Whipton Barton Federation Science Long Term Curriculum Map

At Whipton Barton Federation, we aim to provide all students with a deep understanding of the world around them, beginning from the moment they join us. We cultivate the mindset of children as scientists, encouraging them to approach each task with curiosity and a desire to expand their knowledge. Our Science curriculum equips students with essential practical skills, scientific knowledge, and an understanding of both scientific processes and their real-world applications, both today and in the future.

Practical experimentation is a cornerstone of our approach, allowing students to apply key scientific concepts in real-world contexts. This hands-on learning builds year on year, ensuring comprehensive coverage and preparation for Key Stage 3.

Scientific Enquiry Across the Curriculum

Scientific enquiry is at the heart of each Science unit, with students encouraged to explore questions about the world around them. These enquiry skills are revisited and developed throughout their time at Whipton Barton Federation, ensuring a consistent progression in their understanding. Below are examples of how enquiry skills develop as students move through the primary years.

Reception

In Reception, children are introduced to core scientific principles through exploration and questioning. They engage in activities like testing materials to determine which would be suitable for a bear to wear in the rain. These activities help children develop key scientific skills, such as observation, prediction, critical thinking, and communication. Continuous provision and adult-led activities foster curiosity, with topics such as animal classification, plant growth, and the life cycles of plants and animals explored. Through stories like *Supertato: The Return of Evil Pea*, children engage in investigations such as how to melt ice, linking storytelling with scientific concepts.

Year 1

In Year 1, children begin asking simple scientific questions and recognise that there are various ways to answer them. They observe the world closely, using simple tools, and start to classify objects. Topics include the identification of plants and animals, the basic structure of common plants, animal diets (carnivores, herbivores, omnivores), and the changing seasons.

Year 2
In Year 2, students develop their scientific enquiry skills by using their observations to suggest answers and record data. Topics covered include living and non-living things, habitats, food chains, plant needs, animal needs, and material suitability.

Year 3
In Year 3, children conduct simple scientific enquiries by asking relevant questions, making careful observations, and recording findings. They investigate plant functions, how water is transported in plants, animal structures, rock and soil types, light and shadows, and the effect of forces.

Year 4
In Year 4, children engage in comparative and fair testing, using scientific language and presenting their findings through drawings, charts, and predictions. Topics include classification of living things, human body functions, animal adaptations, sound production, and electrical circuits.

Year 5
In Year 5, students plan various types of scientific enquiries, take measurements, and use results to make predictions. They explore life cycles, physical and chemical changes, Earth and Space, and magnetism.

Year 6
In Year 6, children refine their scientific enquiry skills by recognising and controlling variables, taking precise measurements, and presenting findings. They explore sustainability, the impact of lifestyle on health, evolution, and energy transfer.

Core Skills and Scientific Enquiry Methods

Throughout their time with us, students develop a range of skills, including observation, planning, investigation, and the use of specialist vocabulary. Effective questioning and communication of ideas are emphasised. Key scientific enquiry methods—such as observing over time, pattern seeking, classification, comparative testing, and research—are embedded in the curriculum. We aim to foster a lasting enthusiasm and interest in Science, helping students to become confident and inquisitive scientists.

