concluding - Using straightforward scientific evidence to answer questions or to support their findings • Evaluating and raising further questions and predictions - Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Communicating their findings - Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 				

Year 4						
<p>Year 4</p>	<p>Good Vibrations (Sound)</p> <p>Key Learning: A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.Context: Builds on their understanding of hearing, which was covered in Year 1 (Using our senses) during work around the senses.</p> <p>NC Link:</p> <ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel 	<p>Switched On (Electricity)</p> <p>Key Learning: Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.</p> <p>Context: This is the first time that electricity will be taught in KS1&2 – prior knowledge and understanding should be elicited and built on.</p> <p>NC Link:</p> <ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery 	<p>In a State (States of matter)</p> <p>Key Learning: A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling.</p>	<p>Where Does All That Food Go? (Animals including humans)</p> <p>Key Learning: Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).</p> <p>Context: Children will build on knowledge of the human body that they developed in Key Stage 1 and also during the Amazing Bodies unit in Year 3.</p> <p>NC Link:</p>	<p>Who Am I? (Living things and their habitats)</p> <p>Key Learning: Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.</p> <p>Context: Children will further develop the understanding of keys they gained in the Year 3 rocks module, using them to identify animals from a range of habitats.</p> <p>NC Link:</p> <ul style="list-style-type: none"> identify and name a variety of living things (plants and animals) in the local and wider environment, using classification keys to assign them to groups <p>Vocabulary:</p>	<p>Human Impact</p> <p>Context: In this module children will learn about some of the positive and negative ways that humans change the environment, locally and globally, with a particular focus on how this affects other living things. This will be related to a developing understanding of food chains (building on what children learned in Year 2) and what happens if food chains are broken by habitat disruption or the removal of a species from an ecosystem.</p> <p>NC Link:</p> <ul style="list-style-type: none"> recognise that environments can change and that this can sometimes pose dangers to living things. <p>Vocabulary: environment, impact, positive, negative, litter, pollution, waste, biodiversity, habitat, derelict, graffiti, traffic, destroy, create, location, food chain, producer, consumer, human impact , global issue, destruction, deforestation, rainforest, climate, climate change, zoo, endangered, breed, wild, natural, predator, prey, conservation, categories, tally chart, pictogram, bar chart, axes, scale, opinion, point of view, argument, viewpoint, debate</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can give examples of how an environment may change

