

Queenswood Science Curriculum

Science, at its most fundamental, seeks to explain the material world. This document sets out clearly the expected content and sequence of knowledge to be delivered at Queenswood as children move throughout the school. This has been chosen to ensure the children know more and remember more as they progress in their science learning, and that their substantive and disciplinary knowledge deepens as they continue their science learning.

Key Substantive Knowledge taught through our Science curriculum:

- Plants
- Animals including humans
- Living things and their habitats
- Materials
- Seasonal changes
- Rocks
- Light
- Forces and Magnets
- States of matter
- Sound
- Electricity
- Earth and Space
- Evolution and Inheritance

Disciplinary knowledge taught through our Science curriculum:

<p>Methods to answer scientific questions e.g. fair testing, classification, pattern seeking, grouping and observing</p>	<p>Analysis, presentation and evaluation of scientific data to draw conclusions e.g. how to present and process scientific data using specific graphs and tables which are used alongside substantive theory, to draw tentative conclusions.</p>
<p>Apparatus and techniques e.g. the knowledge of how to carry out and record procedures safely, proficiently and accurately</p>	<p>Development of scientific knowledge over time. i.e. knowledge of how scientific laws and theories develop over time</p>

Plants						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ Explore the natural world around them, making observations and drawing pictures of animals and plants. 	<ul style="list-style-type: none"> ➤ Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. ➤ Identify and describe the basic structure of a variety of common flowering plants, including trees. 	<ul style="list-style-type: none"> ➤ Observe and describe how seeds and bulbs grow into mature plants. ➤ Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. ➤ Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats) 	<ul style="list-style-type: none"> ➤ Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. ➤ Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. ➤ Investigate the way in which water is transported within plants. ➤ Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	<ul style="list-style-type: none"> ➤ Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats) ➤ Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats) ➤ Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) 	<ul style="list-style-type: none"> ➤ Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) 	<ul style="list-style-type: none"> ➤ Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. (Y6 - Living things and their habitats) ➤ Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)

Living things and their habitats						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ 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. 	<ul style="list-style-type: none"> ➤ Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) ➤ Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) ➤ Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans) ➤ Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans) ➤ Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 - Animals, including humans) ➤ Observe changes across the four seasons. (Y1 - Seasonal change) 	<ul style="list-style-type: none"> ➤ Explore and compare the differences between things that are living, dead, and things that have never been alive. ➤ Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. ➤ Identify and name a variety of plants and animals in their habitats, including microhabitats. ➤ 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. ➤ Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals including humans) 	<ul style="list-style-type: none"> ➤ Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants) 	<ul style="list-style-type: none"> ➤ Recognise that living things can be grouped in a variety of ways. ➤ Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. ➤ Recognise that environments can change and that this can sometimes pose dangers to living things. ➤ Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans) 	<ul style="list-style-type: none"> ➤ Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. ➤ Describe the life process of reproduction in some plants and animals. 	<ul style="list-style-type: none"> ➤ 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. ➤ Give reasons for classifying plants and animals based on specific characteristics.

Animals- including humans						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ Explore the natural world around them, making observations and drawing pictures of animals and plants. 	<ul style="list-style-type: none"> ➤ Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. ➤ Identify and name a variety of common animals that are carnivores, herbivores and omnivores. ➤ Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). ➤ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 	<ul style="list-style-type: none"> ➤ Notice that animals, including humans, have offspring which grow into adults. ➤ Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). ➤ Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	<ul style="list-style-type: none"> ➤ Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. ➤ Identify that humans and some other animals have skeletons and muscles for support, protection and movement. 	<ul style="list-style-type: none"> ➤ Describe the simple functions of the basic parts of the digestive system in humans. ➤ Identify the different types of teeth in humans and their simple functions. ➤ Construct and interpret a variety of food chains, identifying producers, predators and prey. 	<ul style="list-style-type: none"> ➤ Describe the changes as humans develop to old age. ➤ Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) ➤ Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) 	<ul style="list-style-type: none"> ➤ Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. ➤ Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. ➤ Describe the ways in which nutrients and water are transported within animals, including humans. ➤ Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. (Y6 - Living things and their habitats) ➤ Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)

Evolution and inheritance						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 		<ul style="list-style-type: none"> ➤ 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. (Y2 - Living things and their habitats) 	<ul style="list-style-type: none"> ➤ Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) 	<ul style="list-style-type: none"> ➤ Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) 		<ul style="list-style-type: none"> ➤ Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. ➤ Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. ➤ Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Seasonal change						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 	<ul style="list-style-type: none"> ➤ Observe changes across the four seasons. ➤ Observe and describe weather associated with the seasons and how day length varies. 		<ul style="list-style-type: none"> ➤ Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light) 		<ul style="list-style-type: none"> ➤ Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space) 	

Materials						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. 	<ul style="list-style-type: none"> Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. 	<ul style="list-style-type: none"> Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 	<ul style="list-style-type: none"> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks) Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets) 	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 	<ul style="list-style-type: none"> 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. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. 	

Rocks						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 	<ul style="list-style-type: none"> ➤ Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) ➤ Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) ➤ Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) ➤ Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) 	<ul style="list-style-type: none"> ➤ Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials) 	<ul style="list-style-type: none"> ➤ Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. ➤ Describe in simple terms how fossils are formed when things that have lived are trapped within rock. ➤ Recognise that soils are made from rocks and organic matter. 			<ul style="list-style-type: none"> ➤ Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance)

Light						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ 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. 	<ul style="list-style-type: none"> ➤ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) 		<ul style="list-style-type: none"> ➤ Recognise that they need light in order to see things and that dark is the absence of light. ➤ Notice that light is reflected from surfaces. ➤ Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. ➤ Recognise that shadows are formed when the light from a light source is blocked by an opaque object. ➤ Find patterns in the way that the size of shadows change. 			<ul style="list-style-type: none"> ➤ Recognise that light appears to travel in straight lines. ➤ Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. ➤ 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. ➤ Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Forces						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 		<ul style="list-style-type: none"> ➤ Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials) 	<ul style="list-style-type: none"> ➤ Compare how things move on different surfaces. ➤ Notice that some forces need contact between two objects, but magnetic forces can act at a distance. ➤ Observe how magnets attract or repel each other and attract some materials and not others. ➤ Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. ➤ Describe magnets as having two poles. ➤ Predict whether two magnets will attract or repel each other, depending on which poles are facing. 		<ul style="list-style-type: none"> ➤ Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. ➤ Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. ➤ Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 	

Sound						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 	<ul style="list-style-type: none"> ➤ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) 			<ul style="list-style-type: none"> ➤ Identify how sounds are made, associating some of them with something vibrating. ➤ Recognise that vibrations from sounds travel through a medium to the ear. ➤ Find patterns between the pitch of a sound and features of the object that produced it. ➤ Find patterns between the volume of a sound and the strength of the vibrations that produced it. ➤ Recognise that sounds get fainter as the distance from the sound source increases. 		

Electricity						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ 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. 				<ul style="list-style-type: none"> ➤ Identify common appliances that run on electricity. ➤ Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. ➤ Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. ➤ Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. ➤ Recognise some common conductors and insulators, and associate metals with being good conductors. 		<ul style="list-style-type: none"> ➤ Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. ➤ Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. ➤ Use recognised symbols when representing a simple circuit in a diagram.

Earth and space						
EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> ➤ 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. 	<ul style="list-style-type: none"> ➤ Observe changes across the four seasons. (Y1 - Seasonal changes) ➤ Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes) 				<ul style="list-style-type: none"> ➤ Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. ➤ Describe the movement of the Moon relative to the Earth. ➤ Describe the Sun, Earth and Moon as approximately spherical bodies. ➤ Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. 	

EYFS

Exploring the natural world	EYFS	Key Vocabulary
<p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Encourage interactions with the outdoors to foster curiosity. • Touch, smell and hear the natural world around them. • Observe and interact with natural processes such as <ul style="list-style-type: none"> ❖ ice melting, ❖ sound causing a vibration. ❖ light travelling through a transparent material. ❖ an object casting a shadow. ❖ a magnet attracting an object. ❖ a boat floating on water. • Ask and answer questions relating to how we care for the natural world. 		<p>Waterproof, strong/weak, hard/soft</p>

Describing what is in the outside world	EYFS	Key Vocabulary
<p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Encourage focused observation of the natural world. • Observe, describe and comment on things found outside including plants and animals. • Name and describe plants and animals. • Recognise familiar plants and animals in local environment. 		<p>Natural, wild, wildlife, native, log, stone, tree, dead, leaves, soil, roots, stem, flower, water, light, warmth, temperature, compost Lifecycle: - Egg, caterpillar, chrysalis, butterfly. Birds (owl, duck), insects/bugs Minibeasts (e.g ladybird, woodlouse, bee, wasp, spider, earthworm, snail, locust, cricket, millipede, butterfly, caterpillar), Fish, reptiles (snake, tortoise), amphibians, mammals (mouse, shrew, vole, hare, fox).</p>

Understanding the changing seasons on the natural world	EYFS	Key Vocabulary
<p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Observe the weather and seasonal features. • Observe and record the weather daily. • Share texts focussing on seasonal changes. • Observe the natural world and recognise similarities and differences in how it changes throughout the year. • Observe changes in animal behaviour related to seasonal changes. 		<p>Spring (growth, baby animals) - Summer - Autumn (Harvest) - Winter Weather: - Sun, rain, wind, snow, ice, frost, sleet, hail. - Cold/warm/hot Day length, day light.</p>

Progression of Disciplinary Knowledge**End of Reception**

Choose the resources they need for their chosen activities.
Handle equipment and tools effectively.
Answer how and why questions about their experiences.
Make observations.
Develop their own narratives and explanations by connecting ideas or events.
Explain why some things occur and talk about changes.

Key Stage 1 units:

A: Plants	KS1 Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees. Identify and classify trees and other plants that they see regularly, including deciduous and evergreen varieties. Compare two leaves, seeds, flowers etc. Classify leaves, seeds, flowers etc. using a range of characteristics. Use simple charts to identify plants and trees. Observe key features of trees and plants e.g. the shape of the leaves, the colour of the flower/blossom. Identify and label the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green. Gather information about trees and plants and make observations of how they change over a period of time. Measure and compare the height of plants and the length of time it takes for different plants to grow. Use a range of evidence to answer questions about how plants change over time, e.g. photographs. 	<p>Year 1</p> <p>Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area Names of garden and wild flowering plants in the local area</p>		<p>Year 2</p> <p>light, shade, sun, warm, cool, water, grow, healthy</p>		
	Disciplinary concepts				
	<p>Make relevant observations using simple equipment. Conduct simple tests, with support. Identify and classify with guidance. Measure using non-standard units of measure. Gather and record data pictorially. Recognise findings. Use observations and ideas to suggest answers to simple questions.</p>	<p>Recognise that questions can be answered in different ways. Observe closely. Identify and classify. Gather and record data in simple charts to help answer questions. Use observations and ideas to suggest answers to simple questions.</p>			
	Categories of disciplinary knowledge				
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment	
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data	
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions	
Unit Overview					
<p>Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants.</p> <p>Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.</p>			<ul style="list-style-type: none"> Plants are flowering plants grown in pots with coloured petals and leaves and a stem. Trees are not plants. All leaves are green. All stems are green. A trunk is not a stem. Blossom is not a flower. 		