Year	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Reception	Children are naturally curious and, throughout their Reception year, they are introduced to core scientific principles as they explore and question the world around them. For example, they might be asked, "Which materials would be good for Bear to wear if he went splashing in the rain?" This activity encourages children to think scientifically by prompting them to consider questions like: What are we trying to find out? How can we test the materials? Which materials might work best and why? How can we ensure the test is fair? What did we learn from the test? By introducing these basic concepts of scientific testing early on, children develop essential skills in observation, prediction, critical thinking, and discussion. In the Early Years, the curiosity to explore and investigate is nurtured through both continuous provision and adult-led activities, with resources like exploration and interest trays set up in the learning environment. The Early Years curriculum covers a wide range of scientific topics, including animal classification, plant growth from seeds, the life cycles of plants and animals (such as butterflies and frogs), the seasons, and changes in states of matter. Science is taught not only during specific topic time but also integrated into many of our 'Talk Through Stories'. For instance, during the Superhero topic, we read *Supertato: The Return of Evil Pea*, where Evil Pea escapes from the freezer and freezes the entire supermarket. Throughout the week, children engage in activities such as investigating the quickest way to melt ice, determining the best location for the ice to melt, and discussing methods to break the ice. This story also provides opportunities to discuss illustrations, such as why the red chillies are rubbing themselves on the ice, with one child explaining, "Because chillies are hot and hot things melt ice."					
Year	**Term 1**	**Term 2**	**Term 3**	**Term 4**	**Term 5**	**Term 6**
Year 1	**Polar Adventures**	**Who Am I?**	**Holiday**	**On Safari**	**Celebrations**	**Treasure Island**
Knowledge	To know where the North Pole is. To know where the South Pole is. To know where the Arctic is. To know where the Antarctic is.	To identify and label parts of the body. To know basic parts of the skeleton. To know each of the senses. To know that smells pass through the air (as particles).	To know the differences between hot and cold places. To know what clothing would be appropriate for hot conditions. To know what clothing would be appropriate for cold conditions.	To know what a vertebrate is. To know what an invertebrate is. To describe different habitats of some invertebrates. To compare different invertebrates.	To know how to discuss scientific findings. To know what illuminate means. To know what a light source is. To know and give examples of different light sources.	To know and name some of the most important things humans need to survive. To know what an island is. To name different everyday materials.

	To describe what the Arctic regions are like. To describe what clothes would be appropriate for the Arctic regions. To be able to identify the most suitable materials to keep warm. To know how to give a reason for an answer. To know how to conduct a fair test to test suitable materials for the Arctic conditions. To know what a carnivore is. To know what a herbivore is. To know what an omnivore is. To give examples of prey and predators. To know how to classify some animals.	To know that we taste with our mouth and our nose. To use the terms: sweet, sour, bitter and salty to describe tastes. To know how our eyes help us. To know basic parts of the eye. To know how we use our sense of touch. To describe how materials feel using the sense of touch. To know that we use our ears to hear sounds.	To make predictions. To know how to conduct a fair test with support. To know and name a variety of fish. To know and name a variety of amphibians. To know and name a variety of reptiles. To know and name a variety of birds. To know and name a variety of mammals. To know what a marine biologist does. To name a variety of everyday materials. To know how to classify some everyday materials. To know how to use observations to suggest answers. To describe how humans can affect turtle sea life.	To identify some similarities between some invertebrates. To identify some differences between some invertebrates. To know how to gather some simple data. To know some simple food chains. To draw some simple food chains.	To make connections between light and different celebrations. To compare different light sources in terms of brightness levels. To begin to describe how shadows are made. To know that different fabrics can create different types of shadows. To describe what opaque means. To describe what translucent means. To describe what transparent means. To be able to classify some objects using opaque, translucent and transparent. To know and use the term reflective. To know and describe simple physical	To know the purpose of some everyday materials. To describe how some materials would be useful when designing a shelter. To know what waterproof means. To know what windproof means. To describe some harmful effects of the sun. To describe appropriate ways to protect our bodies from the sun. To know what sun proof means. To know what float means. To know what sink means. To be able to use materials knowledge to design a raft that will float.

	To know why nutrition is important. To know that food provides energy. To make predictions and record results.		To describe how we could improve our local environment.		properties of a variety of everyday objects. To know that sounds are made by vibrations. To know how to identify sources of some sounds.	To be able to evaluate the designs. To begin to know the importance of a varied diet. To begin to make comparisons between humans and fish.
Key Vocabulary	Arctic, Antarctic, carnivore, herbivore, omnivore, prey, predator, materials	smell, taste, hear, touch, sight, senses	species, fish, bird, amphibian, reptiles, mammals, materials, pollution	vertebrate, invertebrate, food chain, predator, prey, observe, findings, results, conclusion	illuminate, light source, opaque, translucent, transparent, shadow	island, waterproof, windproof, sun proof, sink, float, materials
National Curriculum	**Year 1 National Curriculum Science Statements** **Working Scientifically** Ask simple questions and recognise that they can be answered in different ways (Polar Regions) (On Safari) (Holiday) Use simple equipment to observe closely (Who am I?) (On Safari) (Holiday) (Celebrations) Perform simple tests (Polar Regions) (On Safari) (Holiday) Identify and classify (Polar Regions) (On Safari) (Holiday) (Celebrations) Use his/her observations and ideas to suggest answers to questions (Polar Regions) (On Safari) (Holiday) (Celebrations) Gather and record data to help in answering questions (Who am I?) (Holiday) (Celebrations) **Animals, Including Humans** Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals (Polar Regions) (Holiday) (On Safari) (Treasure Island) Group animals according to what they eat (Treasure Island) Identify and name a variety of common animals that are carnivores, herbivores and omnivores (Holiday) (On Safari)					

	• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds, mammals, including pets (Polar Regions) (Holiday) (On Safari) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense (Who am I?) (Treasure Island) **Materials** • Distinguish between an object and the material from which it is made (Celebrations) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock (Polar Regions) (Holiday) (On Safari) (Celebrations) • Describe the simple physical properties of a variety of everyday materials (Polar Regions) (Holiday) (Celebrations) (Treasure Island) • Compare and group together a variety of everyday materials on the basis of their simple physical properties (Treasure Island) **Plants** • Identify and name a variety of common wild and garden plants, including, deciduous and evergreen trees (Treasure Island) • Identify and describe the basic structure of a variety of common flowering plants, including trees (Celebrations) **Seasonal Changes - taught throughout the year, not as a stand-alone unit** • Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies

Year 2	Healthy Me	Mini Worlds	Materials Monster	Move It	Young Gardeners	Little Masterchef
Knowledge	To begin to know what it means to be healthy, both physically and mentally. To know why people exercise.	To know why objects may look different when magnified. To know what plants need to grow well. To know what animals need to survive.	To know and identify different everyday materials. To classify different materials. To know vocabulary to describe physical properties of materials.	To define a force. To know the difference between push and pull motions. To name some different forces.	To know how to identify key vocabulary on seed packets. To describe the optimum conditions for growing seeds. To name what a plant needs to grow healthily.	To know what a chef does. To know what hygiene is. To describe why hygiene is important in a kitchen. To know how to classify utensils in different ways.

	To know that fitness is not based on weight. To begin to know the impact of exercise on our body. To know how to maintain a fair test. To know and name different everyday materials. To compare suitability of different everyday materials. To identify healthy snacks. To describe how germs can be transferred between people. To name ways that you can be more hygienic and stop germs spreading.	To know what magnify means. To describe the appearance of materials through a magnifying glass. To identify is something is living. To identify is something is dead. To identify is something has never been alive. To know what features mean something is alive. To define a habitat. To describe how different habitats provide for the basic needs of different kind of animals and plants. To define a micro-habitat. To describe how a habitat may be suitable for a living thing. To describe how a habitat may be	To know how to use some of the senses to find out about materials. To know what a microscope is used for. To know how to use a microscope. To compare suitability of a resource. To explain why a material may be suitable or unsuitable.	To know how to conduct a fair test. To know how to make predictions. To label some parts of a moving vehicle. To describe different wheel types. To describe how some materials will respond to different forces.	To name a variety of different plants. To describe how plants grow from seeds. To know what a cloche is. To identify key features of a cloche. To know what kind of things plants might need protection from. To identify suitable materials for a cloche. To explain why a gardener might use a cloche. To identify similarities and differences between a typical plant and a cactus.	To know how to classify foods in different ways. To know that food and water are a basic need. To describe why we need food. To describe why we need water.