<p>through a medium to the ear</p> <ul style="list-style-type: none"> find patterns between the pitch of a sound and features of the object that produced it find patterns between the volume of a sound and the strength of the vibrations that produced it recognise that sounds get fainter as the distance from the sound source increases <p>Vocabulary: sound, faint, loud, quiet, high, low, repeating, continuous, vibration, vibrate, solid, gas, volume, strength of vibrations, sound source, fainter, distance, pitch, travel, pitch, insulation</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can name sound sources and state that sounds are produced by the vibration of the object Can state that sounds travel through different mediums such as air, water, metal Can give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it Can give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder Can give examples to demonstrate that sounds get fainter as the distance from the sound source increases Can explain what happens when you strike a drum or pluck a string and use a diagram to show how sounds 	<ul style="list-style-type: none"> recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors. <p>Vocabulary: electricity, electrical, electrical appliance, electrical device, mains, plugged in, battery, power, rechargeable, solar, wind up, sound, light, heat, movement, cell, wire, bulb, bulb holder, buzzer, motor, component, circuit, terminal, positive, negative, switch, electrical conductor, electrical insulator</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can name the components in a circuit Can make electric circuits Can control a circuit using a switch Can name some metals that are conductors Can name materials that are insulators Can communicate structures of circuits using drawings which show how the components are connected Use classification evidence to identify that metals are good conductors and non-metals are insulators Can incorporate a switch into a circuit to turn it on and off Can connect a range of different switches identifying the parts that are insulators and conductors 	<p>Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.</p> <p>Context: This module introduces the concept of states of matter. It focuses on reversible changes; reversibility will be covered in more detail in Year 5, along with other types of change.</p> <p>NC Link:</p> <ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. <p>Vocabulary: solid, liquid, gas, hard, soft, pour, flow, pile, pool, surface, horizontal, runny, viscous, sticky, grain, powder, ice, water, temperature, cool, cooling, warm, warming, hot, degree Celsius, melt, melting, freeze, freezing, solidify, solidifying, heating, states of</p>	<ul style="list-style-type: none"> describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey. <p>Vocabulary: mouth, oesophagus, stomach, small intestine, large intestine, rectum, anus, digestive system, digestion, carbohydrate, fat, sugar, protein, roughage, dairy, fruit, vegetables, vitamins, nutrients, minerals, balanced diet, healthy, mechanical process, chemical process, teeth, canine, incisor, premolar, molar, cutting, tearing, grinding, dental hygiene, food chain, food web, producer, consumer, predator, prey, herbivore, omnivore, carnivore</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can sequence the main parts of the digestive system Can draw the main parts of the digestive system onto a human outline Can describe what happens in each part of the digestive system Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for Can name producers, predators and prey within a habitat Can use diagrams or a model to describe the journey 	<p>Classification, environment, habitat, features, sequence, key, distinguish, similarities, differences, vertebrate, fish, amphibian, reptile, bird, mammal, backbone, hair, scales, feathers, eggs, wings, beak, lungs, gills, cold blooded, warm blooded, suckle, head, thorax, abdomen, wing, segment, antennae, insects, arachnids (spiders), crustaceans, myriapods, molluscs, worms</p> <p>human impact, positive, negative, migrate, hibernate</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can name living things living in a range of habitats, giving the key features that helped them to identify them Can give examples of how an environment may change both naturally and due to human impact <p>Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.)</p> <ul style="list-style-type: none"> Can use classification keys to identify unknown plants and animals Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain there is always plenty of food for wild animals animals are only land-living creatures 	<p>both naturally and due to human impact</p> <p>Science capital – Science in the workplace: Conservationist Nature warden/ranger Environmental scientist Water quality officer Ecotourism Researcher Field survey worker Entomologist Marine biologist</p>
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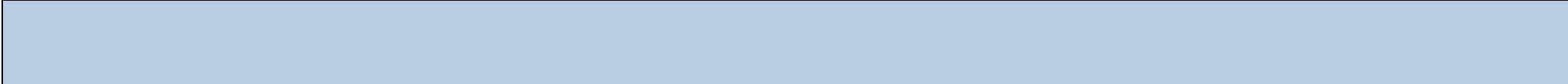
	<p>travel from an object to the ear</p> <ul style="list-style-type: none"> • Can demonstrate how to increase or decrease pitch and volume using musical instruments or other objects • Can use data to identify patterns in pitch and volume • Can explain how loudness can be reduced by moving further from the sound source or by using a sound insulating medium <p>Common misconceptions: Pitch and volume are frequently confused, as both can be described as high or low.</p> <p>Some children may think:</p> <ul style="list-style-type: none"> • sound is only heard by the listener • sound only travels in one direction from the source • sound can't travel through solids and liquids • high sounds are loud and low sounds are quiet. <p>Science capital – Science in the workplace: Audiologist Acoustic scientist Acoustic engineer Sound technician Music scientist</p>	<ul style="list-style-type: none"> • Can add a circuit with a switch to a DT project and can demonstrate how it works • Can give reasons for choice of materials for making different parts of a switch • Can describe how their switch works <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • electricity flows to bulbs, not through them • electricity flows out of both ends of a battery • electricity works by simply coming out of one end of a battery into the component. <p>Science capital – Science in the workplace: Electrical scientist Cardiovascular Technologists and Technicians Acoustic consultant. Aerospace engineer. Broadcast engineer. CAD technician. Control and instrumentation engineer. Design engineer. Electrical engineer. Electronics engineer.</p>	<p>matter, change of state, boiling point, melting point, freezing point, evaporation, water cycle</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> • Can create a concept map, including arrows linking the key vocabulary • Can name properties of solids, liquids and gases • Can give everyday examples of melting and freezing • Can give everyday examples of evaporation and condensation • Can describe the water cycle • Can give reasons to justify why something is a solid liquid or gas • Can give examples of things that melt/freeze and how their melting points vary • From their observations, can give the melting points of some materials • Using their data, can explain what affects how quickly a solid melts • Can measure temperatures using a thermometer • Can explain why there is condensation on the inside the hot water cup but on the outside of the icy water cup • From their data, can explain how to speed up or slow down evaporation • Can present their learning about the water cycle in a range of ways e.g. diagrams, explanation text, story of a water droplet <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • 'solid' is another word for hard or opaque • solids are hard and cannot break or change shape easily and are often in one 	<p>of food through the body explaining what happens in each part</p> <ul style="list-style-type: none"> • Can record the teeth in their mouth (make a dental record) • Can explain the role of the different types of teeth • Can explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores • Can create food chains based on research <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • arrows in a food chains mean 'eats' • the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain • there is always plenty of food for wild animals • your stomach is where your belly button is • food is digested only in the stomach • when you have a meal, your food goes down one tube and your drink down another • the food you eat becomes "poo" and the drink becomes "wee" <p>Science capital - Science in the workplace: Animal and animal based careers - Doctor Vet Physiotherapist Physiologist Ophthalmologist Zoologist Conservationist Sports scientist pathologist Nutritionist (humans or other animals)</p>	<ul style="list-style-type: none"> • animals and plants can adapt to their habitats, however they change • all changes to habitats are negative. <p>Science capital – Science in the workplace: Conservationist Nature warden/ranger Environmental scientist Water quality officer Ecotourism Researcher Field survey worker Entymologist Marine biologist</p>	
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- substances made of very small particles like sugar or sand cannot be solids
- particles in liquids are further apart than in solids and they take up more space
- when air is pumped into balloons, they become lighter
- water in different forms – steam, water, ice – are all different substances
- all liquids boil at the same temperature as water (100 degrees)
- melting, as a change of state, is the same as dissolving
- steam is visible water vapour (only the condensing water droplets can be seen)