Progression of Disciplinary Knowledge

End of Year 1	<p>Observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Pupils might keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.</p> <p>Ask simple questions when prompted Suggest ways of answering a question. Make relevant observations using simple equipment Conduct simple tests, with support Identify and classify with guidance Gather and record data Recognise findings Use their observations and ideas to suggest answers to simple questions</p> <p>Vocabulary Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar/ities, different/ces, beaker, pipette, syringe, thermometers.</p>
End of Year2	<p>Observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.</p> <p>Ask simple questions Recognise that questions can be answered in different ways Observe closely, using simple equipment Perform simple tests Identify and classify Record and communicate findings in a range of ways and begin to use simple scientific language Gather and record data to help answer questions Use observations and ideas to suggest answers to simple questions</p> <p>Vocabulary Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.</p>

Key Stage 1 Units:

A: Animals including Humans	KS1	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Label key features of a range of animals which includes animals from each of the vertebrate groups on a picture/diagram. • Classify animals using a range of features. • Compare two animals from the same or different groups. • Sort and group animals using similarities and differences • Classify animals according to what they eat. • Make first-hand, close observations of animals from each of the groups. • Use secondary resources to find out what animals eat, including talking to experts e.g. pet owners, zookeepers etc. • Use simple charts etc. to identify unknown animals • Label parts of the body on pictures and diagrams. • Take measurements of parts of their body. • Look for and identify patterns between people e.g. Do people with big hands have big feet? • Investigate human senses e.g. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match? • Explore objects using different senses • Talk about their findings from investigations using appropriate vocabulary e.g. "My fingers are much better at feeling than my toes" "We found that the crisps all taste the same." 	<p>Year 1</p> <p>Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves</p> <p>Names of animals experienced first-hand from each vertebrate group</p> <p>Parts of the body including those linked to PSHE teaching.</p>	<p>Year 2</p> <p>Senses - touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue</p> <p>Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples - meat, fish, vegetables, bread, rice, pasta)</p>				
	Disciplinary concepts					
	<p>Ask simple questions, when prompted suggest ways of answering a question. Identify and classify with guidance. Measure using non-standard units of measure. Gather and record data pictorially. Recognise findings. Use observations and ideas to suggest answers to simple questions.</p>	<p>Ask simple questions. Recognise that questions can be answered in different ways. Identify and classify. Record and communicate findings in a range of ways and begin to use simple scientific language. Gather and record data in simple charts to help answer questions.</p>				
	Categories of disciplinary knowledge					
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. These key features can be used to identify them.</p> <p>Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals.</p> <p>Humans have key parts in common, but these vary from person to person. Humans (and other animals) find out about the world using their senses. Humans have five senses - sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body.</p>		<ul style="list-style-type: none"> ✚ Only four-legged mammals, such as pets, are animals. ✚ Humans are not animals. ✚ Insects are not animals. ✚ All 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group. ✚ Amphibians and reptiles are the same. 				

Progression of Disciplinary Knowledge

End of Year 1

Using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells.

Ask simple questions when prompted

Suggest ways of answering a question.

Make relevant observations using simple equipment

Conduct simple tests, with support Identify and classify with guidance

Gather and record data

Recognise findings

Use their observations and ideas to suggest answers to simple questions

Vocabulary

Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar/ities, different/ces, beaker, pipette, syringe, thermometers.

End of Year2

Observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.

Ask simple questions

Recognise that questions can be answered in different ways

Observe closely, using simple equipment

Perform simple tests Identify and classify

Record and communicate findings in a range of ways and begin to use simple scientific language

Gather and record data to help answer questions

Use observations and ideas to suggest answers to simple questions

Vocabulary

Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.

Key Stage 1 units:

A: Everyday Materials	KS1	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Label a picture or diagram of an object made from different materials • Describe the properties of different materials • Classify objects made of one material in different ways e.g. a group of object made of metal. • Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials. • Classify materials based on their properties. • Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters. • Sort objects and materials using a range of properties • Choose an appropriate method for testing an object for a particular property • Use test evidence to answer questions about properties e.g. "Which cloth is the most absorbent?" 	Year 1	Year 2				
	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through Names of materials - wood, metal, plastic, glass, brick, rock, paper, cardboard	Properties of materials - as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching				
	Disciplinary concepts					
	Ask simple questions, when prompted suggest ways of answering a question. Conduct simple tests, with support. Identify and classify with guidance. Gather and record data pictorially. Use observations and ideas to suggest answers to simple questions.	Ask simple questions. Perform simple tests. Identify and classify. Record and communicate findings in a range of ways and begin to use simple scientific language. Use observations and ideas to suggest answers to simple questions.				
Categories of disciplinary knowledge						
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>All objects are made of one or more materials. Some objects can be made from different materials e.g. plastic, metal or wooden spoons.</p> <p>Materials can be described by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties.</p>		<ul style="list-style-type: none"> ✚ Only fabrics are materials. ✚ Only building materials are materials. ✚ Only writing materials are materials. ✚ The word 'rock' describes an object rather than a material. ✚ 'Solid' is another word for hard. 				

Progression of Disciplinary Knowledge

End of Year 1

Perform simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?'

Ask simple questions when prompted

Suggest ways of answering a question.

Make relevant observations using simple equipment

Conduct simple tests, with support Identify and classify with guidance

Gather and record data

Recognise findings

Use their observations and ideas to suggest answers to simple questions

Vocabulary

Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar/ities, different/ces, beaker, pipette, syringe, thermometers.

End of Year 2

Compare the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.

Ask simple questions

Recognise that questions can be answered in different ways

Observe closely, using simple equipment

Perform simple tests Identify and classify

Record and communicate findings in a range of ways and begin to use simple scientific language

Gather and record data to help answer questions

Use observations and ideas to suggest answers to simple questions

Vocabulary

Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.

Key Stage 1 units:

A: Seasonal Changes		KS1		Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> Name the four seasons and identify when in the year they occur. Describe weather in different seasons over a year. Gather data about day length regularly throughout the year Use evidence gathered to describe the general types of weather and changes in day length over the seasons. Collect information about the weather regularly throughout the year. Use evidence to describe features of their surroundings, e.g. themselves, animals, plants that change over the seasons. Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans. Present information in tables and charts to compare the weather across the seasons. 				Year 1	Year 2			
				Weather (sunny, rainy, windy, snowy etc.) Seasons (winter, summer, spring, autumn)	Sun, sunrise, sunset, day length			
Disciplinary concepts				Make relevant observations using simple equipment. Measure using non-standard units of measure. Gather and record data pictorially. Use observations and ideas to suggest answers to simple questions.	Identify and classify. Record and communicate findings in a range of ways and begin to use simple scientific language. Gather and record data in simple charts to help answer questions. Use observations and ideas to suggest answers to simple questions.			
Categories of disciplinary knowledge								
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="background-color: #ffcccc;">Using a range of equipment</td> </tr> <tr> <td style="background-color: #ffcccc;">Presenting data</td> </tr> <tr> <td style="background-color: #ffcccc;">Making predictions</td> </tr> </table>		Using a range of equipment	Presenting data	Making predictions
Using a range of equipment								
Presenting data								
Making predictions								
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings					
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change					
Unit Overview				Misconceptions				
<p>In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again.</p> <p>The weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer.</p> <p>The change in weather causes many other changes. Some examples are: numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people.</p>				<ul style="list-style-type: none"> ✘ It always snows in winter. ✘ It is always sunny in the summer. ✘ There are only flowers in spring and summer. ✘ It rains most in the winter. 				

Progression of Disciplinary Knowledge

End of Year 1

Make tables and charts about the weather.
Record what happens in the world around them, including day length, as the seasons change.

Ask simple questions when prompted
Suggest ways of answering a question.
Make relevant observations using simple equipment
Conduct simple tests, with support
Identify and classify with guidance
Gather and record data
Recognise findings
Use their observations and ideas to suggest answers to simple questions

Vocabulary

Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar/ities, different/ces, beaker, pipette, syringe, thermometers.

End of Year2

Ask simple questions
Recognise that questions can be answered in different ways
Observe closely, using simple equipment
Perform simple tests
Identify and classify
Record and communicate findings in a range of ways and begin to use simple scientific language
Gather and record data to help answer questions
Use observations and ideas to suggest answers to simple questions

Vocabulary

Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.

Key Stage 1 units:

B: Living Things & their Habitats		KS1		Key Vocabulary			
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> Explore the outside environment regularly to find objects that are living, dead and have never lived. Classify objects found in the local environment into living, dead and never lived. Observe animals and plants carefully, drawing and labelling diagrams. Identify and name a variety of plants and animals in their habitats, including micro-habitats. Identify key features that mean an animal or plant is suited to its micro-habitat. Describe how animals obtain their food from plants and other animals. Create simple food chains for a familiar local habitat from first-hand observation and research. Create simple food chains from information given e.g. in picture books (<i>Gruffalo</i> etc.). Report and explain in simple terms why an animal or plant is suited to a habitat e.g. the caterpillar cannot live under the soil like a worm as it needs fresh leaves to eat; the seaweed we found on the beach cannot live in our pond because it is not salty 				Year 1		Year 2	
				Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed Names of local habitats e.g. pond, woodland etc.		Names of micro-habitats e.g. under logs, in bushes etc.	
				Disciplinary concepts			
				Make relevant observations using simple equipment - e.g. magnifying glass. Identify and classify with guidance. Use observations and ideas to suggest answers to simple questions.		Observe closely, using simple equipment - e.g. magnifying glass. Identify and classify. Gather and record data in simple charts to help answer questions. Use observations and ideas to suggest answers to simple questions.	
				Categories of disciplinary knowledge			
		Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment	
		Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data	
		Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions	
Unit Overview				Misconceptions			
<p>All objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.)</p> <p>An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels).</p> <p>Animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants - shelter, food and water.</p> <p>Within a habitat there are different micro-habitats e.g. in a woodland - in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain.</p>				<ul style="list-style-type: none"> ✚ An animal's habitat is like its 'home'. ✚ Plants and seeds are not alive as they cannot be seen to move. ✚ Fire is living. ✚ Arrows in a food chain mean 'eats'. 			

