Christ Church Upper Armley CE Primary School

# Science Curriculum Intent and Overview

## Implementation

### When is Science taught?

Pupils begin their formal science education in the early years foundation stage (EYFS). This involves learning foundational knowledge primarily through the 'understanding the world: the natural world' area of learning. This provides a number of rich contexts for pupils to learn a wide range of vocabulary. These words form the beginnings of scientific concepts that will be built on in Year 1 and beyond. Because pupils develop their scientific and non-scientific vocabulary during this time, the EYFS should not just be considered as preparation for learning further science in Year 1. (Ofsted, Research review series: science April 2021)
In KS 1 and 2. Science is taught every week across all year groups. Substantive knowledge alongside disciplinary knowledge is sequenced and taught in topics that progress across the age phases. We have selected the 'Developing Experts' platform to enrich and extend learning in Science so that our children are able to see possible careers in Science and learn from experts in society.

### How is Science taught?

Activities are carefully chosen so that they match specific curriculum intent.
Teachers use systematic teaching approaches, where learning is scaffolded using carefully sequenced explanations, models, analogies and other representations to help pupils to acquire, organise and remember scientific knowledge.
Teaching takes account of the limited working-memory capacity of their pupils when planning lessons. Systematic approaches, alongside carefully selected texts, are used to teach the most important vocabulary in science.
Learning takes place both inside and outside the classroom.

### How do we assess and monitor Science?

Class teachers are responsible for the assessment of children in their class in Science. In EYFS evidence in Floor books and Tapestry is used to make judgements about progress and attainment. In KS 1 and 2 evidence from pupil's science is used to assess and monitor children's progress and attainment. At the end of every taught unit, teachers make summative judgements on the science tracking grid. The Science lead is responsible for ensuring progression in knowledge and skills across year groups and monitoring the quality of the subject through lesson drop ins, book looks, analysis of assessment data, staff development sessions and pupil interviews.

## Greater Depth:

In order to cater for the children who are working at greater depth we will encourage them and provide opportunities for them to further deepen their substantive and disciplinary knowledge. This will include:

- In class questioning and extending. Which will require children to evidence or justify their understanding. This could be through oral explanation or through diagrams/ drawings or written.
- considering learning roles. Pupils may be encouraged to peer teach a skill or concept. Lead or design a practical group activity to support scientific study. Take on a leadership role within a group. Showcase/ share their learning with others by researching a particular area of interest to present to the class by being provided with suitable materials and encouraged to increase their knowledge and skills to become an expert in their field, through further reading suggested by the teacher, independent research and presenting findings in an analytical and evaluative way.
- leadership opportunities such as becoming a Science Ambassador during Science week. Representing their class to discuss science with the subject lead and to work collaboratively with the junior leadership team, class council and SLT.
- access to national competitions and resources through STEM and CREST awards. Parents and children will be signposted to opportunities for extension beyond the classroom through national opportunities through the STEM network and by completing CREST awards.

## Key Curriculum Principles

### 1. The Bigger Picture: Progression of knowledge should be clear

The knowledge (both disciplinary and substantive) that children will learn through each year is clear and builds on prior learning. Units of work are clearly sequenced and the substantive knowledge will be explicitly taught supported by a variety of resources (Science lead, equipment, online platforms).

### 2. Enrichment:

Pupils will experience a rich science curriculum that aims to inspire curiosity and develop the skills to enrich practical study of the subject. This enrichment will be enabled by trips, visits, the outside classroom, visitors, equipment and online resources.

### 3. Disciplinary knowledge

Specific scientific skills are explicitly taught throughout and alongside substantive knowledge to enable a progression of skills, concepts and scientific enquiry. There is coherence between maths and science so that the subjects support the development of each other. The content areas for this study are set out in the 'working scientifically' programme of study which include: knowledge of methods (fair testing, models, classification, pattern spotting, description), Knowledge of apparatus and techniques including measurement, knowledge of data analysis including ways of presenting findings to others and knowledge of how science uses evidence to support and develop explanations and theories.

### 4. Oracy:

Through our work with Voice 21 and participation in the 'Narrowing the Word Gap' project, pupils regularly experience different types of talk, such as exploratory talk and presentational talk. Teacher's discuss scientific vocabulary and present it to them. This might be through listening to storybooks and non-fiction texts, as well as rhymes and poems. Teachers model effective use of scientific language and encourage children to use specific scientific vocabulary in their work, providing them with word banks.

## Overview, Long Term Plan, Content and progression

EYFS Nursery and Reception Understanding the World

| Class/ Term | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|---|
| Reception | All About Me | Why are there so many leaves on the ground? (Seasonal Change) | How do things move? How do we get About? | What happened to Jacks Beans? | What Would You Find on the Farm? | Keeping Healthy<br>Who can I Ask for Help? |
| | My body, my senses, what I can do.<br>Growth and change from a baby to a child. | Why is it so cold in winter?<br><br>Woodland animals found in the UK, animals that like the cold – penguins and polar bears. | Transport, forces, floating and sinking, pushes and pulls, gravity, magnetism, speed and distance.<br>Space and the sun, moon and stars. | Seeds grow into plants, bulbs, caring for seedlings, life cycle of the corn plant/bean plant.<br>Life cycle of the caterpillar, frog and butterfly. | Animals and their young – UK farm animals, animals that lay eggs, mammals and reptiles found in deserts, polar regions and jungle.<br>Classifying animals into groups such as birds, mammals, reptiles, and amphibians. | Healthy eating, sleeping, exercise, clothing, tooth care, sun safety.<br>Keeping themselves safe and how to ask for help.<br>The importance of healthcare professionals and their roles. |

## Statutory framework for EYFS (2021) Understanding the World

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 visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. 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 domains. Enriching and widening children's vocabulary will support later reading comprehension.

ELG: The World
Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants;
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|---|
| Year 1 | Human Body (Seasonal Changes) | Everyday Materials (Seasonal changes) | Animals | Caring for the planet (Seasonal Changes) | Plants | Growing and Cooking (Seasonal Changes) |
| Year 2 | Animals including Humans | Materials | Plants (Light and Dark) | Living things and their habitats | Plants (Bulbs and Seeds) Growing Up | Bulbs and Seeds Wildlife |
| Year 3 | Human Body (Skeletons and Movement) | Nutrition and Diet (Food Waste) Rocks | Soil Fossils | Light | Plants A | Plants B Forces and Magnets |
| Year 4 | Grouping and Classifying Living Things | States of matter | Sound | Electricity | Habitats and Deforestation | Digestive System Food Chains |
| Year 5 | Forces | Space Global Warming | Properties of Animals Life Cycles | Animals including humans (DETAIL) | Reproduction | Properties of Changing Materials |
| Year 6 | Living things and their habitats | Electricity | Light (light pollution) | Circulatory System | Diet, Drugs and Lifestyle | Adaptation- Evolution and Inheritance (Fossils) |

- Sustainability Units of work.

## Key Stage 1

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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.

| **Curriculum content Statutory requirements for Year 1** | **Year 2 Curriculum content. Statutory requirements.** |
|---|---|
| Plants<br><br>Pupils should be taught to:<br><br>• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees<br>• identify and describe the basic structure of a variety of common flowering plants, including trees. | Living things and their habitats<br>Pupils should be taught to:<br>• explore and compare the differences between things that are living, dead, and things that have never been alive<br>• 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<br>• identify and name a variety of plants and animals in their habitats, including microhabitats<br>• 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. |
| Animals, including humans<br><br>Pupils should be taught to:<br><br>• identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals<br>• identify and name a variety of common animals that are carnivores, herbivores and Omnivores<br>• describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)<br>• identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. | Plants<br>Pupils should be taught to:<br>• observe and describe how seeds and bulbs grow into mature plants<br>• find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. |

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| Everyday materials<br><br>Pupils should be taught to:<br><br>• distinguish between an object and the material from which it is made<br>• identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock<br>• describe the simple physical properties of a variety of everyday materials<br>• compare and group together a variety of everyday materials on the basis of their simple physical properties. | Animals, including humans<br><br>Pupils should be taught to:<br>• notice that animals, including humans, have offspring which grow into adults<br>• find out about and describe the basic needs of animals, including humans, for survival (water, food and air)<br>• describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. |
| Seasonal changes<br><br>Pupils should be taught to:<br><br>• observe changes across the four seasons<br>• observe and describe weather associated with the seasons and how day length varies | Uses of everyday materials<br>Pupils should be taught to:<br>• identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses<br>• find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. |

## Lower Key Stage 2

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- 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 reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings

| Year 3 Curriculum content Statutory requirements | Year 4 Curriculum content Statutory requirements |
|---|---|
| Plants<br><br>Pupils should be taught to:<br>• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers<br>• 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<br>• investigate the way in which water is transported within plants<br>• explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. | Living things and their habitats<br><br>Pupils should be taught to:<br>• recognise that living things can be grouped in a variety of ways<br>• explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment<br>• recognise that environments can change and that this can sometimes pose dangers to living things. |
| Animals, including humans<br><br>Pupils should be taught to:<br>• 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<br>• identify that humans and some other animals have skeletons and muscles for support, protection and movement. | Animals, including humans<br><br>Pupils should be taught to:<br>• describe the simple functions of the basic parts of the digestive system in humans<br>• identify the different types of teeth in humans and their simple functions<br>• construct and interpret a variety of food chains, identifying producers, predators and prey. |
| Rocks<br><br>Pupils should be taught to:<br>• compare and group together different kinds of rocks on the basis of their appearance and simple physical properties<br>• describe in simple terms how fossils are formed when things that have lived are trapped within rock<br>• recognise that soils are made from rocks and organic matter. | States of matter<br><br>Pupils should be taught to:<br>• compare and group materials together, according to whether they are solids, liquids or gases<br>• 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)<br>• identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.<br>• |
| Light<br><br>Pupils should be taught to:<br>• recognise that they need light in order to see things and that dark is the absence of light<br>• notice that light is reflected from surfaces<br>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes<br>• recognise that shadows are formed when the light from a light source is blocked by an opaque object<br>• find patterns in the way that the size of shadows change. | Sound<br><br>Pupils should be taught to:<br>• identify how sounds are made, associating some of them with something vibrating<br>• recognise that vibrations from sounds travel through a medium to the ear<br>• find patterns between the pitch of a sound and features of the object that produced it<br>• find patterns between the volume of a sound and the strength of the vibrations that produced it<br>• recognise that sounds get fainter as the distance from the sound source increases. |