Science capital – Science in the workplace:
 Research scientist
 Inventor
 Quality manager
 Project manager
 Analytical scientist
 CAD technician
 Design engineer
 Materials engineer.

Scientific enquiry

- **Asking simple questions and recognising that they can be answered in different ways** - Asking relevant questions and using different types of scientific enquiries to answer them
- **Making observations and taking measurements** - Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- **Engaging in practical enquiry to answer questions** - Setting up simple practical enquiries, comparative and fair tests
- **Recording and presenting evidence** - Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- **Answering questions and concluding** - Using straightforward scientific evidence to answer questions or to support their findings
- **Evaluating and raising further questions and predictions** - Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- **Communicating their findings** - Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions



Properties of Materials

Key Learning: 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.

Context: Children will have Identified and compared the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Finding out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2). They will have compared and grouped together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3) They will have compared and grouped materials together, according to whether they are solids, liquids or gases and observed 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). They will also have identified the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4)

NC Link:

- compare and group together everyday materials based on

Earth and Space

Key learning:
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 365¼ days to complete its orbit around 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.

Context:
Children extend their awareness of seasonal changes through the year and observations of the Sun’s movement across the sky, which they developed during Key Stage 1. Year 3 work on shadows also provides a sound basis for investigations. The module also draws on children’s previous use of the calendar to calculate the duration of events (Year 4 Mathematics) and solve problems involving units of time (Year 5 Mathematics).

NC Link:

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as

Forces

Key Learning:
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. 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.

Context: In Year 3 children learned about how contact and non-contact forces make things start and stop moving. This module builds on these ideas and develops an understanding of how forces including gravitational attraction and drag forces – friction, air resistance, water resistance, and upthrust in water – affect movement.