Progression of Disciplinary Knowledge

<p>End of Year 1</p>	<p>Ask simple questions when prompted Suggest ways of answering a question. Make relevant observations using simple equipment Conduct simple tests, with support Identify and classify with guidance Gather and record data Recognise findings Use their observations and ideas to suggest answers to simple questions</p> <p>Vocabulary Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar/ities, different/ces, beaker, pipette, syringe, thermometers.</p>
<p>End of Year2</p>	<p>Sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. They should describe how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. They could construct a simple food chain that includes humans (e.g. grass, cow, human). They could describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there.</p> <p>Ask simple questions Recognise that questions can be answered in different ways Observe closely, using simple equipment Perform simple tests Identify and classify Record and communicate findings in a range of ways and begin to use simple scientific language Gather and record data to help answer questions Use observations and ideas to suggest answers to simple questions</p> <p>Vocabulary Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.</p>

Key Stage 1 units:

B: Plants		KS1	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Make close observations of seeds and bulbs and describe how plants that they have grown from seeds and bulbs have developed over time. • Classify seeds and bulbs. • Research when and how to plant a range of seeds and bulbs. • Plan when and how to plant a range of seeds and bulbs and identify plants that grew well in different conditions. • Look after the plants as they grow, identifying similarities and differences. • Make close observations and measurements of their plants growing from seeds and bulbs. • Make comparisons between plants as they grow. • Identify similarities and difference between bulbs and seeds. 			Year 1		Year 2		
			Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area Names of garden and wild flowering plants in the local area		light, shade, sun, warm, cool, water, grow, healthy		
			Disciplinary concepts				
			Make relevant observations using simple equipment. Conduct simple tests, with support. Identify and classify with guidance. Measure using non-standard units of measure. Gather and record data pictorially. Use observations and ideas to suggest answers to simple questions.		Observe closely, using simple equipment. Perform simple tests. Identify and classify. Record and communicate findings in a range of ways and begin to use simple scientific language. Use observations and ideas to suggest answers to simple questions.		
			Categories of disciplinary knowledge				
			Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment
			Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data
			Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions
Unit Overview			Misconceptions				
Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy.			<ul style="list-style-type: none"> ✚ Plants are not alive as they cannot be seen to move. ✚ Seeds are not alive. ✚ All plants start out as seeds. ✚ Seeds and bulbs need sunlight to germinate. 				

B: Plants		KS1
Progression of Disciplinary Knowledge		
End of Year 1	<p>Observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Pupils might keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.</p> <p>Ask simple questions when prompted Suggest ways of answering a question. Make relevant observations using simple equipment Conduct simple tests, with support Identify and classify with guidance Gather and record data Recognise findings Use their observations and ideas to suggest answers to simple questions</p> <p>Vocabulary Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar/ities, different/ces, beaker, pipette, syringe, thermometers.</p>	
End of Year2	<p>Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy.</p> <p>Ask simple questions Recognise that questions can be answered in different ways Observe closely, using simple equipment Perform simple tests Identify and classify Record and communicate findings in a range of ways and begin to use simple scientific language Gather and record data to help answer questions Use observations and ideas to suggest answers to simple questions</p> <p>Vocabulary Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.</p>	

Key Stage 1 units:

B: Animals including Humans	KS1	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> Describe how animals, including humans, have offspring which grow into adults, using the appropriate names for the stages Ask questions and use secondary sources to find out about the life cycles of some animals. Observe animals growing over a period of time e.g. chicks, caterpillars, a baby. Identify the basic needs of animals, including humans, for survival. Identify the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Plan a test to explore the effect of exercise on their bodies. Classify food in a range of ways, including using the Eatwell Guide. Use diagrams to explain the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child Measure/observe how animals, including humans, grow. Explain how development and health might be affected by differing conditions and needs being met/not met. 	<p>Year 1</p> <p>Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves</p>	<p>Year 2</p> <p>Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples - meat, fish, vegetables, bread, rice, pasta)</p>				
	Disciplinary concepts					
	<p>Ask simple questions, when prompted suggest ways of answering a question. Make relevant observations. Conduct simple tests, with support. Identify and classify with guidance. Measure using non-standard units of measure. Gather and record data pictorially. Use observations and ideas to suggest answers to simple questions.</p>	<p>Ask simple questions. Recognise that questions can be answered in different ways. Observe closely. Perform simple tests. Identify and classify. Record and communicate findings in a range of ways and begin to use simple scientific language. Use observations and ideas to suggest answers to simple questions.</p>				
	Categories of disciplinary knowledge					
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles.</p> <p>All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To grow into healthy adults, they also need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses.</p>		<ul style="list-style-type: none"> An animal's habitat is like its 'home'. All animals that live in the sea are fish. Respiration is breathing. Breathing is respiration. 				

Progression of Disciplinary Knowledge

End of Year 1

Using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells.

Ask simple questions when prompted

Suggest ways of answering a question.

Make relevant observations using simple equipment

Conduct simple tests, with support Identify and classify with guidance

Gather and record data

Recognise findings

Use their observations and ideas to suggest answers to simple questions

Vocabulary

Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar/ities, different/ces, beaker, pipette, syringe, thermometers.

End of Year2

Observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.

Ask simple questions

Recognise that questions can be answered in different ways

Observe closely, using simple equipment

Perform simple tests Identify and classify

Record and communicate findings in a range of ways and begin to use simple scientific language

Gather and record data to help answer questions

Use observations and ideas to suggest answers to simple questions

Vocabulary

Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.

Key Stage 1 units:

B: Uses of Everyday Materials	KS1	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Classify and sort materials using a range of properties. • Name an object, say what material it is made from, identify its properties and make a link between the properties and a particular use. • Identify that a material may come in different forms which have different properties. • Identify and label the materials used to make a variety of different objects and recognise the properties a material needs to have for a given object.. • Use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot • Make suggestions about alternative materials for a purpose that are both suitable and unsuitable • Plan and test the properties of materials for particular uses (e.g. compare the stretchiness of fabrics to select the most appropriate for a superhero costume, test materials for waterproofness to select the most appropriate for an umbrella.) • Draw conclusions and explain using the key properties why a material is suitable or not suitable for a purpose. 	Year 1	Year 2				
	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through	Names of materials - wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials - as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching				
	Disciplinary concepts					
	Conduct simple tests, with support. Identify and classify with guidance. Recognise findings. Use observations and ideas to suggest answers to simple questions.	Perform simple tests. Identify and classify. Record and communicate findings in a range of ways and begin to use simple scientific language. Use observations and ideas to suggest answers to simple questions.				
Categories of disciplinary knowledge						
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
All objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness.		<ul style="list-style-type: none"> ✚ Only fabrics are materials. ✚ Only building materials are materials. ✚ Only writing materials are materials. ✚ The word rock describes an object rather than a material. ✚ Solid is another word for hard. 				

Progression of Disciplinary Knowledge

End of Year 1

Performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?'

Ask simple questions when prompted
Suggest ways of answering a question.
Make relevant observations using simple equipment
Conduct simple tests, with support Identify and classify with guidance
Gather and record data
Recognise findings
Use their observations and ideas to suggest answers to simple questions

Vocabulary

Questions, answers, equipment, gather, measure, record, results, sort, group, test, explore, observe, compare, describe, similar/ities, different/ces, beaker, pipette, syringe, thermometers.

End of Year2

Comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.

Ask simple questions
Recognise that questions can be answered in different ways
Observe closely, using simple equipment
Perform simple tests Identify and classify
Record and communicate findings in a range of ways and begin to use simple scientific language
Gather and record data to help answer questions
Use observations and ideas to suggest answers to simple questions

Vocabulary

Previous vocab plus observe changes over time, notice patterns, secondary sources, hand lenses, egg timers, identify, classify, data.

Lower Key Stage 2 units:

A: Rocks	LKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Observe rocks closely and how they change over time. • Identify different types of rock and give physical features of each. • Gather information and explain how a fossil is formed. • Explain that soils are made from rocks and also contain living/dead matter. • Classify rocks in a range of different ways, use appropriate vocabulary. • Devise tests to explore the properties of rocks and use data to classify the rocks. • Gather information about how the properties of rocks change over time e.g. soft rocks get worn away more easily • Gather and record information about how fossils are formed. • Identify plant/animal matter and rocks in samples of soil. • Classify soils in a range of ways based on their appearance. • Observe how soil can be separated through sedimentation. • Devise a test to explore the water retention of soils. 		Year 3		Year 4		
		Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil		Igneous, Sedimentary, Metamorphic, permeability, durability		
		Disciplinary concepts				
		Set up simple and practical enquiries, comparative and fair tests with some support. Make systematic and careful observations. Use standard units when taking measurements. With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions. With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated. Suggest possible improvements or further questions to investigate.		Set up simple and practical enquiries, comparative and fair tests. Make systematic and careful. Take accurate measurements using standard units, where appropriate. Gather, record, classify and present data in a variety of ways to help to answer questions. Record findings using simple scientific language, drawings and labelled diagrams. Record findings using keys, bar charts, and tables. Identify differences, similarities or changes related to simple scientific ideas and processes. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.		
Categories of disciplinary knowledge						
Asking and answering questions		Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment	
Identifying, labelling and classifying		Measuring	Using results	Gathering and recording findings	Presenting data	
Drawing conclusions		Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions	
Unit Overview		Misconceptions				
<p>Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil.</p> <p>Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.</p>		<ul style="list-style-type: none"> ✘ Rocks are all hard in nature. ✘ Rock-like, man-made substances such as concrete or brick are rocks. ✘ Materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural'. ✘ Certain found artefacts, like old bits of pottery or coins, are fossils. ✘ A fossil is an actual piece of the extinct animal or plant. ✘ Soil and compost are the same thing. 				

Progression of Disciplinary Knowledge

End of Year 3

Observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. They can raise and answer questions about the way soils are formed.

Ask relevant questions when prompted

Use different types of scientific enquiry to answer them.

Set up simple and practical enquiries, comparative and fair tests with some support.

Make systematic and careful observations, using simple equipment

Use standard units when taking measurements

With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions

With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated

With prompting, suggest conclusions from enquiries Suggest how findings could be reported

Suggest possible improvements or further questions to investigate

Vocabulary

Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.

End of Year 4

Ask relevant questions.