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| Forces and magnets<br><br>Pupils should be taught to:<br>• compare how things move on different surfaces<br>• notice that some forces need contact between two objects, but magnetic forces can act at a distance<br>• observe how magnets attract or repel each other and attract some materials and not others<br>• 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<br>• describe magnets as having two poles<br>• predict whether two magnets will attract or repel each other, depending on which poles are facing. | Electricity<br><br>Pupils should be taught to:<br>• identify common appliances that run on electricity<br>• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers<br>• 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<br>• recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit<br>• recognise some common conductors and insulators, and associate metals with being good conductors. |

## Upper Key Stage 2

Years 5 and 6 Statutory requirements During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- 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
- identifying scientific evidence that has been used to support or refute ideas or arguments.

| Year 5 Curriculum content Statutory requirements | Year 6 Curriculum content Statutory requirements |
|---|---|
| Living things and their habitats<br><br>Pupils should be taught to:<br>• describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird<br>• describe the life process of reproduction in some plants and animals. | Living things and their habitats<br><br>Pupils should be taught to:<br>• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals<br>• give reasons for classifying plants and animals based on specific characteristics. |
| Animals, including humans<br><br>Pupils should be taught to:<br>• describe the changes as humans develop to old age. | Animals, including humans<br><br>Pupils should be taught to:<br>• identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood<br>• recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function<br>• describe the ways in which nutrients and water are transported within animals, including humans.. |
| Properties and changes of materials<br><br>Pupils should be taught to:<br>• 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<br>• know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution<br>• use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating<br>• give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic<br>• demonstrate that dissolving, mixing and changes of state are reversible changes<br>• explain that some changes result in the formation of new materials, and that this kind<br>• of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. | Evolution and inheritance<br><br>Pupils should be taught to:<br>• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago<br>• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents<br>• identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. |
| Earth and space<br><br>Pupils should be taught to:<br>• describe the movement of the Earth, and other planets, relative to the Sun in the solar system<br>• describe the movement of the Moon relative to the Earth | Light<br><br>Pupils should be taught to:<br>• recognise that light appears to travel in straight lines<br>• use the idea that light travels in straight lines to explain that objects are seen<br>• because they give out or reflect light into the eye |

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| • describe the Sun, Earth and Moon as approximately spherical bodies<br>• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky | • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes<br>• use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. |
| Forces<br><br>Pupils should be taught to:<br>• explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object<br>• identify the effects of air resistance, water resistance and friction, that act between moving surfaces<br>• recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. | Electricity<br><br>Pupils should be taught to:<br>• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit<br>• compare and give reasons for variations in how components function, including the<br>• brightness of bulbs, the loudness of buzzers and the on/off position of switches<br>• use recognised symbols when representing a simple circuit in a diagram. |

| | Links to Prior Learning | | |
|---|---|---|---|
| | New learning | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | **Vocabulary** |
| **Reception: All About Me** | To know that we see with our eyes, smell with our nose, hear with our ears, taste with our tongues and touch with our skin.<br><br>To know that the five senses are sight, smell, hearing, taste and touch.<br><br>To know that different objects make different sounds when they are hit or strummed.<br><br>Deeper learning:<br>To know that our senses can help us identify dangers. | To group foods based on their taste and smell.<br><br>To compare different sounds.<br><br>To ask questions to explore different answers. | senses<br>eyes<br>sight<br>taste<br>touch<br>trumpet<br>reed<br>ripple<br>noise<br>vibration<br>sound<br>hearing |

| | Links to Prior Learning | | | |
|---|---|---|---|---|
| | New learning | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | **Vocabulary** | |
| **Reception: Seasonal Changes (Why are there so many leaves on the Ground?)** | children observe and discuss seasonal changes in winter, such as cold, freezing temperatures and that some trees have no leaves.<br>Children will discuss how winter clothing is important to keep us warm. Within this, children can be introduced to other climates, such as polar climates, where temperatures are typically low.<br>Children will explore the features of animals in these climates and how these help animals to survive, such as polar bears having thick fur.<br><br>Deeper learning;<br>Animals that live in different habitats have ways to adapt to that environment. | To compare different habitats such as woodland and polar regions<br><br>To describe adaptations and differences between animals found such as hedgehogs which hibernate and polar bears which have thick fur.<br><br>To observe seasonal changes and use description such as 'trees lose leaves' or 'leaves change colour'.<br><br>To describe the seasons and some of the features of their weather patterns. | winter<br>cold<br>warm<br>freeze<br>frozen<br>melt<br>ice<br>rainy<br>sunny<br>frosty<br>snowy<br>water<br>leaves<br>tree | change<br>hibernate<br>hedgehog<br>polar<br>polar bear<br>penguin<br>fur |

| | Links to Prior Learning | | |
|---|---|---|---|
| | New learning | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | **Vocabulary** |
| **Reception: How do things move? How do we get about? (Machines)** | To know that cars, buses, bikes, ships and aeroplanes are examples of transport that help us to travel.<br><br>To know that machines help make tasks easier.<br><br>To know that everything can be classified as living or non-living.<br><br>Deeper learning:<br>To know that non-living things cannot grow, respire, reproduce or interact with their environment. | To group vehicles based on how they enable us to travel e.g. air, sea, road.<br><br>To identify and group different types of machines.<br><br>To gather data to answer questions. | bus<br>transport<br>bicycle<br>aeroplane<br>wheelbarrow<br>wheel<br>whisk<br>hammer<br>non-living<br>car<br>toy<br>scooter |

| | Links to Prior Learning | | |
|---|---|---|---|
| | New learning | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | **Vocabulary** |
| **Reception: What happened to Jack's beans (Plants and Seeds)** | To know a habitat is where an animal or plant lives.<br><br>To know that insects have six legs and usually a pair of wings.<br><br>To know an insect has a life cycle made up of different stages<br><br>Deeper learning:<br>To know that insects start their life as an egg, then develop into larvae and then into an adult. | Use simple equipment<br><br>Group and classify insects<br><br>Use simple features to compare objects, materials and living things. | Ladybird<br>Ant<br>butterfly<br>spider<br>snail<br>honey<br>worm<br>fly<br>beetle<br>insect<br>ant<br>mouth<br>sap<br>habitat<br>food<br>greenfly<br>life cycle |

| | Links to Prior Learning | | | |
|---|---|---|---|---|
| | New learning | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | **Vocabulary** | |
| **Reception: Animals (What would you find on the farm?)** | Children explore and sort animals based on their simple features.<br>Non-fiction books are a useful resource to introduce these features to children in meaningful contexts.<br>Children will be introduced to vocabulary which will support them to name key features and group animals. For example, birds have two legs, wings and feathers.<br>Children will name common farm animals and contrast with the locations oof wild animals from different habitats such as desert, ocean, polar regions and jungle.<br><br>Deeper learning<br>That animals and plants adapt to their environment, and that adult animals may look different form their young. | Describe the life cycles of some common animals – cows, sheep, pigs, horses.<br><br>Sort and match animals and young – these may look like their parent animal or may be different such as chickens which lay an egg, and tadpoles which grow into frogs.<br><br>Match the animal to its parent based on observable features. | animal<br>scales<br>feathers<br>fur<br>feet<br>legs<br>tail<br>wings<br>head<br>beak<br>snake<br>bird | pigeon<br>magpie<br>sort<br>mouse<br>frog<br>toad<br>cat<br>dog<br>fox |

| | Links to Prior Learning | | |
|---|---|---|---|
| | New learning | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | **Vocabulary** |
| **Reception: Keeping Healthy - Who can I ask for help?** | Children will understand that humans need food and water, shelter and care to stay healthy.<br><br>Children will be able to sort food into food groups such as creating a healthy snack with fruit and vegetables.<br><br>Children will recognise that they need sleep, exercise and food and that their body will indicate when it is well/unwell.<br><br>Deeper learning<br>Children will recognise and describe how they can care for themselves and when and to whom they might seek help such as when they are ill or injured. | Measuring height, weight, using standard and non-standard measures.<br><br>Identifying and sort food types and creating simple snacks.<br><br>Describe how washing, bathing brushing hair, sleep, exercise and eating healthy food contribute to a healthy person.<br><br>Describe how they can be cared for when they are ill or injured. | Fruit<br>Vegetables<br>Water<br>Juice<br>Teeth and toothbrush, paste<br>Dentist, nurse, paramedic, doctor, pharmacist<br>Clothing<br>Sun lotion, hat, gloves, scarf, wellies |