NC Link:

- explain that unsupported objects fall towards the Earth because of the force of gravity acting

Animals including humans

Key Learning:
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 primary and secondary sexual characteristics. This enables the adult to reproduce. This needs to be taught alongside PSHE.

Context: Children build on earlier work from Key Stage 1 and from Year 3, where they learned about the life cycles of plants. They extend their understanding of what a life cycle is, and learn about the life cycles of some familiar (and some less familiar) mammals, amphibians, insects and birds.

NC Link:

- explain the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals.

Vocabulary:
life cycle, birth, growth, reproduction, metamorphosis, aging, death, animal, mammal, amphibian, insect, bird, head, thorax, abdomen, antennae, egg, pupa, cocoon, adult, breeding cycle, prey, predator, reproduce, habitat, environment, migration,

Living things and their habitats

Key Learning: 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 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

Context: Children develop their understanding of the life cycles of plants and of reproduction as a specific stage of those life cycles.

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States of matter - Materials

Key Learning: Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Mixtures can be separated by filtering, sieving and evaporation. 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.

Context: Children will have Identified and compared the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Finding out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2). They will have compared and grouped together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3) They will have compared and grouped materials together, according to whether they are solids, liquids or gases and observed 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). They will also have identified the part played by

	<p>evidence from comparative and fair tests, including their hardness, transparency, conductivity (electrical and thermal), and response to magnets</p> <ul style="list-style-type: none"> give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic <p>Vocabulary: properties, material, solid, liquid, gas, hardness, transparent, opaque, strength, rigidity, flexibility, elastic, electrical conductor/insulator, magnetic, non-magnetic, attract, repel, viscosity, viscous, polyester, nylon, polythene, PVC, recycle, biodegradable, environmentally friendly</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can create a chart or table grouping/comparing everyday materials by different properties Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose Can explain the results from their investigations <p>Common misconceptions:</p> <p>Science capital – Science in the workplace: Research scientist Inventor Quality manager Project manager Analytical scientist CAD technician Design engineer</p>	<p>approximately spherical bodies</p> <ul style="list-style-type: none"> use the idea of the Earth’s rotation to explain day and night. <p>Vocabulary: Greenwich Meridian, International Date Line, Milky Way, Sun, Moon, North/South Pole, asteroid, axis, equator, equinox, full moon, new moon, waning, waxing, crescent, lunar month, galaxy, horizon, longitude, meridian, nebula, planet, solar system, solstice, star, sunrise, sunset, telescope, tilt, time zone, names of planets</p> <p>Assessment: possible evidence</p> <ul style="list-style-type: none"> Can create a voice over for a video clip or animation Can show, using diagrams, the movement of the Earth and Moon Can explain the movement of the Earth and Moon Can show using diagrams the rotation of the Earth and how this causes day and night Can explain what causes day and night Can use the model to explain how the Earth moves in relation to the Sun and the Moon moves in relation to the Earth Can demonstrate and explain verbally how day and night occur Can explain evidence gathered about the position of shadows in term of the movement of the Earth and show this using a model Can explain how a sundial works Can explain verbally, using a model, why we have time zones 	<p>between the Earth and the falling object</p> <ul style="list-style-type: none"> identify the effects of air resistance, water resistance and friction, that act between moving surfaces understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs. <p>Vocabulary: air resistance, Aristotle, balanced forces, bevel gears, clockwork, cogs, compress, extend, effort, forces, friction, force arrow, fulcrum, gravity, Galileo, gears, lever, lift, machine, mechanisms, movement, Newton, Newton meter, pivot, pulley, pull, push, resistance, upthrust, water resistance</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can demonstrate the effect of gravity acting on an unsupported object Can give examples of friction, water resistance and air resistance Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance Can demonstrate how pulleys, levers and gears work Can explain the results of their investigations in terms of the force, showing a good understanding that as the object tries to move through the water or air or across the surface the particles in the water, air or on the surface slow it down 	<p>endangered, threatened, extinct, evolution</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can