Use different types of scientific enquiries to answer their questions

Set up simple and practical enquiries, comparative and fair tests

Make systematic and careful observations using a range of equipment, including thermometers and data loggers

Take accurate measurements using standard units, where appropriate

Gather, record, classify and present data in a variety of ways to help to answer questions

Record findings using simple scientific language, drawings and labelled diagrams

Record findings using keys, bar charts, and tables

Report on findings from enquiries, including oral and written explanations, of results and conclusions

Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes

Use straightforward scientific evidence to answer questions or to support their findings

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.

Lower Key Stage 2 units:

A: Animals including humans	LKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p>		Year 3		Year 4		
<p>Substantive and Disciplinary Knowledge.</p>		Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine		Common and scientific names of bones, endo skeleton, exo skeleton		
<ul style="list-style-type: none"> Use food labels to explore the nutritional content of a range of food items and to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? Use secondary sources to find out the types of food that contain different nutrients. Plan and present a daily diet to contain a good balance of nutrients. Explore the nutrients contained in fast food. Classify food into those that are high or low in particular nutrients and answer questions about nutrients in food based on their gathered evidence. Use secondary sources to research the parts and functions of the skeleton. Compare, contrast and classify skeletons of different animals. Look for similarities e.g. they all have joints to help the animal move, and differences between skeletons Set up an enquiry that asks questions such as: <ul style="list-style-type: none"> Can people with longer legs run faster? Can people with bigger hands catch a ball better? 		Disciplinary concepts		Ask relevant questions when prompted. Use different types of scientific enquiry to answer them. Set up simple and practical enquiries, comparative and fair tests with some support. record, classify and present data in a variety of ways to help to answer questions. With prompting, suggest conclusions from enquiries. Suggest how findings could be reported. Suggest possible improvements or further questions to investigate.		
		Categories of disciplinary knowledge				
		Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment
		Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data
		Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions
Unit Overview		Misconceptions				
<p>Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients - carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water - and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients.</p> <p>Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.</p>		<ul style="list-style-type: none"> Certain whole food groups like fats are 'bad' for you. Certain specific foods, like cheese are also 'bad' for you. Diet and fruit drinks are 'good' for you. Snakes are similar to worms, so they must also be invertebrates. Invertebrates have no form of skeleton. 				

Progression of Disciplinary Knowledge

End of Year 3

Identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out.

Ask relevant questions when prompted

Use different types of scientific enquiry to answer them.

Set up simple and practical enquiries, comparative and fair tests with some support.

Make systematic and careful observations, using simple equipment

Use standard units when taking measurements

With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions

With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated

With prompting, suggest conclusions from enquiries Suggest how findings could be reported

Suggest possible improvements or further questions to investigate

Vocabulary

Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.

End of Year 4

Comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.

Ask relevant questions.

Use different types of scientific enquiries to answer their questions

Set up simple and practical enquiries, comparative and fair tests

Make systematic and careful observations using a range of equipment, including thermometers and data loggers

Take accurate measurements using standard units, where appropriate

Gather, record, classify and present data in a variety of ways to help to answer questions

Record findings using simple scientific language, drawings and labelled diagrams

Record findings using keys, bar charts, and tables

Report on findings from enquiries, including oral and written explanations, of results and conclusions

Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes

Use straightforward scientific evidence to answer questions or to support their findings

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.

Lower Key Stage 2 units:

A: Light	LKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p>		Year 3		Year 4		
<p>Substantive and Disciplinary Knowledge.</p>		<p>Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous</p>		<p>Obtuse & Acute angles</p>		
<ul style="list-style-type: none"> • Identify how we see objects in light and describe dark as the absence of light recognising that objects are not visible in complete darkness. • Using scientific evidence define transparent, translucent and opaque. • Describe how shadows are formed • Explore how different objects are more or less visible in different levels of lighting or with different surfaces e.g. shiny vs matt, are more or less visible. • Plan a test to explore and predict how shadows vary as the distance between a light source and an object or surface is changed. • Demonstrate how shadows are formed by blocking light. • Observe shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground. • Choose suitable materials to make shadow puppets or create artwork using shadows. • Identify and describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change. 		<p>Disciplinary concepts</p> <p>Use different types of scientific enquiry to define. Set up simple and practical enquiries, comparative and fair tests with some support. Make systematic and careful observations. Suggest possible improvements or further questions to investigate.</p>		<p>Use different types of scientific enquiries to answer questions. Set up simple and practical enquiries, comparative and fair tests. Make systematic and careful observations. Identify differences, similarities or changes related to simple scientific ideas and processes. Use straightforward scientific evidence to answer questions or to support findings. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p>		
		<p>Categories of disciplinary knowledge</p>				
		Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment
		Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data
		Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions
<p>Unit Overview</p>		<p>Misconceptions</p>				
<p>We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.</p>		<ul style="list-style-type: none"> ✚ We can still see even where there is an absence of any light ✚ Our eyes 'get used to' the dark • the moon and reflective surfaces are light sources ✚ A transparent object is a light source ✚ Shadows contain details of the object, such as facial features on their own shadow ✚ Shadows result from objects giving off darkness. 				

Progression of Disciplinary Knowledge

End of Year 3

Looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

Ask relevant questions when prompted

Use different types of scientific enquiry to answer them.

Set up simple and practical enquiries, comparative and fair tests with some support.

Make systematic and careful observations, using simple equipment

Use standard units when taking measurements

With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions

With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated

With prompting, suggest conclusions from enquiries Suggest how findings could be reported

Suggest possible improvements or further questions to investigate

Vocabulary

Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.

End of Year 4

Ask relevant questions.

Use different types of scientific enquiries to answer their questions

Set up simple and practical enquiries, comparative and fair tests

Make systematic and careful observations using a range of equipment, including thermometers and data loggers

Take accurate measurements using standard units, where appropriate

Gather, record, classify and present data in a variety of ways to help to answer questions

Record findings using simple scientific language, drawings and labelled diagrams

Record findings using keys, bar charts, and tables

Report on findings from enquiries, including oral and written explanations, of results and conclusions

Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes

Use straightforward scientific evidence to answer questions or to support their findings

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.

Lower Key Stage 2 units:

A: Plants	LKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p>		Year 3		Year 4		
<p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Observe what happens to plants over time when the leaves or roots are removed. • Observe the effect of putting cut white carnations or celery in coloured water. • Plan and perform a test to investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. • Identify flowers, seeds, berries and fruits outside throughout the year. • Observe flowers carefully to identify the pollen. • Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. • Observe seeds being blown from the trees e.g. sycamore seeds. • Use scientific evidence to identify the different features of seeds and how this affects seed dispersal. • Classify seeds in a range of ways, including by how they are dispersed. • Describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination. 		Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)		transportation, nutrients, reproduction, stamen, stigma, ovary		
		Disciplinary concepts				
		Ask relevant questions when prompted. Use different types of scientific enquiry to answer them. Set up simple and practical enquiries, comparative and fair tests with some support. Make systematic and careful observations. With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated. Suggest how findings could be reported. Suggest possible improvements or further questions to investigate.		Ask relevant questions. Use different types of scientific enquiries to answer questions. Set up simple and practical enquiries, comparative and fair tests. Make systematic and careful observations. Gather, record, classify and present data in a variety of ways to help to answer questions. Record findings using simple scientific language, drawings and labelled diagrams. Report on findings from enquiries, including oral and written explanations, of results and conclusions. Identify differences, similarities or changes related to simple scientific ideas and processes.		
		Categories of disciplinary knowledge				
		Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment
		Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data
		Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions
Unit Overview		Misconceptions				
<p>Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.</p>		<ul style="list-style-type: none"> ✚ Plants eat food. ✚ Food comes from the soil via the roots. ✚ Flowers are merely decorative rather than a vital part of the life cycle in reproduction. ✚ Plants only need sunlight to keep them warm. ✚ Roots suck in water which is then sucked up the stem. 				

A: Plants	LKS2
Progression of Disciplinary Knowledge	
End of Year 3	<p>Comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.</p> <p>Ask relevant questions when prompted Use different types of scientific enquiry to answer them. Set up simple and practical enquiries, comparative and fair tests with some support. Make systematic and careful observations, using simple equipment Use standard units when taking measurements With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated With prompting, suggest conclusions from enquiries Suggest how findings could be reported Suggest possible improvements or further questions to investigate</p> <p>Vocabulary Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.</p>
End of Year 4	<p>Ask relevant questions. Use different types of scientific enquiries to answer their questions Set up simple and practical enquiries, comparative and fair tests Make systematic and careful observations using a range of equipment, including thermometers and data loggers Take accurate measurements using standard units, where appropriate Gather, record, classify and present data in a variety of ways to help to answer questions Record findings using simple scientific language, drawings and labelled diagrams Record findings using keys, bar charts, and tables Report on findings from enquiries, including oral and written explanations, of results and conclusions Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes Use straightforward scientific evidence to answer questions or to support their findings Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Vocabulary Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.</p>

Lower Key Stage 2 units:

A: Forces and Magnets	LKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Answer questions about forces and provide examples of forces in everyday life. • Investigate how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. • Explore what materials are attracted to a magnet. • Classify materials according to whether they are magnetic. • Use classification evidence to identify that some metals, but not all, are magnetic. • Explore the way that magnets behave in relation to each other. • Draw diagrams using arrows to show the attraction and repulsion between the poles of magnets. • Use a marked magnet to find the unmarked poles on other types of magnets. • Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table. • Plan an investigation to test the strength of magnets. • Use test results to rank magnets and report findings. 		Year 3		Year 4		
		Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole		Magnetic field		
		Disciplinary concepts				
		Ask relevant questions when prompted. Set up simple and practical enquiries, comparative and fair tests with some support. With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions. With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated. With prompting, suggest conclusions from enquiries. Suggest how findings could be reported.		Ask relevant questions. Set up simple and practical enquiries, comparative and fair tests. Take accurate measurements using standard units, where appropriate. Gather, record, classify and present data in a variety of ways to help to answer questions. Record findings using simple scientific language, drawings and labelled diagrams. Record findings using keys, bar charts, and tables. Report on findings from enquiries, including oral and written explanations, of results and conclusions. Report on findings from enquiries using displays or presentations. Identify differences, similarities or changes related to simple scientific ideas and processes.		
		Categories of disciplinary knowledge				
		Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles - a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other - repel. If two unlike poles, e.g. a north and south, are brought together they will pull together - attract.</p> <p>For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.</p>		<ul style="list-style-type: none"> ✘ The bigger the magnet the stronger it is. ✘ All metals are magnetic. 				