| Year 1 Everyday materials | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Reception, pupils were introduced to the idea of natural and manmade objects. This built upon work undertaken in nursery where pupils used vocabulary to describe different materials and also learn how and why materials can change. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that objects are made from materials<br><br>To know the names of a variety of everyday materials, including wood, plastic, glass, metal, water, and rock<br><br>To know the difference between natural and manmade objects<br><br>To know that some objects float and sink<br><br>To know that some objects soak up water (are absorbent)<br><br>Deeper learning:<br>To know that materials are chosen to make everyday objects because of their properties | Use everyday language/begin to use simple scientific words<br>to ask or answer a scientific question.<br><br>Complete a simple test to identify the properties of materials.<br><br>Predict whether items will sink or float.<br><br>Complete a simple test to identify if objects sink or float.<br><br>Complete a simple test to identify is materials are absorbent or waterproof. | Begin to record simple data<br><br>Use simple, nonstandard equipment and measurements in a practical task. | To identify and describe a variety of everyday materials<br><br>To identify what material an object is made from<br><br>Sort and group objects and materials based on their simple physical properties. | Explain what they have found out about floating and sinking comparing results to prediction.<br><br>Explain, with help, what they have found out about the absorbency of materials.<br><br>Use every day or simple scientific language to ask and/or answer a question on given data. | material<br>wood<br>metal<br>fabric<br>plastic<br>object<br>brick<br>glass<br>elastic<br>property<br>opaque<br>stiff<br>dull<br>transparent<br>rubber<br>polyester<br>factory<br>manmade<br>natural<br>submerge<br>float<br>predict<br>buoyant<br>sink<br>waterproof<br>sponge<br>absorbent<br>soak |

| | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This is the first time pupils have been introduced to the seasons and seasonal changes. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| **Year 1 Seasonal Changes (covered across the year)** | To know the names of the four seasons<br><br>To know the changes each season brings and how these changes affect some plants and animals<br><br>To know the weather associated with each season.<br><br>To know that seasons exist because the amount of sunlight we get changes throughout the year<br><br>To know how humans dress during the summer and winter seasons to cope with the weather conditions.<br><br>Deeper learning:<br>To know that some animals hibernate in the winter | Ask and answer questions about the changes that occur with each season.<br><br>Use the language associated with seasonal changes to ask and answer questions.<br><br>To predict which week was the rainiest by looking at the rainwater collected. | Observe how much rain falls over a four week period and record weekly measurements on a simple table.<br><br>To record rainfall in a simple bar graph or by drawing pictorial representations. | Sort and compare images of the seasons and explain reasons for matching images with particular seasons. | To analyse the data on rainfall to determine which week was the wettest. | season<br>summer<br>spring<br>autumn<br>winter<br>weather<br>harvest<br>autumn<br>hibernate<br>protect<br>sleet<br>temperature<br>frost<br>chick<br>grow<br>spring<br>changes<br>compare<br>summer<br>heatwave<br>warm<br>sun protection<br>record<br>rainfall<br>results<br>graph<br>measuring |

| Year 1 Plants and Planting | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | Those pupils who attended nursery, were introduced to plants as living things. They learnt about how plants are made, where they come from and how to look after them. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that seeds grow into plants<br><br>To know the parts of a plant and tree<br><br>To know that different plants can grow in the same environment<br><br>To know the difference between deciduous and evergreen trees<br><br>To know that plants are a source of food<br><br>Deeper learning:<br>To know that every seed has the beginnings of a new plant inside it, along with a store of food to help it grow. | To ask questions and predict what might happen.<br><br>Explain how to plant a seed and predict what might happen to it.<br><br>Predict which seed matches with which fruit/vegetable. | To observe seeds closely using a magnifying glass<br><br>To observe familiar plants and compare and contrast their features.<br><br>Record ideas and provide explanations.<br><br>Make comparisons between a deciduous tree and an evergreen tree<br><br>Record findings in a table<br><br>Observe the growth of plants and keep a record of how they change over time. | Identify a plant and describe its features.<br><br>Group plants according to one of their features e.g. colour | Use every day or simple scientific language to ask and/or answer a question on given data. | predict<br>plant<br>tree<br>seed<br>oak<br>flower<br>root<br>leaf<br>petal<br>stem<br>weed<br>daisy<br>dandelion<br>wild<br>buttercup<br>evergreen<br>deciduous<br>seasons<br>bush<br>branch<br>vegetable<br>farm<br>tractor<br>supermarket<br>fruit<br>observe<br>adult plant<br>seedling<br>young plant<br>growth |

| Year 1 Animals Including Humans: All about animals | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | Those pupils who attended nursery were introduced to habitats as homes for animals. They were introduced to a variety of different animals, from mammals, to birds, to insects. In Reception, pupils studied insects and were introduced to the characteristics of insects. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know the five groups of animals: birds, mammals, reptiles, fish and amphibians.<br><br>To know that birds are characterised by their beaks, feathers and wings.<br><br>To know that mammals are warm-blooded vertebrates (vertebrates have backbones) with hair. They feed their young with milk and have a more well-developed brain than other types of animals.<br><br>To know that reptiles are known for their scaly skin and ability to regulate their body temperature<br><br>To know that amphibians are known for their ability to live both on land and in water, and often have slimy skin.<br><br>To know that fish are characterised by their gills, fins, and scales, and are found in a wide range of aquatic environments<br><br>To know animals that are herbivores, carnivores and omnivores.<br><br>Deeper learning:<br>To know the difference between wild and domesticated animals. | To ask and answer questions about the characteristics of animals.<br><br>To use simple scientific language to answer questions about animals.<br><br>. | To recording outcomes of sorting activity using a venn diagram.<br><br>To observe living things and describe what they see. | To sort images of animals according to the group they belong to.<br><br>To group mammals and birds based on what they have in common.<br><br>To classify animals based on their similarities and differences. | AE1.1 Explain, with help, what they think they have found out.<br><br>AE1.2 Use every day or simple scientific language to ask and/or answer a question on given data. | amphibian<br>reptile<br>bird<br>fish<br>mammal<br>hatchling<br>feather<br>backbone<br>characteristic<br>warm-blooded<br>reptile<br>scale<br>amphibian<br>gill<br>cold-blooded<br>carnivore<br>omnivore<br>predator<br>canine<br>herbivore<br>natural<br>wild<br>shelter<br>pet<br>veterinary<br>climate<br>similarities<br>differences<br>unsuitable<br>compare |

| | Links to Prior Learning | | | | | |
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| | Substantive Knowledge | Disciplinary Knowledge | | | | Vocabulary |
| | | Questioning, predicting and planning | Observing and recording evidence | Identifying and Classifying | Analysing and evaluating | |
| **Year 1**<br>**Caring for the Planet**<br>**SUSTAINABILITY** | -To know why it is important to care for our planet.<br>-To know ways we can care for our planet.<br>-To know why it is important to care for humans, plants and animals.<br>-To know that planet earth is our home and why we need to look after this.<br>-To know what things we do are helpful for planet earth.<br>-To know what things we do are harmful for planet earth. | QPP1.1 Use everyday language/begin to use simple scientific words to ask or answer a scientific question. | ORE1.1. Observe objects, materials and living things and describe what they see.<br><br>ORE1.3 Begin to record simple data. | IC1.1 Sort and group objects, materials and living things, with help, according to simple observational features. | AE1.1 Explain, with help, what they think they have found out.<br><br>AE1.2 Use every day or simple scientific language to ask and/or answer a question on given data. | Earth<br>Material<br>Recycle<br>Reuse<br>Helpful<br>Harmful<br>Plant<br>Animal<br>Sustainability |

| | Links to Prior Learning | | | | | |
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| | Substantive Knowledge | Disciplinary Knowledge | | | | Vocabulary |
| | | Questioning, predicting and planning | Observing and recording evidence | Identifying and Classifying | Analysing and evaluating | |
| **Year 1 Growing and Cooking SUSTAINABILITY** | -To know where my food comes from (growing vegetables, fruits and animals).<br>-To know what happens to seeds over time.<br>-To know what crops are and how they are turned into food.<br>-To know which parts of the planet can be used for food growth.<br>-To know the edible parts of a plant (fruits and vegetables). | QPP1.1 Use everyday language/begin to use simple scientific words to ask or answer a scientific question.<br><br>QPP1.2 Begin to say what might happen in an investigation. | ORE1.1. Observe objects, materials and living things and describe what they see.<br><br>ORE1.2 Use simple, nonstandard equipment and measurements in a practical task.<br><br>ORE1.3 Begin to record simple data. | IC1.2 Describe how to identify and group familiar objects | AE1.1 Explain, with help, what they think they have found out.<br><br>AE1.2 Use every day or simple scientific language to ask and/or answer a question on given data. | Crops<br>Fruit<br>Vegetables<br>Seed<br>Framer<br>Plant<br>Cook<br>Sustainability |

| Year 2 Plants | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Year 1, pupils learnt how to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. They also learnt how to identify and describe the basic structure of a variety of common flowering plants, including trees. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that every single seed has the beginnings of a new plant inside it, along with a store of food to help it grow.<br><br>To know that some plants develop a bulb that helps them to grow back year after year.<br><br>To know that plants need water, sunlight, nutrients and a suitable temperature to grow.<br><br>To know the stages of growth of a plant are: seed, germination, seedling, vegetative, flowering, seed production.<br><br>Deeper learning:<br>To know how some plants have adapted to the environment they live in. | Predict what plants need to grow.<br><br>Carry out a simple test to determine what plants need to grow. | To observe seeds and bulbs and describe the differences and similarities between them.<br><br>To use microscopes to closely observe seeds and bulbs.<br><br>To observe the growth of a plant and record observations overtime. | To group plants according to their habitats. | To analyse the outcomes of investigation and explain what happens if leaves do not get sunlight.<br><br>To analyse results to explain what plants need to grow. | compare<br>bulb<br>seed<br>growth<br>plant<br>investigate<br>experiment<br>method<br>predict<br>control<br>carbon dioxide<br>photosynthesis<br>glucose<br>oxygen<br>energy<br>pollination<br>germination<br>life cycle<br>reproduction<br>seedling<br>crop<br>thrive<br>healthy<br>insulate<br>manure<br>forest<br>desert<br>survive<br>adapt<br>condition |