		unsuitable for a living thing. To know how to describe a simple food chain. To identify and name different sources of food. To define predator and prey.				
Key Vocabulary	hydrate, dehydrate, diet, disease, energy, exercise, germs, hygiene, nutrition	magnifying lens, microscope, observe, habitat, micro-habitat, food chain, prey, predator	materials, suitability, properties, observe, durability, resources	force, pull, push, surface, friction, prediction, conclusion	germination, sprout, shoot, seed dispersal, sow, intervals, dormant, cloche	hygiene, classify, utensils, knead, vegetables, ingredients, healthy, carbohydrates, protein, fibre, fats, vitamins, minerals, water
National Curriculum	**Year 2 National Curriculum Science Statements** **Working Scientifically** - Ask simple questions and recognise that they can be answered in different ways, including use of scientific language from the national curriculum (Move It) (Young Gardeners) - Use simple equipment to observe closely including changes over time (Healthy Me) (Mini Worlds) (Materials Monster) (Move It) (Young Gardeners) - Communicate his/her ideas, what he/she does and what he/she finds out in a variety of ways (Little Masterchefs) - Perform simple comparative tests (Healthy Me) (Materials Monster) (Young Gardeners) - Identify groups and classify (Healthy Me) (Mini Worlds) (Materials Monster) (Move It) (Young Gardeners) - Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns (Healthy Me) (Mini Worlds) (Materials Monster) (Move It) (Young Gardeners) - Gather and record data to help in answering questions including from secondary sources of information (Healthy Me) (Mini Worlds) (Materials Monster) (Move It) (Young Gardeners)					

	Animals, Including Humans • Understand that animals, including humans, have offspring which grow into adults (Little Masterchefs) • Describe the basic needs of animals, including humans, for survival (food, water, air) (Mini Worlds) (Little Masterchefs) • Describe the importance for humans of exercise eating the right amounts of different types of food and hygiene (Healthy Me) (Little Masterchefs) **Living Things and their Habitat** • Explore and compare the differences between things that are living, things that are dead and things that have never been alive (Mini Worlds) • Identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs of different kinds of animals and plants, and how they depend on each other (Mini Worlds) • Identify and name a variety of plants and animals in their habitats, including micro-habitats (Mini Worlds) • 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 (Mini Worlds) **Materials** • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses (Mini Worlds) (Materials Monster) (Young Gardeners) (Little Masterchefs) • Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (Materials Monster) (Move It) (Little Masterchefs) **Plants** • Observe and describe how seeds and bulbs grow into mature plants (Young Gardeners) (Little Masterchefs) • Describe how plants need water, light and a suitable temperature to grow, stay healthy and describe the impact of changing these (Young Gardeners)

Year 3	Chemistry: Practical Skills	Chemistry: Rock Cycles	Physics: Light	Biology: Plants	Physics: Forces and Magnets	Chemistry: Raw and Synthetic Materials
Knowledge	To know the definition of dependent, independent and control variables.	To know the layers of the Earth.	To know what light is and where it comes from.	To know the three main types of variables.	To know how to define a force.	To know what a raw material is.

	To know how to plan a 'fair test'. To know how to identify variables in a range of experiments. To know the difference between diagrams and illustrations. To know how to identify and draw a range of scientific diagrams. To know how to follow instructions in a method. To know how to write a method for an investigation. To know how to collect data results. To know how to draw a results table and present results. To know how to interpret results. To know how to write a conclusion and present a conclusion. To know how to conduct an investigation.	To know the three main types of rock that make up the Earth's crust. To describe the steps in the rock cycle. To describe how igneous rock is created. To know and explain what intrusive and extrusive igneous rocks are. To know how to classify different types of igneous rock. To describe how sedimentary rock is formed. To describe how fossils are formed. To know and explain how we can tell the age of a sedimentary rock. To describe what metamorphosis is. To describe how metamorphic rock is formed.	To know what light and dark are. To know how we can measure levels of light. To describe what reflection is. To know what happens to the direction of light when it reflects. To know uses of reflection. To describe what refraction is. To know what happens to the direction of light when it refracts. To know uses of refraction. To know how we see. To know the different parts of the eye. To describe ways in which people can be partially sighted.	To know what a plant needs to survive. To know how to plan an investigation into factors affecting plant growth. To know the main parts and functions of a plant. To know how to identify the parts on a flower. To know the parts of a flowering plant's life cycle. To know the conditions required for germination. To know the 3 ways in which seed dispersal takes place. To know what transpiration is. To know the 3 main steps of water transport in plants. To know how to prove that water moves up a plant's stem.	To know the effect forces can have on an object. To name the forces acting upon a range of objects. To describe what Newton studied. To explain what a Newton Meter is and what it does. To know how to measure the size of a range of forces. To know how to define contact forces. To explain what causes a range of contact forces. To describe ways of changing the size of a frictional force. To know how to define non-contact forces. To know the cause and effect of gravitational forces.	To know how to sort raw materials based on where they come from. To describe the uses of some raw materials. To know what a synthetic material is. To sort materials into synthetic and raw materials. To describe the uses of some synthetic materials. To explain that raw materials change properties when made into synthetic materials. To know how glass is made from sand. To know how the properties of sand change to the properties of glass. To know how paper is made from wood. How describe the range of uses of paper.