Progression of Disciplinary Knowledge

End of Year 3

Comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

Ask relevant questions when prompted

Use different types of scientific enquiry to answer them.

Set up simple and practical enquiries, comparative and fair tests with some support.

Make systematic and careful observations, using simple equipment

Use standard units when taking measurements

With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions

With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated

With prompting, suggest conclusions from enquiries Suggest how findings could be reported

Suggest possible improvements or further questions to investigate

Vocabulary

Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.

End of Year 4

Ask relevant questions.

Use different types of scientific enquiries to answer their questions

Set up simple and practical enquiries, comparative and fair tests

Make systematic and careful observations using a range of equipment, including thermometers and data loggers

Take accurate measurements using standard units, where appropriate

Gather, record, classify and present data in a variety of ways to help to answer questions

Record findings using simple scientific language, drawings and labelled diagrams

Record findings using keys, bar charts, and tables

Report on findings from enquiries, including oral and written explanations, of results and conclusions

Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes

Use straightforward scientific evidence to answer questions or to support their findings

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.

Lower Key Stage 2 units:

B: Living things and Their Habitats		LKS2		Key Vocabulary				
<p>Substantive Knowledge Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things. Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Observe plants and animals in different habitats throughout the year. • Name living things living in a range of habitats, giving the key features that helped them to identify them • Compare and contrast the living things observed. • Use classification keys to name unknown living things. • Classify living things found in different habitats based on their features. • Create a simple identification key based on observable features. • Use fieldwork to explore human impact on the local environment e.g. litter, tree planting. • Use secondary sources to find out about how environments may naturally change. • Use secondary sources to find out about human impact, both positive and negative, on environments. • Present learning about changes to the environment in different ways e.g. campaign video, persuasive letter. 		<p>Prior vocabulary</p> Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc.		<p>New Vocabulary</p> classification classification keys environment habitat human impact positive negative migrate hibernate				
		<p>Disciplinary concepts</p>						
		<p>Ask relevant questions when prompted. Use different types of scientific enquiry to answer them. Make systematic and careful observations, using simple equipment. With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions. With prompting, suggest conclusions from enquiries. Suggest how findings could be reported.</p>		<p>Ask relevant questions. Use different types of scientific enquiries to answer questions. Make systematic and careful observations using a range of equipment, including data loggers. Gather, record, classify and present data in a variety of ways to help to answer questions. Record findings using simple scientific language, drawings and labelled diagrams. Report on findings from enquiries, including oral and written explanations, of results and conclusions. Report on findings from enquiries using displays or presentations. Identify differences, similarities or changes related to simple scientific ideas and processes.</p>				
		<p>Categories of disciplinary knowledge</p>						
		Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
		Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
		Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions						
<p>Living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.</p>		<ul style="list-style-type: none"> ✚ The death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain. ✚ There is always plenty of food for wild animals. ✚ Animals are only land-living creatures. ✚ Animals and plants can adapt to their habitats, however they change. ✚ All changes to habitats are negative. 						

Progression of Disciplinary Knowledge

End of Year 3

Ask relevant questions when prompted
 Use different types of scientific enquiry to answer them.
 Set up simple and practical enquiries, comparative and fair tests with some support.
 Make systematic and careful observations, using simple equipment
 Use standard units when taking measurements
 With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions
 With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated
 With prompting, suggest conclusions from enquiries Suggest how findings could be reported
 Suggest possible improvements or further questions to investigate

Vocabulary

Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.

End of Year 4

using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.

Ask relevant questions.
 Use different types of scientific enquiries to answer their questions
 Set up simple and practical enquiries, comparative and fair tests
 Make systematic and careful observations using a range of equipment, including thermometers and data loggers
 Take accurate measurements using standard units, where appropriate
 Gather, record, classify and present data in a variety of ways to help to answer questions
 Record findings using simple scientific language, drawings and labelled diagrams
 Record findings using keys, bar charts, and tables
 Report on findings from enquiries, including oral and written explanations, of results and conclusions
 Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes
 Use straightforward scientific evidence to answer questions or to support their findings
 Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.

Lower Key Stage 2 units:

B: Animals including Humans		LKS2		Key Vocabulary						
<p>Substantive Knowledge Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey. Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Research the function of the parts of the digestive system and draw the main parts onto a human outline. • Identify, sequence and describe what happens in each part of the digestive system. • Create a model of the digestive system using household objects. • Explore eating different types of food to identify which teeth are being used for cutting, tearing and grinding (chewing). • Explain the role of the different types of teeth and record the teeth in their mouth (make a dental record). • Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls. • Use food chains to identify producers, predators and prey within a habitat. • Use secondary sources to identify animals in a habitat and find out what they eat. • Create food chains based on research. 		Prior Vocabulary		New Vocabulary						
		Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water,		Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain						
		Disciplinary concepts								
		Ask relevant questions when prompted. Use different types of scientific enquiry to answer them. Make systematic and careful observations. With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions. With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated.		Ask relevant questions. Use different types of scientific enquiries to answer questions. Make systematic and careful observations. Gather, record, classify and present data in a variety of ways to help to answer questions. Record findings using simple scientific language, drawings and labelled diagrams. Record findings using keys, bar charts, and tables. Identify differences, similarities or changes related to simple scientific ideas and processes.						
Categories of disciplinary knowledge										
Asking and answering questions		Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment					
Identifying, labelling and classifying		Measuring	Using results	Gathering and recording findings	Presenting data					
Drawing conclusions		Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions					
Unit Overview				Misconceptions						
<p>Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added.</p> <p>The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet.</p> <p>Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).</p> <p>Living things can be classified as producers, predators and prey according to their place in the food chain.</p>				<ul style="list-style-type: none"> ✚ Arrows in a food chains mean 'eats'. ✚ The death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain. ✚ There is always plenty of food for wild animals. ✚ Your stomach is where your belly button is. ✚ Food is digested only in the stomach. ✚ When you have a meal, your food goes down one tube and your drink down another. ✚ The food you eat becomes "poo" and the drink becomes "wee". 						

Progression of Disciplinary Knowledge

End of Year 3

Ask relevant questions when prompted
 Use different types of scientific enquiry to answer them.
 Set up simple and practical enquiries, comparative and fair tests with some support.
 Make systematic and careful observations, using simple equipment
 Use standard units when taking measurements
 With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions
 With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated
 With prompting, suggest conclusions from enquiries Suggest how findings could be reported
 Suggest possible improvements or further questions to investigate

Vocabulary

Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.

End of Year 4

comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.

Ask relevant questions.
 Use different types of scientific enquiries to answer their questions
 Set up simple and practical enquiries, comparative and fair tests
 Make systematic and careful observations using a range of equipment, including thermometers and data loggers
 Take accurate measurements using standard units, where appropriate
 Gather, record, classify and present data in a variety of ways to help to answer questions
 Record findings using simple scientific language, drawings and labelled diagrams
 Record findings using keys, bar charts, and tables
 Report on findings from enquiries, including oral and written explanations, of results and conclusions
 Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes
 Use straightforward scientific evidence to answer questions or to support their findings
 Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.

Lower Key Stage 2 units:

B: States of Matter	LKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Observe closely and classify a range of solids and liquids. • Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind. • Classify materials according to whether they are solids, liquids and gases. • Observe a range of materials melting e.g. ice, chocolate, butter. • Plan a test to investigate how to melt ice more quickly. • Observe the changes when making rocky road cakes or ice-cream. • Investigate and identify the melting point of different materials e.g. ice, margarine, butter and chocolate. • Explore freezing different liquids e.g. tomato ketchup, oil, shampoo. • Use a thermometer to measure temperatures e.g. icy water (melting), tap water, hot water, boiling water (demonstration). • Observe water evaporating and condensing e.g. on cups of icy water and hot water. • Plan and set up investigations to explore changing the rate of evaporation e.g. washing, puddles, handprints on paper towels, liquids in containers. • Use secondary sources to find out about the water cycle. 		Year 3		Year 4		
				Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle		
		Disciplinary concepts				
		Use different types of scientific enquiry to answer them. Set up simple and practical enquiries, comparative and fair tests with some support. With modelling and guidance, classify data in a variety of ways to help to answer questions. Make systematic and careful observations, using simple equipment including thermometers. Use standard units when taking measurements.		Use different types of scientific enquiries to answer questions. Set up simple and practical enquiries, comparative and fair tests. Make systematic and careful observations using a range of equipment, including thermometers and data loggers. Take accurate measurements using standard units, where appropriate. Classify and present data in a variety of ways to help to answer questions. Identify differences, similarities or changes related to simple scientific ideas and processes.		
		Categories of disciplinary knowledge				
		Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment
		Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data
		Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions
Unit Overview		Misconceptions				
<p>A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid.</p> <p>Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling.</p> <p>Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle.</p>		<ul style="list-style-type: none"> ✚ Solid' is another word for hard or opaque. ✚ Solids are hard and cannot break or change shape easily and are often in one piece. ✚ Substances made of very small particles like sugar or sand cannot be solids. ✚ Particles in liquids are further apart than in solids and they take up more space. ✚ When air is pumped into balloons, they become lighter. ✚ Water in different forms - steam, water, ice - are all different substances. ✚ All liquids boil at the same temperature as water (100 degrees). ✚ Melting, as a change of state, is the same as dissolving. ✚ Steam is visible water vapour (only the condensing water droplets can be seen). ✚ Clouds are made of water vapour or steam. ✚ The substance on windows etc. is condensation rather than water. ✚ The changing states of water (illustrated by the water cycle) are irreversible. ✚ Evaporating or boiling water makes it vanish. ✚ Evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material. 				

Progression of Disciplinary Knowledge

End of Year 3

Ask relevant questions when prompted
 Use different types of scientific enquiry to answer them.
 Set up simple and practical enquiries, comparative and fair tests with some support.
 Make systematic and careful observations, using simple equipment
 Use standard units when taking measurements
 With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions
 With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated
 With prompting, suggest conclusions from enquiries Suggest how findings could be reported
 Suggest possible improvements or further questions to investigate

Vocabulary

Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.

End of Year 4

grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.

Ask relevant questions.

Use different types of scientific enquiries to answer their questions
 Set up simple and practical enquiries, comparative and fair tests
 Make systematic and careful observations using a range of equipment, including thermometers and data loggers
 Take accurate measurements using standard units, where appropriate
 Gather, record, classify and present data in a variety of ways to help to answer questions
 Record findings using simple scientific language, drawings and labelled diagrams
 Record findings using keys, bar charts, and tables
 Report on findings from enquiries, including oral and written explanations, of results and conclusions
 Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes
 Use straightforward scientific evidence to answer questions or to support their findings
 Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.