| | Links to Prior Learning | | | | | |
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| | | | | | | |
| | Substantive Knowledge | Disciplinary Knowledge | | | | Vocabulary |
| | | Questioning, predicting and planning | Observing and recording evidence | Identifying and Classifying | Analysing and evaluating | |
| **Year 2 Animals: needs for survival** | -To know that animals have different ways of keeping warm (i.e. reptiles need direct heat to survive).<br>-To know that animals need some or all of air, water, food and shelter to survive.<br>-To know that animals are carnivores, herbivores or omnivores.<br>-To know that fish can breathe under water using gills.<br>-To know that amphibians can live on land and in water. | QPP 2.1 Suggest ideas, ask simple questions and know that they can be answered / investigated in different ways including simple secondary sources, such as books and video clips. | ORE2.2 Use simple equipment, such as hand lenses or egg timers to take measurements, make observations and carry out simple tests. | 1C2.1 Decide, with help, how to group materials, living things and objects, noticing changes over time and beginning to see patterns.<br><br>IC2.2 Identify and classify groups of biological/ chemical/physical materials independently | AE2.1 Use simple scientific language to explain what they have found out. | Mammals<br>Birds<br>Fish<br>Amphibians<br>Reptiles<br>Humans<br>Survival |

| | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Year 1, pupils learnt how to distinguish between an object and the material from which it is made. They also learnt how to identify and name a variety of everyday materials. Pupils described the simple physical properties of a variety of everyday materials and they learnt how to compare and group together a variety of everyday materials on the basis of their simple physical properties. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| **Year 2 Everyday materials** | To know that a material is what something is made of.<br><br>To know that materials can be changed by squashing, bending, twisting and stretching.<br><br>To know that some materials are stronger than others.<br><br>To know that some materials are suitable / unsuitable for particular purposes.<br><br>To know that some materials can be melted to change their shape.<br><br>Deeper learning:<br>To know real-life examples of when bending, twisting, stretching or squashing objects has been useful. | Use everyday language/begin to use simple scientific words to ask or answer a scientific question about materials.<br><br>Perform simple tests on a range of different materials and their uses to check their suitability for bridge construction.<br><br>Plan and carry out a simple test to explore the stretchiness of materials.<br><br>Predict what will happen to materials when twisted, bent, stretched or squashed.<br><br>Follow simple instructions to test how waterproof materials are. | Observe what happens to materials when they are tested and record evidence in a chart.<br><br>Measure how much water is in a beaker.<br><br>Record results in a bar graph. | 1C2.1 Decide, with help, how to group materials, living things and objects, noticing changes over time and beginning to see patterns. | Analyse outcomes of simple test to evaluate which materials are the most successful to use as a bridge.<br><br>Analyse outcomes of simple test to evaluate which materials are the most stretchable.<br><br>Analyse outcomes of simple test to explain what happens when materials are changed. | brick<br>material<br>suitable<br>property<br>object<br>bridge<br>structure<br>obstacle<br>triangle<br>construction<br>elastic<br>hinder<br>floppy<br>stretchy<br>limit<br>bend<br>twist<br>stretch<br>force<br>squash<br>waterproof<br>protective<br>fluorescent<br>safety<br>mackintosh |

| Year 2 Living things in their habitats | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Year 1, pupils learnt how to identify and name a variety of common animals that are carnivores, herbivores and omnivores. In the earlier year 2 unit on animals including humans, pupils found out about and described the basic needs of animals, including humans, for survival (water, food and air). | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that there are things that are living, dead or have never been alive.<br><br>To know there are seven characteristics of living things: movement, respiration, growth, excretion, nutrition, reproduction, senses.<br><br>To know that a microhabitat is a smaller area that can be found within a habitat.<br><br>To know that producers make their own food, which creates energy for them to grow, reproduce and survive.<br><br>To know that consumers have to eat to get energy.<br><br>To know that a food chain describes who eats who.<br><br>Deeper learning:<br>To know what would happen if one element of the food chain was in short supply. | To suggest ideas about what would make a suitable microhabitat.<br><br>To raise questions about what animals eat and where they find their food and research the answers. | To observe a microhabitat using a magnifying glass.<br><br>To record observations in writing. | Sort things into those that are living, dead and have never been alive.<br><br>Create food chains to show who eats who within a habitat. | AE2.1 Use simple scientific language to explain what they have found out.<br><br>AE2.2 Identify simple patterns and/or relationships using simple comparative language. | excrete<br>nutrition<br>reproduce<br>respire<br>senses<br>fungi<br>microhabitat<br>habitat<br>survive<br>shelter<br>colony<br>condition<br>insect<br>antennae<br>suitable<br>omnivore<br>herbivore<br>producer<br>consumer<br>carnivore<br>nutrient<br>caterpillar<br>life cycle<br>food chain<br>rot |

| | Links to Prior Learning | | | | | |
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| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| **Year 2 Growing up** | -To know that Most mammals give birth to their young.<br>-To know that reptiles amphibians birds and most insects lay eggs and these are their offspring.<br>-To know that humans give birth to their young.<br>-To know that animals follow different stages of the life cycle.<br>-To know that the body changes and grows throughout the life cycle. | QPP 2.1 Suggest ideas, ask simple questions and know that they can be answered / investigated in different ways including simple secondary sources, such as books and video clips.<br><br>QPP2.2 Begin to make predictions. | ORE2.1 Observe something closely and describe changes over time.<br><br>ORE2.2 Use simple equipment, such as hand lenses or egg timers to take measurements, make observations and carry out simple tests. | 1C2.1 Decide, with help, how to group materials, living things and objects, noticing changes over time and beginning to see patterns.<br><br>IC2.2 Identify and classify groups of biological/ chemical/physical materials independently | AE2.1 Use simple scientific language to explain what they have found out.<br><br>AE2.2 Identify simple patterns and/or relationships using simple comparative language. | Offspring<br>Growth<br>Egg<br>Adult<br>Parent<br>Baby<br>Child<br>Teenager<br>Life Cycle |

| | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This is the first time pupils have been introduced to forces and magnets. | | | | | |
| | Substantive Knowledge | Disciplinary Knowledge | | | | Vocabulary |
| | | Questioning, predicting and planning | Observing and recording evidence | Identifying and Classifying | Analysing and evaluating | |
| **Year 3 Forces and magnets** | To know that forces are the things that allow the movement of all objects around us.<br><br>To know that friction is a force between two surfaces that are sliding, or trying to slide, across each other.<br><br>To know that magnets have two poles: north and south.<br><br>To know that 2 magnets will attract or repel each other; opposite poles attract and similar poles repel.<br><br>To know that magnetic materials are always made of metal.<br><br>To know that magnetism is a force that can act at a distance.<br><br>Deeper learning:<br>To know some everyday uses of magnets | Predict how different surfaces will affect the movement of objects.<br><br>To predict if magnets will attract or repel one another.<br><br>To predict which materials will be magnetic.<br><br>To carry out a test to determine which materials are magnetic.<br><br>To predict which magnets will be the strongest and weakest.<br><br>To carry out a fair test to determine the strength of different magnets. | Record measurements and observations in a table.<br><br>Transfer measurements to a bar graph.<br><br>Record results in a Carroll diagram.<br><br>Decide what to observe and measure during investigation.<br><br>Take accurate measurements. | 1C2.1 Decide, with help, how to group materials, living things and objects, noticing changes over time and beginning to see patterns. | Use findings to explain which forces were involved.<br><br>Analyse data to draw conclusions about the impact of friction on the movement of objects.<br><br>To analyse outcomes to conclude which materials are magnetic.<br><br>Gather data to answer which magnets are the strongest / weakest. | friction<br>air resistance<br>non-contact forces<br>force<br>contact force<br>motion<br>texture<br>resistance<br>tilt<br>surface<br>repel<br>magnet<br>horseshoe magnet<br>attract<br>bar magnet<br>iron<br>magnetic field<br>steel<br>magnetism<br>magnetic<br>non-magnetic<br>materials<br>attract<br>recycle<br>non-contact forces<br>magnetic north<br>magnetic needle<br>compass<br>direction<br>orienteering |

| Year 3 Rocks and Soils | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | Although the topic of rocks has been raised when exploring materials during years 1 and 2, this is the first time children explore the properties of rocks and how they have been formed and how they can be used. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that intrusive igneous rocks form beneath the earth's surface and extrusive igneous rocks are formed when hot molten rock solidifies on the earth's surface.<br><br>To know there are three types of rock: igneous, sedimentary and metamorphic rocks<br><br>To know that water causes rocks to erode<br><br>To know that fossils are formed when things that have lived are trapped between rocks.<br><br>To know that soil is made from rock and matter that has come from a recently living organism.<br><br>Deeper learning:<br>To know what causes hemical weathering, physical weathering and biological weathering. | To carry out a fair test to investigate the durability, permeability and density of a range of rocks.<br><br>To use ideas about the properties of rocks to consider their uses in everyday life.<br><br>To predict which rocks will be permeable.<br><br>To plan and carry out a fair test to determine the permeability of rocks.<br><br>To carry out a test to determine the properties of soils | Use a microscope to see if rocks contain crystals.<br><br>Use weighing scales to measure the weight of rocks.<br><br>Observe rocks to note permeability. | To compare and group together different types of rock | To analyse results to sort rocks into groups based on their properties.<br><br>To analyse observations and measurements to determine which rocks are the most permeable.<br><br>To analyse observations to explain differences between soil samples. | extrusive igneous rock<br>igneous rocks<br>intrusive igneous rock<br>magma<br>crystals<br>sandstone<br>marble<br>metamorphic rock<br>limestone<br>sedimentary rock<br>texture<br>erosion<br>receding<br>appearance<br>submerged<br>sediment<br>amber<br>embedded<br>fossil<br>extinct<br>fragments<br>decompose<br>clay soil<br>sandy soil<br>chalky soil |