explain the changes that takes place in boys and girls during puberty Can explain how a baby changes physically as it grows, and also what it is able to do <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> a baby grows in a mother’s tummy a baby is “made”. <p>Science capital – Science in the workplace: Animal and animal based careers - Doctor Vet Physiotherapist Physiologist Ophthalmologist Zoologist Conservationist Sports scientist pathologist Nutritionist (humans or other animals) Conservationist Nature warden/ranger Environmental scientist Water quality officer Ecotourism Researcher Field survey worker Entomologist Marine biologist</p>	<p>Vocabulary: flower, carpel, stamen, pollen, seed, seed head, berry, hip, fruit, pollinator, pollination, fertilise, fertilisation, seed dispersal, male, female, organs, sex, propagate, propagation, stem/leaf/root cutting, runner, tuber, rhizome, bulb, crop, cropping, produce, yield, glut</p> <p>Assessment: possible evidence:</p> <ul style="list-style-type: none"> Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways Can present their understanding of the life cycle of a range of animals in different ways e.g. drama, pictorially, chronological reports, creating a game Can identify patterns in life cycles Can compare two or more animal life cycles they have studied Can explain how a range of plants reproduce asexually <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> all plants start out as seeds all plants have flowers plants that grow from bulbs do not have seeds only birds lay eggs. <p>Science capital – Science in the workplace: Farmer Agronomist Botanist Horticultural scientist Pathologist Plant breeder</p>	<p>evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4)</p> <p>NC Link:</p> <ul style="list-style-type: none"> Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. <p>Vocabulary: Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material</p> <p>Assessment: Possible evidence:</p> <ul style="list-style-type: none"> Can group solids based on their observations when mixing them with water Can give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water Can explain the results from their investigations <p>Common misconceptions:</p>
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	Materials engineer.	<ul style="list-style-type: none"> • Can describe the arguments and evidence used by scientists in the past <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • the Earth is flat • the Sun is a planet • the Sun rotates around the Earth • the Sun moves across the sky during the day <ul style="list-style-type: none"> • the Sun rises in the morning and sets in the evening • the Moon appears only at night • night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth. <p>Science capital – Science in the workplace: Astronauts Engineers Aerospace Engineers Computer Engineers Materials Engineers Mechanical Engineers Robotics Engineers Telecommunications Engineers.</p>	<ul style="list-style-type: none"> • Can demonstrate clearly the effects of using levers, pulleys and gears <p>Common misconceptions: Some children may think:</p> <ul style="list-style-type: none"> • the heavier the object the faster it falls, because it has more gravity acting on it • forces always act in pairs which are equal and opposite • smooth surfaces have no friction • objects always travel better on smooth surfaces • a moving object has a force which is pushing it forwards and it stops when the pushing force wears out • a non-moving object has no forces acting on it • heavy objects sink and light objects float. <p>Science capital – Science in the workplace: Geophysicist seismologist</p>		<p>Garden designer Propagation scientist Conservationist Nature warden/ranger Environmental scientist Field survey worker Marine biologist</p>	<p>Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed. Some children may think:</p> <ul style="list-style-type: none"> • thermal insulators keep cold in or out • thermal insulators warm things up • solids dissolved in liquids have vanished and so you cannot get them back • lit candles only melt, which is a reversible change. <p>Science capital – Science in the workplace: Research scientist Inventor Quality manager Project manager Analytical scientist CAD technician Design engineer Materials engineer.</p>
Scientific enquiry		<ul style="list-style-type: none"> • Asking simple questions and recognising that they can be answered in different ways - Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Making observations and taking measurements - Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. 				

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| | <ul style="list-style-type: none">• Engaging in practical enquiry to answer questions - Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary• Recording and presenting evidence - Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs• Answering questions and concluding - Identifying scientific evidence that has been used to support or refute ideas or arguments. 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.• Evaluating and raising further questions and predictions - 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. Using test results to make predictions to set up further comparative and fair tests. <p>Communicating their findings - 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.</p> |
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