Lower Key Stage 2 units:

B: Sound	LKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> Name sound sources and state that sounds are produced by the vibration of the object. Classify sound sources. Explain what happens when you strike a drum or pluck a string and create diagrams to show how sounds travel from an object to the ear. Explore making sounds with a range of objects, such as musical instruments and other household objects. Explore how string telephones or ear gongs work. Explore altering the pitch or volume of objects, such as the length of a guitar string, amount of water in bottles, size of tuning forks. Measure sounds over different distances. Measure sounds through different insulation materials. Plan a test to demonstrate how to increase or decrease pitch and volume using musical instruments or other objects and use the data produced to identify patterns in pitch and volume. 		Year 3		Year 4		
				Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation		
		Disciplinary concepts				
		Set up simple and practical enquiries, comparative and fair tests with some support. With modelling and guidance, classify data in a variety of ways to help to answer questions. Make systematic and careful observations, using simple equipment. Use standard units when taking measurements.		Set up simple and practical enquiries, comparative and fair tests. Take accurate measurements using standard units, where appropriate. data in a variety of ways to help to answer questions.		
Categories of disciplinary knowledge						
Asking and answering questions		Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment	
Identifying, labelling and classifying		Measuring	Using results	Gathering and recording findings	Presenting data	
Drawing conclusions		Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions	
Unit Overview		Misconceptions				
<p>A sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds.</p>		<ul style="list-style-type: none"> ✚ Sound is only heard by the listener. ✚ Sound only travels in one direction from the source. ✚ Sound can't travel through solids and liquids. ✚ High sounds are loud and low sounds are quiet. 				

B: Sound		LKS2
Progression of Disciplinary Knowledge		
End of Year 3	<p>Ask relevant questions when prompted Use different types of scientific enquiry to answer them. Set up simple and practical enquiries, comparative and fair tests with some support. Make systematic and careful observations, using simple equipment Use standard units when taking measurements With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated With prompting, suggest conclusions from enquiries Suggest how findings could be reported Suggest possible improvements or further questions to investigate</p> <p>Vocabulary Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.</p>	
End of Year 4	<p style="background-color: yellow;">finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.</p> <p>Ask relevant questions. Use different types of scientific enquiries to answer their questions Set up simple and practical enquiries, comparative and fair tests Make systematic and careful observations using a range of equipment, including thermometers and data loggers Take accurate measurements using standard units, where appropriate Gather, record, classify and present data in a variety of ways to help to answer questions Record findings using simple scientific language, drawings and labelled diagrams Record findings using keys, bar charts, and tables Report on findings from enquiries, including oral and written explanations, of results and conclusions Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes Use straightforward scientific evidence to answer questions or to support their findings Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Vocabulary Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.</p>	

Lower Key Stage 2 units:

B: Electricity		LKS2		Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> Construct a range of circuits, draw diagrams and label the parts of the circuit. Plan and perform a test to explore which materials can be used instead of wires to make a circuit. Classify the materials that were suitable/not suitable for wires. Explore how to connect a range of different switches, investigate and identify how they function in different ways. Choose switches to add to circuits to solve particular problems, such as a pressure switch for a burglar alarm report how it works. Apply their knowledge of conductors and insulators to design and make different types of switch. Report on the structures of circuits using drawings which show how the components are connected Make circuits that can be controlled as part of a DT project. 				Year 3		Year 4		
				<p>Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol</p>				
				Disciplinary concepts				
				<p>Set up simple and practical enquiries, comparative and fair tests with some support. Use standard units when taking measurements. With modelling and guidance, classify. Suggest how findings could be reported.</p>		<p>Set up simple and practical enquiries, comparative and fair tests. Classify and present data in a variety of ways to help to answer questions. Report on findings from enquiries, including oral and written explanations, of results and conclusions. Report on findings from enquiries using displays or presentations.</p>		
Categories of disciplinary knowledge								
Asking and answering questions		Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment			
Identifying, labelling and classifying		Measuring	Using results	Gathering and recording findings	Presenting data			
Drawing conclusions		Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions			
Unit Overview				Misconceptions				
<p>Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity.</p>				<ul style="list-style-type: none"> ⚡ Electricity flows to bulbs, not through them. ⚡ Electricity flows out of both ends of a battery. ⚡ Electricity works by simply coming out of one end of a battery into the component. 				

Progression of Disciplinary Knowledge

End of Year 3

Ask relevant questions when prompted
 Use different types of scientific enquiry to answer them.
 Set up simple and practical enquiries, comparative and fair tests with some support.
 Make systematic and careful observations, using simple equipment including thermometers.
 Use standard units when taking measurements
 With modelling and guidance, gather, record, classify and present data in a variety of ways to help to answer questions
 With prompting, use various ways of recording, grouping and displaying evidence and suggest how findings may be tabulated
 With prompting, suggest conclusions from enquiries Suggest how findings could be reported
 Suggest possible improvements or further questions to investigate

Vocabulary

Scientific enquiry changes over time, notice patterns, secondary sources, comparative tests, fair tests, careful, accurate, observations, equipment, gather, measure, record, data, evidence, results, keys, bar charts, table, results, conclusions, predictions, support.

End of Year 4

observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

Ask relevant questions.
 Use different types of scientific enquiries to answer their questions
 Set up simple and practical enquiries, comparative and fair tests
 Make systematic and careful observations using a range of equipment, including thermometers and data loggers
 Take accurate measurements using standard units, where appropriate
 Gather, record, classify and present data in a variety of ways to help to answer questions
 Record findings using simple scientific language, drawings and labelled diagrams
 Record findings using keys, bar charts, and tables
 Report on findings from enquiries, including oral and written explanations, of results and conclusions
 Report on findings from enquiries using displays or presentations Identify differences, similarities or changes related to simple scientific ideas and processes
 Use straightforward scientific evidence to answer questions or to support their findings
 Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Previous vocab plus enquiry types increase, decrease, identify, classify, order, notice patterns, relationships, appearance, present results, data loggers.

Upper Key Stage 2 units:

A: Light	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> Describe, with diagrams or models as appropriate, how light travels in straight lines either from sources or reflected from other objects into our eyes. Devise and perform tests and record with diagrams or models as appropriate, to show how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape. Answer questions that explain how evidence from enquiries shows that light travels in straight lines. Predict and explain, with diagrams or models as appropriate, how the path of light rays can be directed by reflection to be seen, e.g. the reflection in car rear view mirrors or in a periscope. Observe how the shape of shadows can be varied. Explore different ways to demonstrate that light travels in straight lines e.g. shining a torch down a bent and straight hose pipe, shining a torch through different shaped holes in card. Ask and answer questions about the behaviour of light, reflection and shadows, such as in periscope design, rear view mirrors and shadow puppets. 	<p>Year 5</p>	<p>Year 6</p> <p>Light, Light source Dark, absence of light Transparent, Translucent Opaque, Shiny, matt, Surface, Shadow, reflect Mirror, Sunlight, Dangerous Straight lines, Light rays</p>				
	Disciplinary concepts					
	<p>Plan different types of scientific enquiries to answer questions. With prompting, recognise and control variables where necessary. Record data and results using labelled diagrams, keys, tables and charts. Use line graphs to record data. Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships.</p>	<p>Plan different types of scientific enquiries to answer questions. Recognise and control variables where necessary. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Report and present findings from enquiries, including explanations of, and degree of, trust in results</p>				
	Categories of disciplinary knowledge					
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>Light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen.</p> <p>Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.</p>		<ul style="list-style-type: none"> We see objects because light travels from our eyes to the object. A shadow is a reflection from the Sun. Our eyes produce light so we can see things. The distance light travels depends on day or night. Objects that reflect are sources of light (e.g., the Moon). 				

Progression of Disciplinary Knowledge

End of Year 5

Plan different types of scientific enquiries to answer questions.
 With prompting, recognise and control variables where necessary
 Select, with prompting, and use appropriate equipment to take readings
 Take precise measurements using standard units
 Begin to understand the need for repeat readings
 Take and process repeat readings
 Record data and results
 Record data using labelled diagrams, keys, tables and charts
 Use line graphs to record data
 Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships
 With support, present findings from enquiries orally and in writing
 Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

Plan different types of scientific enquiries to answer questions
 Recognise and control variables where necessary
 Use a range of scientific equipment to take measurements
 Take measurements with increasing accuracy and precision
 Take repeat readings when appropriate
 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs
 Report and present findings from enquiries, including conclusions and causal relationships
 Report and presents findings from enquiries in oral and written forms such as displays and other presentation
 Report and present findings from enquiries, including explanations of, and degree of, trust in results Identify scientific evidence that has been used to support or refute ideas or arguments
 Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

A: Electricity	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p>		Year 5		Year 6		
<p>Substantive and Disciplinary Knowledge.</p>				Circuit Complete circuit Circuit diagram Circuit symbol Cell Battery Bulb Buzzer Motor Switch Voltage		
<ul style="list-style-type: none"> Explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightness's or make a motor go faster or slower. Make circuits to solve particular problems, such as a quiet and a loud burglar alarm. Carry out fair tests exploring changes in circuits. Communicate structures of circuits using circuit diagrams with recognised symbols. Devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Predict results and answer questions by drawing on evidence gathered. 		<p>Disciplinary concepts</p> <p>Plan different types of scientific enquiries to answer questions. With prompting, recognise and control variables where necessary. Select, with prompting, and use appropriate equipment to take readings. Take precise measurements using standard units. Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships With support, present findings from enquiries orally and in writing. Suggest further comparative or fair tests.</p>		<p>Plan different types of scientific enquiries to answer questions. Recognise and control variables where necessary. Use a range of scientific equipment to take measurements. Take measurements with increasing accuracy and precision. Take repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Report and present findings from enquiries, including conclusions and causal relationships Use test results to make predictions to set up further comparative and fair tests.</p>		
		<p>Categories of disciplinary knowledge</p>				
		Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment
		Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data
		Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions
<p>Unit Overview</p>		<p>Misconceptions</p>				
<p>Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well.</p> <p>You can use recognised circuit symbols to draw simple circuit diagrams.</p>		<ul style="list-style-type: none"> Larger-sized batteries make bulbs brighter A complete circuit uses up electricity Components in a circuit that are closer to the battery get more electricity. 				