| Year 3 Light | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This is the first time pupils have covered the topic of light. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that we need light in order to see things and that dark is the absence of light<br><br>To know that exposure to the sun can be dangerous to humans<br><br>To know that objects are reflective and some objects reflect light better than others.<br><br>To know that a shadow is formed when an opaque object blocks the light<br><br>To know that shadows change throughout the day due to the changing position of the sun. Shadows are longer in the early morning and late evening and are shortest in the middle of the day (noon).<br><br>To know that shadows change when an object is moved closer or further away from the light source.<br><br>Deeper learning:<br>To know how shadows would differ in each season. | To answer questions about light using scientific vocabulary.<br><br>To predict what will happen if an item is left in the sun without protection.<br><br>To carry out a test to investigate the impact of sunscreen<br><br>To plan a test to explore the reflectiveness of different materials.<br><br>To predict what will happen to the size of a shadow throughout the day.<br><br>To carry out a fair test to investigate what happens to a shadow when the light source is moved closer / further away. | To choose a way to record and present findings and conclusions of their investigation.<br><br>Make systematic and careful observations.<br><br>To observe how shadows change the further away from the light source they are and write an explanation of what they noticed.<br><br>To record results in a table and then present in a graph. | To sort images into those that are light sources and non-light sources. | To analyse results to draw a conclusion about what is important about sunscreen<br><br>To analyse results to draw a conclusion as to which materials are better at reflecting light.<br><br>To analyse results to draw a conclusion that explains what happens to your shadow throughout the day and explain why. | natural<br>artificial<br>source<br>light<br>reflect<br>ultraviolet rays<br>sunburn<br>vitamin D<br>protection<br>exposure<br>high visibility<br>reflective<br>surface<br>materials<br>fluorescent<br>sundial<br>ray<br>block<br>shadow<br>opaque<br>opposite<br>position<br>direction<br>cast<br>size<br>puppet<br>shape<br>closer<br>further |

| Year 3 Animals including humans | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Year 1, pupils have learnt how to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. They learnt how to identify and name a variety of common animals that are carnivores, herbivores and omnivores. And they learnt how to describe and compare the structure of a variety of common animals.<br>In Year 2 unit, pupils noticed that animals, including humans, have offspring which grow into adults. They found out about and described the basic needs of animals, including humans, for survival (water, food and air) and learnt how to describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. They also learnt the stages in the life cycles of a number of different animals and matched offspring to their parents. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know how food from each food group is essential for human growth and health.<br><br>To know that food labels show the nutrients in food.<br><br>To know that animals have different types of skeleton: exoskeleton, endoskeleton and hydrostatic skeleton.<br><br>To know the three main functions of the human endoskeleton are to protect, support and allow movement.<br><br>To know that muscles allow animals to move.<br><br>Deeper knowledge:<br>To know what key bones in the human skeleton protect. | QPP 3.1 Use ideas to pose questions, independently, about the world around them. | To record findings using scientific language and present in note form and diagrams. | To group foods according to the food group they belong to.<br><br>To match animals to their endoskeleton.<br><br>To identify the different bones in the human body and explain function. | To analyse food labels and use the data to explain whether the food is a healthy choice or an occasional treat.<br><br>To use research to conclude which types of skeletons some animals have. | carbohydrate<br>vitamin<br>mineral<br>nutrition<br>protein<br>energy<br>nutrition label<br>portion<br>diet<br>balanced<br>vertebrate<br>hydrostatic skeleton<br>exoskeleton<br>endoskeleton<br>invertebrate<br>ulna<br>tibia<br>fibular<br>radius<br>humerus<br>spine<br>rib cage<br>vertebrate<br>skull<br>muscle<br>diaphragm<br>biceps<br>contract<br>hamstrings |

| Year 3 Plants | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This unit builds on learning in Year 1, when pupils learnt to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. They also learnt how to identify and describe the basic structure of a variety of common flowering plants, including trees. In Year 2, pupils learnt the stages of growth of a plant: seed, germination, seedling, vegetative, flowering, seed production. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know the parts of a flowering plant and their functions.<br><br>To know that water is transported through plants by transpiration.<br><br>To know the reproductive parts of a flower: anther, stigma, filament and style.<br><br>To know that pollination is the transfer of pollen from a male part of a plant to a female part of a plant to produce seeds<br><br>To know that seeds can be dispersed by wind, water, animals and gravity.<br><br>Deeper learning:<br>To know what photosynthesis is. | To use knowledge about plants to pose questions about plant growth.<br><br>To plan an investigation to answer a question about plant growth.<br><br>To predict what the outcome of plant investigation will be.<br><br>To carry out test to investigate how water is transported through a plant. | To carefully observe flowering plants to identify their parts.<br><br>To record results in diagrammatic form and in writing. | IC3,1 Talk about criteria for grouping, sorting and categorising, beginning to see patterns and relationships. | To analyse results to conclude what happens if one element required in plant growth is changed. | photosynthesis<br>nutrients<br>absorb<br>transpiration<br>anther<br>stigma<br>filament<br>reproduction<br>style<br>pollen<br>nectar<br>pollination<br>pollinator<br>seed dispersal |

| | Links to Prior Learning | | | | | |
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| | | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| **Year 3 Nutrition Diet (Food Waste)** | -To know that humans need the correct types and amount of food to for a balanced diet.<br>-To know that humans get their nutrition from what they eat.<br>-To know that food can be sorted into five food groups (fruit and vegetables, carbohydrates, protein, dairy and fats/ sugars).<br>-To know that the different food groups have different function in the body.<br>-To know that food waste is food that is safe to eat but is thrown away instead. Food waste has a negative impact on the planet. | What makes up a balanced diet?<br><br>What is food waste and how can it be reduced? | ORE3.1 Make decisions about what to observe during an investigation.<br><br>ORE3.2 Take accurate measurements using standard units.<br><br>ORE3.3 Record their findings using scientific language and present in note form, writing frames, diagrams, tables and charts. | Talk about criteria for grouping, sorting and categorising, beginning to see patterns and relationships. What are the needs of each animal and why are they so important? Identify which food can be classified in each group? | Gather information on how food wasted can be reduced both in and out of school. | Balanced Diet<br>Nutrition<br>Herbivore<br>Carnivore<br>Omnivore<br>Carbohydrates<br>Protein<br>Dairy<br>Fats<br>Sugars<br>Food waste<br>Landfill<br>Recycling<br>Edible<br>Inedible |

| Year 4 Sound | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | Although during year 1 children have covered the topic of senses which includes hearing, this is the first time children have explored the topic of sound. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that sound is created by vibrations.<br><br>To know that sound travels from an object, through a medium, to the ear<br><br>To know that some materials absorb sound and some materials reflect sound. Materials that absorb sound are called insulators.<br><br>To know that the loudness of a sound is volume. The stronger the vibration, the louder the sound.<br><br>To know that pitch is how high or low a sound it. Pitch is caused by the speed of a sound's vibrations.<br><br>To know that sounds get fainter as the distance from the sound source increases.<br>Deeper learning:<br>To know that loud sounds can be dangerous and how we can protect ourselves from them | To answer questions about sound using scientific language.<br><br>To plan a fair test to test which material makes the best ear defenders.<br><br>To predict which material will be the best sound insulator.<br><br>To plan a test to investigate the volume of sounds.<br><br>To plan and make an instrument that creates sounds with different pitches. | To make careful and systematic observations and record results on a table.<br><br>To take measurements using a decibel meter. | QPP 4.1 Suggest relevant questions and know that they could be answered in a variety of ways, including using secondary sources such as ICT.<br><br>QPP 4.2 Answer questions using straight forward scientific evidence.<br><br>QPP 4.3 Make predictions and give a reason using simple scientific vocabulary.<br><br>QPP 4.4 Make decisions about different enquiries, including recognising when a fair test is necessary and begin to identify variables. | Identify, with help, similarities and differences in data to help form conclusions about how sound travels in solids, liquids and gases.<br><br>To analyse data to conclude which material is the best sound insulator.<br><br>To identify patterns in data to draw conclusions about the volume of sounds.<br><br>To use scientific evidence to support findings. | eardrum<br>signals<br>vibration<br>medium<br>waves<br>source<br>vacuum<br>particles<br>echo<br>energy<br>reflect<br>materials<br>absorb<br>defenders<br>insulate<br>volume<br>power<br>decibel meter<br>decibels<br>amplitude<br>low pitch<br>pitch<br>orchestra<br>instruments<br>high pitch<br>fade<br>travel<br>sound source<br>particles<br>energy |

| Year 4 Living things and their habitats: classification | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Key Stage One, pupils learnt how to identify and name a variety of common animals that are carnivores, herbivores and omnivores. They found out about and described the basic needs of animals, including humans, for survival (water, food and air). Pupils explored and compared the differences between things that are living, dead, and things that have never been alive. They learnt how to identify and name a variety of plants and animals in their habitats, including microhabitats; and described how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identified and named different sources of food. Pupils also learnt that that different animals are suited to different habitats and that these habitats provide animals with what they need to survive. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that living things can be grouped in a variety of ways.<br><br>To know that classification keys help group, identify and name a variety of living things in their local environment.<br><br>To know that animals adapt to suit their environment. | QPP 4.1 Suggest relevant questions and know that they could be answered in a variety of ways, including using secondary sources such as ICT.<br><br>QPP 4.2 Answer questions using straight forward scientific evidence.<br><br>QPP 4.3 Make predictions and give a reason using simple scientific vocabulary. | To record data using a classification key.<br><br>Record findings about habitats using scientific language, notes, labelled diagrams and keys. | Identify and classify animals based on their habitats.<br><br>To identify similarities between animals that live in the same habitat.<br><br>To group animals according to a classification of their choice.<br><br>To identify how animals have been sorted and grouped. | AE4.2 Identify, with help, changes, patterns, similarities and differences in data to help form conclusions.<br><br>AE4.3 Use scientific evidence to support their findings. | habitat<br>adapted<br>conditions<br>camouflage<br>microhabitat<br>species<br>invertebrate<br>classify<br>vertebrate<br>characteristics<br>classification key<br>organism<br>identify<br>criteria<br>sub-group<br>region<br>blubber<br>adapted<br>colouring<br>features<br>non-flowering plant<br>flowering plant<br>pond dipping<br>oxygenised<br>ecosystem |