	To know how to write an investigation report.	To know properties and uses of different metamorphic rocks. To know what a geologist is. To know how geologists identify rocks. To know how to draw an identification key. To describe the effect water can have on rocks. To describe chemical weathering and what is does. To know how large earth movements can cause rocks to change.	To know how white light can be used to make colours. To know how base colours of light can make new colours. To know how rainbows are created. To know different uses of light. To know how light is used in shadow puppetry. To explain how a periscope works.	To know what a plant adaptation is. To know how plants adapt to extreme hot and cold conditions. To know how plants adapt to attract or deter animals.	To describe how a magnetic force may lead to attraction or repulsion. To describe the forces acting on an object that floats in water. To know why the forces acting on an object may lead to it floating or sinking. To describe features of an object that enable it to float. To know what levers, gears and pulleys are. To know why levers, gears and pulleys are helpful. To describe applications of levers, gears and pulleys.	To explain why it is a good thing to recycle paper. To describe what the process of recycling involves. To know that making synthetic materials takes energy. To know the negative impact of using raw materials. To know what sustainably means. To describe ways of living sustainably. To explain some difficulties of living sustainably.
Key Vocabulary	diagram, conclusion, method, equipment, variable, dependent variable, control variable, independent variable, experiment, investigation, data, results	mineral, rock, magma, organic matter, hard, density, permeable, erosion, sediment, igneous, sedimentary, metamorphic, weathering, fossilisation	pupil, cornea, lens, retina, optic nerve, primary colours, secondary colours, periscope, shadow, opaque, translucent, transparent, light,	sepals, ovule, ovary, style, stigma, petal, filament, anther, transpiration, dispersal, germination, pollination, flowering, fertilisation, adaptations	force, contact, up-thrust, gravity, gravitational force, air resistance, water resistance, friction, magnetic force, physicist, motion,	material, raw, synthetic, recycling, sustainable, biodegradable, fossil fuels, substance

			sources, luminous, darkness, lux, reflection, refraction		newton meter, lever, pulley, gear	

National Curriculum

Year 3 National Curriculum Science Statements

Working Scientifically

- Ask relevant questions and use different types of scientific enquiries to answer them (Practical Skills) (Rock Cycle) (Light) (Plants) (Forces and Magnets) (Raw and Synthetic Materials)
- Set up simple practical enquiries, comparative and fair tests (Practical Skills) (Rock Cycle) (Light) (Plants) (Forces and Magnets) (Raw and Synthetic Materials)
- Make systematic and careful observations and where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (Practical Skills) (Light) (Plants) (Forces and Magnets)
- Gather, record, classify and present data in a variety of ways to help in answering questions (Practical Skills) (Rock Cycle) (Light) (Plants) (Forces and Magnets) (Raw and Synthetic Materials)
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables (Practical Skills) (Rock Cycle) (Light) (Plants) (Forces and Magnets) (Raw and Synthetic Materials)
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (Practical Skills) (Rock Cycle)
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (Practical Skills) (Rock Cycle) (Light) (Plants) (Forces and Magnets) (Raw and Synthetic Materials)
- Identify differences, similarities or changes related to simple scientific ideas and processes (Practical Skills) (Rock Cycle) (Light) (Plants) (Forces and Magnets) (Raw and Synthetic Materials)
- Use straightforward scientific evidence to answer questions or to support his/her findings (Practical Skills) (Rock Cycle) (Light) (Plants) (Forces and Magnets) (Raw and Synthetic Materials)