Progression of Disciplinary Knowledge

End of Year 5

Plan different types of scientific enquiries to answer questions.
 With prompting, recognise and control variables where necessary
 Select, with prompting, and use appropriate equipment to take readings
 Take precise measurements using standard units
 Begin to understand the need for repeat readings
 Take and process repeat readings
 Record data and results
 Record data using labelled diagrams, keys, tables and charts
 Use line graphs to record data
 Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships
 With support, present findings from enquiries orally and in writing
 Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

Plan different types of scientific enquiries to answer questions
 Recognise and control variables where necessary
 Use a range of scientific equipment to take measurements
 Take measurements with increasing accuracy and precision
 Take repeat readings when appropriate
 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs
 Report and present findings from enquiries, including conclusions and causal relationships
 Report and presents findings from enquiries in oral and written forms such as displays and other presentation
 Report and present findings from enquiries, including explanations of, and degree of, trust in results Identify scientific evidence that has been used to support or refute ideas or arguments
 Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

A: Living Things and their Habitats	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important. • Use first-hand observation to identify characteristics shared by the animals in a group. • Use secondary sources to research the characteristics of animals that belong to a group. • Identify animals in the five vertebrate groups and some of the invertebrate groups and record the key characteristics. • Describe how living things are classified into broad groups according to common observable characteristics and identify similarities and differences, including micro-organisms, plants and animals. • Identify and compare the characteristics of animals in different groups • Use information about the characteristics of an unknown animal or plant to assign it to a group. • Create classification keys for plants and animals • Classify plants and animals, presenting this in a range of ways e.g. Venn diagrams, Carroll diagrams and keys. • Create an imaginary animal which has features from one or more groups. 	<p>Year 5</p> <p>Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings</p>	<p>Year 6</p> <p>Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering</p>				
	Disciplinary concepts					
	<p>Record data and results using labelled diagrams, keys, tables and charts. Use line graphs to record data. Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships. Use straightforward scientific evidence to answer questions or to support their findings. With support, present findings from enquiries orally and in writing.</p>	<p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Report and presents findings from enquiries in oral and written forms such as displays and other presentation. Identify scientific evidence that has been used to support or refute ideas or arguments.</p>				
	Categories of disciplinary knowledge					
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>Living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other living things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot.</p> <p>Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms.</p> <p>Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.</p>		<ul style="list-style-type: none"> ✚ All micro-organisms are harmful. ✚ Mushrooms are plants. 				

Progression of Disciplinary Knowledge

End of Year 5

Plan different types of scientific enquiries to answer questions.
 With prompting, recognise and control variables where necessary
 Select, with prompting, and use appropriate equipment to take readings
 Take precise measurements using standard units
 Begin to understand the need for repeat readings
 Take and process repeat readings
 Record data and results
 Record data using labelled diagrams, keys, tables and charts
 Use line graphs to record data
 Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships
 With support, present findings from enquiries orally and in writing
 Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Plan different types of scientific enquiries to answer questions
 Recognise and control variables where necessary
 Use a range of scientific equipment to take measurements
 Take measurements with increasing accuracy and precision
 Take repeat readings when appropriate
 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs
 Report and present findings from enquiries, including conclusions and causal relationships
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 Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

A: Animals including Humans	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Draw a diagram of the circulatory system, label the parts and annotate it to show what the parts do. • Create a model of the circulatory system. • Plan and perform a range of pulse rate investigations: <ul style="list-style-type: none"> • fair test - effect of different activities on my pulse rate • pattern seeking - exploring which groups of people may have higher or lower resting pulse rates • observation over time - how long does it take my pulse rate to return to my resting pulse rate (recovery rate) • pattern seeking - exploring recovery rate for different groups of people. • Use subject knowledge about the heart to draw conclusions from investigations. • Research the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources. • Report information e.g. in a health leaflet describing impact of drugs and lifestyle on the body. 	<p>Year 5</p> <p>Puberty - the vocabulary to describe sexual characteristics</p>	<p>Year 6</p> <p>Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle</p>				
	Disciplinary concepts					
	<p>Plan different types of scientific enquiries to answer questions. With prompting, recognise and control variables where necessary. Select, with prompting, and use appropriate equipment to take readings. Take precise measurements using standard units. Begin to understand the need for repeat readings. Take and process repeat readings. Record data and results using labelled diagrams, keys, tables and charts. Use line graphs to record data. Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships. With support, present findings from enquiries orally and in writing. Suggest further comparative or fair tests.</p>	<p>Plan different types of scientific enquiries to answer questions. Recognise and control variables where necessary. Use a range of scientific equipment to take measurements. Take measurements with increasing accuracy and precision. Take repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Report and presents findings from enquiries in oral and written forms such as displays and other presentation. Use test results to make predictions to set up further comparative and fair tests.</p>				
	Categories of disciplinary knowledge					
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.</p> <p>Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. This content is also included in PSHE. The new statutory requirements for relationships and health education can be found below:</p> <p>https://www.gov.uk/government/publications/relationships-education-relationships-and-sex-education-rse-and-health-education/physical-health-and-mental-wellbeing-primary-and-secondary</p>		<ul style="list-style-type: none"> ✚ Your heart is on the left side of your chest. ✚ The heart makes blood. ✚ The blood travels in one loop from the heart to the lungs and around the body. ✚ When we exercise, our heart beats faster to work the muscles more. ✚ Some blood in our bodies is blue and some blood is red. ✚ We just eat food for energy. ✚ All fat is bad for you. ✚ All dairy is good for you. ✚ Protein is good for you, so you can eat as much as you want. ✚ Foods only contain fat if you can see it. ✚ All drugs are bad for you. 				

Progression of Disciplinary Knowledge

End of Year 5

Plan different types of scientific enquiries to answer questions.
 With prompting, recognise and control variables where necessary
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 Take precise measurements using standard units
 Begin to understand the need for repeat readings
 Take and process repeat readings
 Record data and results
 Record data using labelled diagrams, keys, tables and charts
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 Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships
 With support, present findings from enquiries orally and in writing
 Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Plan different types of scientific enquiries to answer questions
 Recognise and control variables where necessary
 Use a range of scientific equipment to take measurements
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 Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

A: Evolution and Inheritance		UKS2		Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Identify characteristics that make a plant or animal suited or not suited to a particular habitat • Identify examples of living things that lived millions of years ago and the fossil evidence we have to support this • Use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity. • Use secondary sources to find out about how the population of peppered moths changed during the industrial revolution. • Use secondary sources to identify and explain why the dominant colour of the peppered moth changed over a very short period of time • Make observations of fossils to identify living things that lived on Earth millions of years ago. • Identify features in animals and plants that are passed on to offspring and explore this process by considering the artificial breeding of animals or plants e.g. dogs. • Compare the ideas of Charles Darwin and Alfred Wallace on evolution. • Research the work of Mary Anning and how this provided evidence of evolution. 				Year 5		Year 6		
				Disciplinary concepts				
				Record data and results using labelled diagrams, keys, tables and charts. Use line graphs to record data. Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships. Use straightforward scientific evidence to answer questions or to support their findings.			Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Report and present findings from enquiries, including conclusions and causal relationships Identify scientific evidence that has been used to support or refute ideas or arguments.	
				Categories of disciplinary knowledge				
				Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment
				Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data
				Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions
Unit Overview				Misconceptions				
<p>All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other.</p> <p>Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution.</p> <p>Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.</p>				<ul style="list-style-type: none"> ✚ Adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life. ✚ Offspring most resemble their parents of the same sex, so that sons look like fathers. ✚ All characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited. ✚ Cavemen and dinosaurs were alive at the same time. 				

Progression of Disciplinary Knowledge

End of Year 5

Plan different types of scientific enquiries to answer questions.
 With prompting, recognise and control variables where necessary
 Select, with prompting, and use appropriate equipment to take readings
 Take precise measurements using standard units
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 Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships
 With support, present findings from enquiries orally and in writing
 Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

Plan different types of scientific enquiries to answer questions
 Recognise and control variables where necessary
 Use a range of scientific equipment to take measurements
 Take measurements with increasing accuracy and precision
 Take repeat readings when appropriate
 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs
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 Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

B: Animals including Humans	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Identify and explain the changes that takes place in boys and girls during puberty. • Identify and explain how a baby changes physically as it grows, and also what it is able to do. • Present information about the changes occurring during puberty as an information leaflet for other Y5 children or answers to 'problem page questions'. 	Year 5	Year 6				
	Puberty - the vocabulary to describe sexual characteristics	Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle				
	Disciplinary concepts					
	Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships. With support, present findings from enquiries orally and in writing.	Report and present findings from enquiries, including conclusions and causal relationships Report and presents findings from enquiries in oral and written forms such as displays and other presentation. Report and present findings from enquiries, including explanations of, and degree of, trust in results.				
Categories of disciplinary knowledge						
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce.</p> <p>This needs to be taught alongside PSHE.</p>		<ul style="list-style-type: none"> ✚ A baby grows in a mother's tummy. ✚ A baby is "made". 				

Progression of Disciplinary Knowledge

End of Year 5

researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.

Plan different types of scientific enquiries to answer questions.

With prompting, recognise and control variables where necessary

Select, with prompting, and use appropriate equipment to take readings

Take precise measurements using standard units

Begin to understand the need for repeat readings

Take and process repeat readings

Record data and results

Record data using labelled diagrams, keys, tables and charts

Use line graphs to record data

Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships

With support, present findings from enquiries orally and in writing

Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

Plan different types of scientific enquiries to answer questions

Recognise and control variables where necessary

Use a range of scientific equipment to take measurements

Take measurements with increasing accuracy and precision

Take repeat readings when appropriate

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs

Report and present findings from enquiries, including conclusions and causal relationships

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Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

B: Living Things and their Habitats	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Use secondary sources and, where possible, first-hand observations to find out about the life cycle of a range of animals. • Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth. • Compare two or more animal life cycles • Draw the life cycle of a range of animals identifying similarities and differences between the life cycles • Look for patterns between the size of an animal and its expected life span. • Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes. • Identify and explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways • Plant bulbs and then harvest to see how they multiply. • Use secondary sources to find out about pollination. 	<p>Year 5</p> <p>Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings</p>	<p>Year 6</p> <p>Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering</p>				
	Disciplinary concepts					
	<p>Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships. Use straightforward scientific evidence to answer questions or to support their findings. With support, present findings from enquiries orally and in writing. Suggest further comparative or fair tests.</p>	<p>Report and present findings from enquiries, including conclusions and causal relationships. Report and present findings from enquiries, including explanations of, and degree of, trust in results. Identify scientific evidence that has been used to support or refute ideas or arguments. Use test results to make predictions to set up further comparative and fair tests.</p>				
	Categories of disciplinary knowledge					
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis.</p> <p>Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.</p>		<ul style="list-style-type: none"> ✚ All plants start out as seeds. ✚ All plants have flowers. ✚ Plants that grow from bulbs do not have seeds. ✚ Only birds lay eggs. 				