| Year 4 Electricity | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This is the first time pupils have covered the topic electricity. | | | | | |
| | Substantive Knowledge | Disciplinary Knowledge | | | | Vocabulary |
| | | Questioning, predicting and planning | Observing and recording evidence | Identifying and Classifying | Analysing and evaluating | |
| | To know the components of a simple circuit: bulb, switch, battery, switch, buzzer and bell.<br><br>To know what an electrical appliance is and why they can be dangerous.<br><br>To know that a component in a circuit will only work if it is part of a complete loop with a battery.<br><br>To know that conductors are materials that allow electricity to flow through them and that insulators do not.<br><br>To know that a switch opens and closes a circuit and that components in the circuit will only work when the switch is closed.<br><br>Deeper learning:<br>To know some examples of when switches are used in everyday life. | Predict whether a circuit will operate a component or not explaining reasoning.<br><br>Predict which materials will be insulators and conductors.<br><br>Plan and carry out a fair test to determine which materials are conductors and insulators.<br><br>Predict whether a switch will enable a bulb to light when placed in different positions in a circuit.<br><br>Predict what will happen when additional components are added to a circuit.<br><br>Plan and carry out a fair test to answer questions about the addition of components to a circuit. | Record and present information, findings and conclusions in writing and drawings.<br><br>Record results of investigation in a table and transfer to a venn diagram.<br><br>Make observations of circuits containing switches and record the outcome. | To classify appliances based on whether they are electrical or non-electrical. | Use scientific evidence to answer questions about electrical circuits.<br><br>Use scientific evidence to answer questions materials that conduct or insulate electricity.<br><br>Use recorded data to make predictions, pose new questions and suggest improvements for further enquiries. | electricity<br>mains electricity<br>appliance<br>socket<br>batteries<br>series circuit<br>voltage<br>cell<br>circuit<br>component<br>power<br>current<br>bulb<br>wire<br>battery<br>conductor<br>insulator<br>metal<br>copper<br>rubber<br>control<br>current<br>complete circuit<br>incomplete circuit<br>switch<br>non-renewable energy<br>wind turbines<br>solar panels<br>hydropower<br>renewable energy |

| Year 4 Animals including humans: digestive system | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Key Stage One, pupils have learnt how to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. They learnt how to identify and name a variety of common animals that are carnivores, herbivores and omnivores. And they learnt how to describe and compare the structure of a variety of common animals. Pupils noticed that animals, including humans, have offspring which grow into adults. They found out about and described the basic needs of animals, including humans, for survival (water, food and air) and learnt how to describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. They also learnt the stages in the life cycles of a number of different animals and matched offspring to their parents. In Year Three, pupils identified that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. They also learn how to identify that humans and some other animals have skeletons and muscles for support, protection and movement. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know the simple functions of the basic parts of the digestive system in humans.<br><br>To know that teeth are classified into three groups: incisors, canines and molars.<br><br>To know that incisors bite and cut food, canines tear food and molars grind and crush food.<br><br>To know that predators are animals that hunt, kill and eat other animals for food.<br><br>To know that prey is an animal hunted by another for food.<br><br>Deeper learning:<br>To know how to look after your teeth. | Predict the effect of different liquids on the enamel of teeth.<br><br>Make decisions about an enquiry into the effect of different liquids on teeth, recognising when a fair test is necessary and beginning to identify variables. | Record findings about parts of the digestive system, using simple scientific language, written notes and labelled diagrams.<br><br>Record findings about human teeth using simple scientific language, written notes and labelled diagrams.<br><br>Make systematic and careful observations to explain the functions of organs within the digestive system.<br><br>Make systematic and careful observations of the impact of liquids on teeth and record findings in a table. | | Identify, with help, changes to the surfaces of teeth to help form conclusions about the impact of different liquids on the enamel. | small intestine<br>digestive system<br>stomach<br>large intestine<br>oesophagus<br>liver<br>peristalsis<br>gall bladder<br>absorb<br>saliva<br>jaw<br>gum<br>molars<br>canines<br>incisors<br>plaque<br>enamel<br>tooth decay<br>cavity<br>fluoride<br>producer<br>consumer<br>predator<br>ecosystem<br>prey<br>tundra<br>threatened<br>interdependence<br>hide<br>food web |

| Year 4 States of matter | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This is the first time pupils have studied states of matter. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that there are three states of matter: solid, liquid and gas.<br><br>To know that some materials change state when they are heated or cooled.<br><br>To know that a solid changes to a liquid when it is heated and this is known as melting.<br><br>To know that a liquid changes to a solid when it is cooled and this is known as freezing.<br><br>To know that heating a liquid will change its state to a gas and this is known as evaporation.<br><br>To know that a gas changes to a liquid when cooled and this is known as condensation.<br><br>To know that the water cycle is a natural process that involves evaporation and condensation.<br><br>Deeper learning:<br>To know what transpiration, groundwater and run-off are in relation to the water cycle. | Predict which foods will have the highest melting point and explain reasoning using scientific vocabulary.<br><br>Answer questions about changes of state using straight forward scientific evidence.<br><br>Predict which container of liquid will evaporate more quickly and explain why.<br><br>Conduct a fair test to investigate which liquid will evaporate more quickly. | Record and present information, findings and conclusions in writing and drawings.<br><br>Take measurements of temperature using a thermometer.<br><br>To present data in a bar graph.<br><br>Record findings about the water cycle using simple scientific language, drawings and diagrams. | Classify substances based on their state of matter.<br><br>Identify similarities and differences between properties of each state of matter. | Use scientific evidence to conclude which foods have higher melting points.<br><br>Use scientific data to answer questions about the different boiling points of various substances.<br><br>Use recorded data about the evaporation of liquid to make predictions, pose new questions and suggest improvements for further enquiries. | gas<br>matter<br>liquid<br>volume<br>solid<br>particle<br>arranged<br>bond<br>heated<br>cooled<br>reverse<br>sublimation<br>deposition<br>freezing<br>boiling<br>condensation<br>water vapour<br>process<br>absorb<br>evaporation<br>water cycle<br>precipitation<br>transpiration<br>surface run off<br>groundwater |

| | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This is the first time pupils have studied states of matter. | | | | | |
| | Substantive Knowledge | Disciplinary Knowledge | | | | Vocabulary |
| | | Questioning, predicting and planning | Observing and recording evidence | Identifying and Classifying | Analysing and evaluating | |
| **Year 4 Habitats and Deforestation** | -To know that a habitat provide everything that a plant or animal needs.<br>-To know that there are different habitats: urban, field, woodland and aquatic.<br>-To know that humans can have a positive and negative effect on the natural environment.<br>-To know that deforestation impacts animals and plants by destroying their habitats.<br>-To know that when habitats are destroyed plants and animals can become extinct. | QPP 4.1 Suggest relevant questions and know that they could be answered in a variety of ways, including using secondary sources such as ICT.<br><br>QPP 4.2 Answer questions using straight forward scientific evidence.<br>ORE4.1 Make systematic and careful observations. | ORE4.1 Make systematic and careful observations.<br><br>ORE4.3 Choose appropriate ways to record and present information, findings and conclusions for different audiences (e.g. displays, oral or written explanations). | IC4 Identify similarities/differences/changes when talking about scientific processes. | AE4.2 Identify, with help, changes, patterns, similarities and differences in data to help form conclusions.<br><br>AE4.3 Use scientific evidence to support their findings. | Deforestation<br>Rainforest<br>Natural resource<br>Habitat destruction<br>Biodiversity<br>Palm oil<br>Extinct<br>Endangered<br>sustainable |

| Year 5 Animals including humans (Life Cycles) | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Year Three, pupils identified that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. They also learnt how to identify that humans and some other animals have skeletons and muscles for support, protection and movement. In Year 4, pupils described the simple functions of the basic parts of the digestive system in humans; identified the different types of teeth in humans and their simple functions; and constructed and interpreted a variety of food chains, identifying producers, predators and prey. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know the key stages of the human life cycle.<br><br>To know that the gestation period is when the foetus develops inside the female. It is different in all mammals.<br><br>To know the changes from being a baby to a toddler.<br><br>To know that during puberty, hormones cause physical, mental and emotional changes.<br><br>To know the changes from adulthood to old age.<br><br>Deeper learning:<br>To know some of the common ailments elderly people may experience and how they can be prevented. | Raise different types of scientific questions, and hypotheses. | Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs and bar and line graphs<br><br>Take measurements using a range of scientific equipment with increasing accuracy and precision. | To make comparisons between human life cycles and those of other animals. | Report and present findings from enquiries - including conclusions, causal relationships and explanations of and a degree of trust in results - in oral and written forms. | adolescent<br>reproduce<br>dependent<br>puberty<br>foetus<br>embryo<br>trimester<br>midwife<br>umbilical cord<br>womb<br>gestation<br>pregnant<br>breeding<br>extreme<br>duration<br>growth spurt<br>childhood<br>motor skills<br>milk teeth<br>constant<br>cataract<br>memory<br>neurodegenerative<br>lifestyle<br>keratin<br>adolescence<br>bloodstream<br>hormone<br>growth<br>appetite |