Forces and Magnets

- Compare how things move on different surfaces (Forces and Magnets)
- Notice that some forces need contact between two objects, but magnetic forces can act as a distance (Forces and Magnets)
- Observe how magnets attract or repel each other and attract some materials and not others (Forces and Magnets)
- 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 (Forces and Magnets)
- Describe magnets as having two poles (Forces and Magnets)
- Predict whether two magnets will attract or repel each other depending on which poles are facing (Forces and Magnets)

	Light • Recognise that he/she needs light in order to see things and that dark is the absence of light (Light) • Notice that light is reflected from surfaces (Light) • Recognise that light from the sun can be dangerous and there are ways to protect your eyes (Light) • Recognise that shows are formed when the light from a light source is blocked by a solid object (Light) • Find patterns in the way that a shadow changes in size (Light) **Plants** • Identify and describe the functions of different parts of flowering plants: roots, steam/trunk, leaves and flowers (Plants) • Explore and describe the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grown) and how they vary from plant to plant (Plants) • Investigate the way in which water is transported in plants (Plants) • Explore the part that flowers play in the life cycle of flowering plants, including pollination, see formation and seed dispersal (Plants) **Rocks** • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (Rock Cycle) • Describe in simple terms how fossils are formed when things that have lived are trapped within rock (Rock Cycle) • Recognise that soils are made from rocks and organic matter (Rock Cycle)

Year 4	Physics: Sound	Biology: Ecosystems	Chemistry: States of Matter	Physics: Electrical Circuits	Biology: Adaptations	Biology: Anatomy
Knowledge	To know what sound waves are. To know how we hear sounds. To explain how we can stop sound.	To know what a habitat is. To know what an ecosystem is. To identify the components of a given ecosystem.	To know what is meant by the property of a substance. To name the properties of solids, liquids and gases.	To know what static charge is. To know how to create a build-up of static charge.	To know what an adaptation is. To know that adaptations are not a 'choice'.	To label major organs in the human body. To know the functions of the major human organs.

	To know how sounds are produced. To describe ways that different sounds can be made. To make your own instrument. To know what the pitch of a sound is. To describe ways to change the pitch of a sound. To give examples of objects that produce high and low pitch sounds. To know what the amplitude of sound is. To know how to change the amplitude of a sound. To give examples of high amplitude and low amplitude. How know what the science of acoustics involves. To know how scientists dampen noise that is not wanted.	To define a carnivore, herbivore and omnivore. To name some animals that are carnivores, herbivores and omnivores. To know how to draw a Venn diagram to sort animals based on what they eat. To know what a producer is. To identify producers in a given ecosystem. To explain how plants make their own food. To know that food chains show the transfer of energy between organisms. To know how to label a food chain. To know how to construct a food chain. To know how to draw scientific sketches. To know how to show energy transfer between	To explain which state or matter a substance is in based on its properties. To know what a particle is. To describe how particles are arranged in solids, liquids and gases. To explain how we know that particles in solids, liquids and gases are moving. To know what happens to particles when a substance is heated or cooled. To predict what happens to a solid, liquid or gas when it is heated or cooled. To know how to give evidence to show that each state expands when heated and contracts when cooled. To know what happens to the arrangement of particles when a	To explain how a build-up of charge leads to sparks through the air. To describe the parts of an electrical circuit. To explain how electricity in a circuit is different to static electricity. To state the conditions for electricity to flow in a circuit. To explain what a circuit diagram is. To identify the components from the circuit symbols. To know how to build a basic circuit from the circuit diagrams provided. To describe what electrical insulators and conductors are. To give examples of electrical insulators and conductors.	To know a range of common adaptations e.g. camouflage. To describe the conditions of hot and dry environments. To know the adaptations of some desert animals. To know the adaptations of some desert plants. To know the conditions of cold environments. To know the common adaptations of animals to cold environments e.g. insulation. To make comparisons between organisms from different cold environments. To compare the eyes of nocturnal and diurnal animals. To know how echolocation works.	To explain why organ donation is so important. To label the human skeleton. To know the functions of the skeleton. To know the difference between an endoskeleton and exoskeleton. To know the variation within the animal kingdom. To compare the human skeleton to other animals. To compare human organs to other animals. To compare the teeth of different animals. To identify the types of human teeth. To describe the function of different types of teeth.