Progression of Disciplinary Knowledge

End of Year 5

observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.

- Plan different types of scientific enquiries to answer questions.
- With prompting, recognise and control variables where necessary
- Select, with prompting, and use appropriate equipment to take readings
- Take precise measurements using standard units
- Begin to understand the need for repeat readings
- Take and process repeat readings
- Record data and results
- Record data using labelled diagrams, keys, tables and charts
- Use line graphs to record data
- Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships
- With support, present findings from enquiries orally and in writing
- Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

- Plan different types of scientific enquiries to answer questions
- Recognise and control variables where necessary
- Use a range of scientific equipment to take measurements
- Take measurements with increasing accuracy and precision
- Take repeat readings when appropriate
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs
- Report and present findings from enquiries, including conclusions and causal relationships
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- Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

B: Properties and changes of materials	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Identify and use understanding of properties to explain everyday uses of materials, for example, how bricks, wood, glass and metals are used in buildings. • Create charts or tables grouping/comparing everyday materials by different properties. • Explore adding a range of solids to water and other liquids e.g. cooking oil, as appropriate. • Investigate rates of dissolving by carrying planning and performing a comparative and fair test and report results. • Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture. • Use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving. • give reasons for choice of equipment and methods to separate a given solution or mixture such as salt or sand in water • Explore a range of non-reversible changes e.g. rusting, adding fizzy tablets to water, burning. • Carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced? • Use secondary sources to research new materials produced by chemists e.g. Spencer Silver (glue of sticky notes) and Ruth Benerito (wrinkle free cotton). • Plan and perform a test to investigate the properties of different materials in order to recommend materials for particular functions depending on these properties e.g. test waterproofness and thermal insulation to identify a suitable fabric for a coat. • Use test evidence gathered about different properties to suggest an appropriate material for a particular purpose. 	Year 5	Year 6				
	Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material					
	Disciplinary concepts Plan different types of scientific enquiries to answer questions. With prompting, recognise and control variables where necessary. Select, with prompting, and use appropriate equipment to take readings. Take precise measurements using standard units. Record data and results using labelled diagrams, keys, tables and charts. Use straightforward scientific evidence to answer questions or to support their findings. With support, present findings from enquiries orally and in writing.	Plan different types of scientific enquiries to answer questions. Recognise and control variables where necessary. Use a range of scientific equipment to take measurements. Take measurements with increasing accuracy and precision. Take repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Report and present findings from enquiries, including explanations of, and degree of, trust in results. Identify scientific evidence that has been used to support or refute ideas or arguments.				
	Categories of disciplinary knowledge					
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.</p> <p>Mixtures can be separated by filtering, sieving and evaporation.</p> <p>Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.</p>		<p>Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed.</p> <ul style="list-style-type: none"> ✚ Thermal insulators keep cold in or out. ✚ Thermal insulators warm things up. ✚ Solids dissolved in liquids have vanished and so you cannot get them back. ✚ Lit candles only melt, which is a reversible change. 				

Progression of Disciplinary Knowledge

End of Year 5

carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.

Plan different types of scientific enquiries to answer questions.

With prompting, recognise and control variables where necessary

Select, with prompting, and use appropriate equipment to take readings

Take precise measurements using standard units

Begin to understand the need for repeat readings

Take and process repeat readings

Record data and results

Record data using labelled diagrams, keys, tables and charts

Use line graphs to record data

Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships

With support, present findings from enquiries orally and in writing

Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

Plan different types of scientific enquiries to answer questions

Recognise and control variables where necessary

Use a range of scientific equipment to take measurements

Take measurements with increasing accuracy and precision

Take repeat readings when appropriate

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs

Report and present findings from enquiries, including conclusions and causal relationships

Report and presents findings from enquiries in oral and written forms such as displays and other presentation

Report and present findings from enquiries, including explanations of, and degree of, trust in results Identify scientific evidence that has been used to support or refute ideas or arguments

Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

B: Earth and Space	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> • Use secondary sources to create a model to show the movement of the Earth around the Sun and the Moon around the Earth. • Gather and record information to produce information to explain how the Earth moves in relation to the Sun and the Moon moves in relation to the Earth. • Use secondary sources to help make a model to show why day and night occur. • Make first-hand observations of how shadows caused by the Sun change through the day. • Make a sundial and report how it works. • Research time zones. • Consider the views of scientists in the past and evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel. 	Year 5	Year 6				
	<p>Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets</p>					
	<p>Disciplinary concepts</p>					
	<p>Select, with prompting, and use appropriate equipment to take readings. Take precise measurements using standard units. Take and process repeat readings. Record data and results using labelled diagrams, keys, tables and charts. Use line graphs to record data. Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships. Use straightforward scientific evidence to answer questions or to support their findings.</p>	<p>Use a range of scientific equipment to take measurements. Take measurements with increasing accuracy and precision. Take repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Report and present findings from enquiries, including conclusions and causal relationships Report and present findings from enquiries, including conclusions and causal relationships Report and present findings from enquiries, including explanations of, and degree of, trust in results. Identify scientific evidence that has been used to support or refute ideas or arguments.</p>				
<p>Categories of disciplinary knowledge</p>						
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
<p>Unit Overview</p>		<p>Misconceptions</p>				
<p>The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes $365\frac{1}{4}$ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.</p>		<ul style="list-style-type: none"> ✘ The Earth is flat. ✘ The Sun is a planet. ✘ The Sun rotates around the Earth. ✘ The Sun moves across the sky during the day. ✘ The Sun rises in the morning and sets in the evening. ✘ The Moon appears only at night. ✘ Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth. 				

Progression of Disciplinary Knowledge

End of Year 5 comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.

Plan different types of scientific enquiries to answer questions.

With prompting, recognise and control variables where necessary

Select, with prompting, and use appropriate equipment to take readings

Take precise measurements using standard units

Begin to understand the need for repeat readings

Take and process repeat readings

Record data and results

Record data using labelled diagrams, keys, tables and charts

Use line graphs to record data

Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships

With support, present findings from enquiries orally and in writing

Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

Plan different types of scientific enquiries to answer questions

Recognise and control variables where necessary

Use a range of scientific equipment to take measurements

Take measurements with increasing accuracy and precision

Take repeat readings when appropriate

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs

Report and present findings from enquiries, including conclusions and causal relationships

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Report and present findings from enquiries, including explanations of, and degree of, trust in results Identify scientific evidence that has been used to support or refute ideas or arguments

Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.

Upper Key Stage 2 units:

B: Forces	UKS2	Key Vocabulary				
<p>Rigour comes from the effective interplay between substantive and disciplinary knowledge. Highlighted in yellow below is the disciplinary knowledge and how it relates to the substantive knowledge.</p> <p>Substantive and Disciplinary Knowledge.</p> <ul style="list-style-type: none"> Investigate and identify the effect of friction in a range of contexts e.g. trainers, bathmats, mats for a helter-skelter. Investigate and identify the effects of water resistance in a range of contexts e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water. Investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats. Gather and record evidence from investigations to draw conclusions. Explore and identify how levers, pulleys and gears work. Make a product that involves a lever, pulley or gear and demonstrates how they work. Create a timer that uses gravity to move a ball. Use secondary sources to research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. Plan and perform a test to demonstrate the effect of gravity acting on an unsupported object. 	Year 5	Year 6				
	Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears					
	Disciplinary concepts					
	Plan different types of scientific enquiries to answer questions. With prompting, recognise and control variables where necessary. Select, with prompting, and use appropriate equipment to take readings. Take precise measurements using standard units. Record data and results using labelled diagrams, keys, tables and charts. Use line graphs to record data. Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships. Use straightforward scientific evidence to answer questions or to support their findings.	Plan different types of scientific enquiries to answer questions. Recognise and control variables where necessary. Use a range of scientific equipment to take measurements. Take measurements with increasing accuracy and precision. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs. Report and present findings from enquiries, including conclusions and causal relationships. Identify scientific evidence that has been used to support or refute ideas or arguments.				
Categories of disciplinary knowledge						
Asking and answering questions	Observing closely	Performing tests	Planning enquiries and tests	Using a range of equipment		
Identifying, labelling and classifying	Measuring	Using results	Gathering and recording findings	Presenting data		
Drawing conclusions	Reporting	Identifying and using scientific evidence	Identifying similarities difference and change	Making predictions		
Unit Overview		Misconceptions				
<p>A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.</p>		<ul style="list-style-type: none"> The heavier the object the faster it falls because it has more gravity acting on it. Forces always act in pairs which are equal and opposite Smooth surfaces have no friction. Objects always travel better on smooth surfaces. A moving object has a force which is pushing it forwards and it stops when the pushing force wears out. A non-moving object has no forces acting on it. Heavy objects sink and light objects float. 				

Progression of Disciplinary Knowledge

End of Year 5

exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.

Plan different types of scientific enquiries to answer questions.

With prompting, recognise and control variables where necessary

Select, with prompting, and use appropriate equipment to take readings

Take precise measurements using standard units

Begin to understand the need for repeat readings

Take and process repeat readings

Record data and results

Record data using labelled diagrams, keys, tables and charts

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Report and present findings from enquiries, including conclusions and, with prompting, suggest causal relationships

With support, present findings from enquiries orally and in writing

Suggest further comparative or fair tests

Vocabulary

Previous vocab plus, notice patterns, relationships, independent variable, dependent variable, controlled variable, accuracy, precision, degree of trust, classification keys, scatter graphs, line graphs, causal relationships, support/refute.

End of Year 6

Plan different types of scientific enquiries to answer questions

Recognise and control variables where necessary

Use a range of scientific equipment to take measurements

Take measurements with increasing accuracy and precision

Take repeat readings when appropriate

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar charts and line graphs

Report and present findings from enquiries, including conclusions and causal relationships

Report and presents findings from enquiries in oral and written forms such as displays and other presentation

Report and present findings from enquiries, including explanations of, and degree of, trust in results. Identify scientific evidence that has been used to support or refute ideas or arguments

Use test results to make predictions to set up further comparative and fair tests

Vocabulary

Previous vocab plus opinion/fact, confidently name scientific enquiry types.