| Year 5 Living things and their habitats (Reproduction) | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Key Stage One, pupils learnt how to identify and name a variety of common animals that are carnivores, herbivores and omnivores. They found out about and described the basic needs of animals, including humans, for survival (water, food and air). Pupils explored and compared the differences between things that are living, dead, and things that have never been alive. They learnt how to identify and name a variety of plants and animals in their habitats, including microhabitats; and described how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identified and named different sources of food. Pupils also learnt that that different animals are suited to different habitats and that these habitats provide animals with what they need to survive. In Year 4, pupils recognised that living things can be grouped in a variety of ways; and explored and used classification keys to help group, identify and name a variety of living things in their local and wider environment. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that mammals reproduce and give birth to live young.<br><br>To know the different areas of a flowering plant and how this enables reproduction.<br><br>To know that plant reproduce through pollination.<br><br>To know that fertilisation occurs when male pollen joins with the female ovule. | Predict what a new cutting of a plant could turn into by drawing a diagram and recording predictions. | Describe the key features of life cycles and draw accompanying diagrams. | To identify the similarities and differences between different mammals. | Use relevant scientific language and illustrations to discuss, communicate and justify their scientific Ideas about life cycles. | reproduction<br>asexual reproduction<br>genes<br>tuber<br>fertilisation<br>amphibian<br>metamorphosis<br>larva<br>caterpillar<br>pupa<br>egg<br>fledgling<br>egg tooth<br>embryo<br>hatch<br>life cycle<br>vertebrate<br>reproduction<br>warm-blooded<br>living organism |

| Year 5 Earth and Space | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This is the first time pupils have studied earth and space. | | | | | |
| | **Substantive Knowledge** | | **Disciplinary Knowledge** | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that the sun, moon and earth are spherical.<br><br>To know that the Earth rotates in front of the Sun on an imaginary line called its axis . It takes 24 hours or one day to make a rotation.<br><br>To know that when the Earth is facing the sun we get day and when it is not facing the sun we get night.<br><br>To know that the moon orbits the Earth once every 27.3 days<br><br>Deeper learning:<br>To know the order of the planets from the sun. | To use a model to answer questions about how we get day and night and the seasons.<br><br>Use test results to make predictions to set up further comparative and fair tests about the apparent movement of the sun across the sky. | Take measurements to record the length of shadows at different times of the day. | IC5 Use and develop keys to identify, classify and describe living things and materials. | Use relevant scientific language and illustrations to discuss, communicate and justify their scientific Ideas about the solar system.<br><br>Justify scientific ideas about the apparent movement of the sun across the sky using relevant scientific language and diagrams.<br><br>Identify scientific evidence that has been used to support or refute ideas or arguments about the movement of the moon relative to the Earth | orbit<br>terrestrial planet<br>Solar System<br>spherical<br>gas giant planets<br>orbit<br>season<br>poles<br>hemisphere<br>axis<br>shadow<br>time zone<br>sundial<br>dial<br>phase<br>waxing<br>waning<br>eclipse<br>moon |

| Year 5 Forces | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Year Three, pupils were introduced to forces and magnets. Pupils compared how things move on different surfaces; noticed that some forces need contact between 2 objects, but magnetic forces can act at a distance; and observed how magnets attract or repel each other and attract some materials and not others. Children learnt how to compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identified some magnetic materials; described magnets as having 2 poles and they learnt how to predict whether 2 magnets will attract or repel each other, depending on which poles are facing. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that levers and pulleys are two types of simple machines that are used to make work easier by reducing the amount of force required to move an object.<br><br>To know that gears do three things: change the direction of motion, change the speed of motion and change the amount of force.<br><br>To know that gravity the name for a force that pulls everything down toward the centre of the Earth.<br><br>To know that air resistance is a force which acts as friction between the object and air and is the opposing force to gravity.<br><br>To know that water resistance is a force which prevents an object from moving easily through the water.<br><br>Deeper learning:<br>To know the similarities and differences between air and water resistance. | To plan a comparative enquiry to compare the effectiveness of pulleys.<br><br>To predict which objects will fall to the Earth quicker.<br><br>To plan a fair test to determine which objects fall to the Earth quicker.<br><br>Make predictions and give a reason using scientific vocabulary.<br><br>Design a test to create the best parachute deciding which variable to test and which to control.<br><br>Design a fair test to determine which boat move through water quicker.<br><br>Design a fair test to determine which floor covering prevents people from slipping | Measure force using a forcemeter.<br><br>Take measurements using a range of scientific equipment with increasing accuracy and precision.<br><br>Take repeated readings and record data and results using charts and graphs. | IC5 Use and develop keys to identify, classify and describe living things and materials. | Use scientific evidence to support findings.<br><br>Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas. | load<br>pulley<br>lever<br>pivot<br>fulcrum<br>weight<br>mass<br>astronomy<br>Sir Isaac Newton<br>gravity<br>gear<br>mesh<br>mechanism<br>rack and pinion<br>bevel gear<br>Galileo Galilei<br>opposing<br>air resistance<br>parachute<br>streamlined<br>upthrust<br>buoyant<br>water resistance<br>sink<br>Newton meter<br>resistance<br>lubricant<br>Newton<br>friction |

| Year 5 Properties of Materials | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This unit builds on the work undertaken in the Year 4 States of Matter unit. In Year 4, pupils learnt to compare and group materials together, according to whether they are solids, liquids or gases; observed that some materials change state when they are heated or cooled, and measured or researched the temperature at which this happens in degrees Celsius (°C); and finally, identified the part played by evaporation and condensation in the water cycle and associated the rate of evaporation with temperature. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that a thermal conductors allow heat to pass through them easily.<br><br>To know that thermal insulators prevent heat from passing through them easily.<br><br>To know that hardness is the ability of a material to resist being dented.<br><br>To know that some materials will dissolve in liquid to form a solution.<br><br>To know that mixtures might be separated by sieving, filtering and evaporating.<br><br>Deeper learning:<br>To know that some changes are irreversible. | Make predictions and give a reason using scientific vocabulary<br><br>Plan an investigation that tests whether materials are electrical conductors, transparent, strong thermal conductors or magnetic.<br><br>Plan a fair test to determine which material is the best to insulate a cup.<br><br>Plan a fair test to determine which materials are the hardest.<br><br>Plan a fair test to determine which substances are soluble.<br><br>Use test results to make predictions to set up further comparative and fair tests | Record data and results in a table.<br><br>Take measurements, with a thermometer, with increasing accuracy and precision.<br><br>Report and present findings from enquiries - including conclusions, causal relationships and explanations of and a degree of trust in results - in oral and written forms. | IC5 Use and develop keys to identify, classify and describe living things and materials. | Report and present findings from enquiries - including conclusions, causal relationships and explanations of and a degree of trust in results - in oral and written forms. | versatile<br>transparent<br>durable<br>magnetic<br>conductive<br>thermal<br>insulator<br>degrees Celsius (°C)<br>molecules<br>conduction<br>steel<br>stone<br>force<br>hardness<br>iron<br>solute<br>insoluble<br>solvent<br>dissolve<br>soluble<br>solution<br>substance<br>saturation<br>solute<br>evaporation<br>filtering<br>sieving<br>mixture<br>pure substance |

| Year 5 Changes of Materials | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This unit builds on the work undertaken in the Year 4 States of Matter unit. In Year 4, pupils learnt to compare and group materials together, according to whether they are solids, liquids or gases; observed that some materials change state when they are heated or cooled, and measured or researched the temperature at which this happens in degrees Celsius (°C); and finally, identified the part played by evaporation and condensation in the water cycle and associated the rate of evaporation with temperature. This unit also compliments the work undertaken in the previous Year 5 unit on properties of materials. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that a reversible change is one that can be undone.<br><br>To know that an irreversible cannot be undone e,g. burning and rusting.<br><br>To know that some changes result in the formation of new materials.<br><br>To know that when an acid reacts with bicarbonate of soda, it produces carbon dioxide gas, water, and a salt.<br><br>Deeper learning:<br>To know that a new product can be formed when a reaction takes place. | Use scientific ideas to explain what they expect to observe using scientific language.<br><br>Make predictions and give a reason using scientific vocabulary.<br><br>Plan a fair test to investigate rusting.<br><br>Predict the best substances used to make a fizzy rocket | Observer irreversible changes and summarise the changes observed.<br><br>Use measuring equipment to suggest ways to improve the accuracy of observations made in an experiment | IC5 Use and develop keys to identify, classify and describe living things and materials. | Report and present findings from enquiries, including conclusions, in oral and written form<br><br>Use experiment results to test a prediction and write a conclusion to show the best substances to make a fizzy rocket | pure substance<br>solute<br>solvent<br>evaporate<br>solution<br>melting<br>reversible<br>mixture<br>physical change<br>evaporate<br>irreversible<br>effervescence<br>compare<br>chemical change<br>product<br>fair test<br>control variable<br>corrosion<br>rusting<br>variable<br>combustion<br>oxygen<br>fuel<br>extinguish<br>smother<br>carbon dioxide<br>acid<br>reaction<br>predict<br>bicarbonate of soda |

| Year 6 Evolution, Inheritance and adaptation | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | This unit introduces the children to the key concepts of evolution and inheritance by building upon previous topics, including animal characteristics and fossils. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that plants and animals have numerous adaptations which help them to survive in their habitats.<br><br>To know that a characteristic describes how something looks or how it behaves. Characteristics can be passed on from parents to their offspring, meaning that they can be inherited.<br><br>To know that animals adapt to suit their environment in different ways.<br><br>Too know that adaptation may lead to evolution.<br><br>To know that fossils provide information about living things that inhabited the Earth millions of years ago.<br><br>Deeper learning:<br>To know who Charles Darwin was and why some of his ideas were controversial. | QPP 6.1 Pose/select the most appropriate line of enquiry to investigate scientific questions.<br><br>QPP 6.4 Select and plan the most suitable line of enquiry, explaining which variables need to be controlled and why, in a variety of comparative and fair tests. | Discuss how scientific ideas have developed over time | Identify and explain patterns seen in the natural environment. | Identify evidence that supports or refutes their findings, selecting fact from opinion.<br><br>Create a scientific report explaining Charles Darwin's observations and theories. | variation<br>characteristic<br>offspring<br>environmental<br>inheritance<br>nutrition<br>climate<br>feature<br>adaptation<br>habitat<br>predator<br>pollinate<br>nutrients<br>epiphytes<br>toxic<br>Mary Anning<br>ichthyosaurus<br>fossil<br>Jurassic Coast<br>palaeontologist<br>natural selection<br>extinct<br>Charles Darwin<br>evolve<br>theory<br>tool<br>neanderthal<br>ancestor<br>homo sapiens<br>primate |

| Year 6 Animals including humans (blood, the heart and the circulatory system) | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | In Year Three, pupils identified that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. They also learn how to identify that humans and some other animals have skeletons and muscles for support, protection and movement. In Year 4, pupils described the simple functions of the basic parts of the digestive system in humans; identified the different types of teeth in humans and their simple functions; and constructed and interpreted a variety of food chains , identifying producers, predators and prey. In Year Five, pupils described the changes as humans develop to old age. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know there are three types of blood vessels: arteries, veins and capillaries.<br><br>To know that the heart pumps blood, carrying nutrients and oxygen, around every part of the body.<br><br>To know the functions of blood and blood vessels.<br><br>To know that drugs, including alcohol, can cause liver damage, poor sleep, high blood pressure, and different types of cancer.<br><br>To keep our heart and body healthy, we need to:<br>• eat a balanced diet (not too much sugar or fat);<br>• exercise regularly;<br>• drink approximately 2 litres of water a day;<br>• limit alcohol intake, in adults;<br>• get approximately 8 hours of sleep.<br><br>Deeper learning:<br>To know what osmosis and diffusion are. | To plan a fair test to investigate the impact of restricted blood flow in humans.<br><br>Make predictions and give a reason using scientific vocabulary.<br><br>Conduct an experiment to explore how soaking gummy sweets in different liquids will affect the size of the sweet.<br><br>Pose/select the most appropriate line of enquiry to investigate scientific questions about heart rate, diet and exercise.<br><br>Select and plan the most suitable line of enquiry, explaining which variables need to be controlled and why when investigating heart rate, diet and exercise. | Record learning about the circulatory system in diagrams and written notes.<br><br>Record results in a pie chart.<br><br>Take accurate measurements with a ruler and record results in a table. | Categorise lifestyle choices into healthy and unhealthy. | Identify evidence that supports or refutes their findings. | ventricle<br>atrium<br>vessel<br>circulatory system<br>valves<br>vein<br>capillary<br>microscope<br>artery<br>blood<br>plasma<br>red blood cell<br>white blood cell<br>platelet<br>concentration<br>absorb<br>osmosis<br>diffusion<br>nutrient<br>pulse<br>diet<br>BPM - beats per minute<br>exercise<br>heart rate<br>depressant<br>stimulant<br>hallucinogen<br>painkiller<br>drug |

| Year 6 Light | Links to Prior Learning | | | | | |
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| | In Year Three, pupils learnt to recognise that they need light in order to see things and that dark is the absence of light; they noticed that light is reflected from surfaces; and recognised that light from the sun can be dangerous and that there are ways to protect their eyes. Children learnt how to recognise that shadows are formed when the light from a light source is blocked by an opaque object; and they found patterns in the way that the size of shadows change. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that light travels in straight lines.<br><br>To know that reflection occurs when light bounces off a surface and changes direction.<br><br>To know that we see things because light travels from light sources to our eyes, or from light sources to objects and then to our eyes.<br><br>To know that shadows have the same shape as the objects that cast them<br><br>To know that the closer an object is to the light source, the bigger the shadow. The further away the object is from the shadow, the smaller the shadow.<br><br>Deeper learning:<br>To know the importance of reflective surfaces in everyday life. | Carry out a mini experiment to find out that light travels in straight lines from a light source to our eyes so that we can see.<br><br>Plan different types of scientific enquiries to answer questions about light, including recognising and controlling variables where necessary<br><br>Make predictions about reflective surfaces and give a reason using scientific vocabulary | Choose the most appropriate equipment in order to take measurements, explaining how to use it accurately<br><br>Choose the most effective approach to record their observations about shadows and report results, linking to mathematical knowledge. | IC6 Identify and explain patterns seen in the natural environment. | Identify scientific evidence that has been used to support or refute ideas or arguments<br><br>Identify the validity of conclusions about shadow length | symbol<br>light<br>eye<br>light source<br>scientific diagram<br>surface<br>bounce<br>direction<br>mirror<br>reflected<br>periscope<br>line of sight<br>angle<br>utilise<br>shadow<br>block<br>opaque<br>transparent<br>translucent<br>real-life problem<br>direction<br>rotate<br>plan<br>sun shade<br>phenomena<br>optical<br>disperse<br>spectrum<br>refraction |

| Year 6 Electricity | Links to Prior Learning | | | | | |
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| | In Year Four, pupils identified common appliances that run on electricity; constructed a simple series electrical circuit, identified and named its basic parts, including cells, wires, bulbs, switches and buzzers. Children also learnt how to: identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery; recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit; and finally, recognise some common conductors and insulators, and associate metals with being good conductors. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that voltage is the force that pushes current around a circuit.<br><br>To know that adding more cells (batteries) to a circuit will make bulbs brighter, buzzers louder and motors faster.<br><br>To know that the number of components in a circuit affect the output.<br><br>To know that wires are always drawn with a straight line using a ruler in scientific diagrams.<br><br>Deeper learning:<br>To know that a parallel circuit splits the current along multiple paths before meeting up again. | Plan different types of scientific enquiries to answer questions about electricity, including recognising and controlling variables where necessary.<br><br>Predict whether bulbs will be brighter than the control.<br><br>Use test results to make predictions to set up further comparative and fair tests. | Measure and record voltmeter recordings.<br><br>Choose the most effective approach to record and report results of wire loop investigation. | | Identify and explain causal relationships in data and identify evidence that supports or refutes their findings, selecting fact from opinion. | circuit<br>circuit diagram<br>symbol<br>battery<br>wires<br>voltage<br>voltmeter<br>brightness<br>electricity<br>current<br>blown<br>variable resistor<br>resistor<br>LED<br>dimmer switch<br>fair test<br>variable<br>output<br>systematically<br>control test<br>timer-based<br>sensor<br>synchronised<br>signal<br>traffic light<br>closed electric circuit<br>conductor<br>insulator<br>indicating<br>resistor |

| Year 6 Living things: classification | Links to Prior Learning | | | | | |
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| | In Year Five, pupils deepened their understanding of life cycles, reproduction and animal characteristics. New concepts such as asexual reproduction and metamorphosis were introduced to help the children understand how life cycles are constantly progressing. | | | | | |
| | **Substantive Knowledge** | **Disciplinary Knowledge** | | | | **Vocabulary** |
| | | **Questioning, predicting and planning** | **Observing and recording evidence** | **Identifying and Classifying** | **Analysing and evaluating** | |
| | To know that Carl Linnaeus created a system of classification, which ranks living things into groups in order to name their species.<br><br>To know that there are five kingdoms of life: plants, animals, fungi, protist, and monera.<br><br>To know that a micro-organism is a very tiny living thing that can only be seen with a microscope. Some of them are helpful, whilst others can be harmful.<br><br>To know that plants can be classified into four main groups flowering, conifers, ferns and mosses.<br><br>To know that animals are classified according to whether they are vertebrates or invertebrates.<br><br>Deeper learning:<br>To know that fungi gain energy from dead matter. | Plan a fair test to investigate the conditions that cause mould to grow on bread.<br><br>Make predictions and give a reason using scientific vocabulary.<br><br>Plan and carry out an investigation to explore how spore dispersal affects reproduction. | Create a labelled diagram of their understanding of the term MRS GREN.<br><br>Collect data over a period of time, deciding how long to take measurements for and checking results with additional readings. | IC6 Identify and explain patterns seen in the natural environment. | Identify scientific evidence that has been used to support or refute ideas or arguments about classification. | conifer<br>classify<br>microorganism<br>fern<br>living organism<br>cell<br>mrs gren<br>unicellular<br>multicellular<br>kingdom<br>species<br>Carl Linnaeus<br>domain<br>Latin<br>classification<br>virus<br>bacteria<br>fungi<br>protozoa<br>plant<br>microscopic<br>mycelium<br>ecosystem<br>fungi |

| | Links to Prior Learning | | | | | |
|---|---|---|---|---|---|---|
| | Built on from Y3 Nutrition and Diet Unit. | | | | | |
| | Substantive Knowledge | Disciplinary Knowledge | | | | Vocabulary |
| | | Questioning, predicting and planning | Observing and recording evidence | Identifying and Classifying | Analysing and evaluating | |
| **Year 6 Diet Drugs and Lifestyle** | -To know that fats can be unsaturated, saturated or trans fats.<br>-To know that saturated fats can cause heart disease.<br>-A drug is a chemical that can change the way your body functions.<br>-To know that some drugs are legal and illegal.<br>-To know that smoking can damage the body and cause breathing problems, heart and lung disease. | QPP 6.1 Pose/select the most appropriate line of enquiry to investigate scientific questions.<br><br>QPP 6.2 Make predictions and give a reason using scientific vocabulary. | ORE6.1 Make their own decisions about which observations to make, using test results and observations to make predictions or set up further comparative or fair tests.<br><br>ORE6.2 Choose the most appropriate equipment in order to take measurements, explaining how to use it accurately. | | AE6.2 Discuss how scientific ideas develop over time.<br><br>AE6.3 Identify and explain causal relationships in data and identify evidence that supports or refutes their findings, selecting fact from opinion. | Unsaturated fat<br>Saturated fat<br>Trans fat<br>Drug<br>Stimulants<br>Depressants<br>Cigarette<br>Vape<br>Tar<br>Nicotine<br>Carbon dioxide<br>Addiction<br>Circulatory system<br>Heart rate |