	To know how engineers build venues to improve sound quality. To know how a string telephone works. To know how loudspeakers and microphones work. The know how animals use echolocation.	organisms on a food web. To know how to construct a food web. To know how to make predictions about the effect of removing one organism from a food web. To name causes of disruption to food webs.	substance changes state. To name each of the changes of state. To give an example of each change of state. To describe what is meant by melting point and boiling point. To describe how it is possible to measure the melting point and boiling point of a substance. To suggest which state of matter a substance will be in when given its temperature. To give examples of substances that do not show typical properties of any state of matter. To explain how some substances do not show typical properties. To know what a non-Newtonian fluid is.	To know how to test whether a material is an insulator or conductor. To know how to write a prediction for what will happen when we change the components in a circuit. To know how to carry out an investigation to test your predictions. To evaluate whether your prediction was correct or not using the results. To create a circuit with a buzzer that can be turned on and off. To design a game that uses a buzzer. To know how to create a buzzer game.	To know the conditions of underwater environments. To know common adaptations of fish. To know common adaptations of marine mammals. To know the conditions of deep sea environments. To know the common adaptations of marine animals. To know about conservation of the deep sea.	To explain why we need oxygen. To explain the components of the circulatory system. To know how the circulatory system works. To label the major components of the digestive system. To know the function of the different parts of the digestive system. To describe the journey food takes through the digestive system.

Key Vocabulary	sound, vibrations, particles, hearing receptors, auditory canal, hammer and anvil, cochlea, ear drum, acoustics, frequency, amplitude, decibel	organisms, microorganisms, habitat, predator, prey, producer, consumer, photosynthesis, herbivore, carnivore, omnivore, food chain	solid, liquid, gas, particle, temperature, melting point, boiling point, freezing point, condensing	static, circuits, insulators, conductors, current, voltage, buzzer, sensor, cell, battery, bulb, switch, current, ammeter, voltmeter	organisms, habitat, adaptation, camouflage, nocturnal, echolocation, biome, climate	endoskeleton, exoskeleton, organ, peristalsis, circulatory system, platelets, plasma
National Curriculum	**Year 4 National Curriculum Science Statements** **Working Scientifically** • Ask relevant questions and use different types of scientific enquiries to answer them (Sound) (Ecosystems) (States of Matter) (Electrical Circuits) (Adaptations) (Anatomy) • Set up simple practical enquiries and fair tests (Sound) (States of Matter) (Electrical Circuits) • Make systematic and careful observations and where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers (States of Matter) • Gather, record, classify and present data in a variety of easy to help in answering questions (Sound) (Ecosystems) (States of Matter) • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables (Sound) (Ecosystems) (States of Matter) (Electrical Circuits) (Adaptations) (Anatomy) • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions (Sound) (Ecosystems) (States of Matter) (Electrical Circuits) (Adaptations) (Anatomy) • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions (Sound) (Ecosystems) (States of Matter) (Electrical Circuits) (Adaptations) (Anatomy) • Identify differences, similarities or changes related to simple scientific ideas and processes (Sound) (Ecosystems) (States of Matter) (Electrical Circuits) (Adaptations) (Anatomy) • Use straightforward scientific evidence to answer questions or to support his/her findings (Sound) (Ecosystems) (States of Matter) (Electrical Circuits) (Adaptations) (Anatomy) **Animals, Including Humans** • Describe the simple functions of the basic parts of the digestive system in humans (Anatomy) • Identify the different types of teeth in humans and their simple functions (Anatomy) • Construct and interpret a variety of food chains, identifying producers, predators and prey (Ecosystems)					

	Electricity • Identify common appliances that run on electricity (Electrical Circuits) • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers) (Electrical Circuits) • Identify whether or not a lamp will lighting simple series circuit, based on whether or not the lamp is part of a complete loop with a battery (Electrical Circuits) • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit) (Electrical Circuits) • Recognise some common conductors and insulators and associate metals, with being good conductors) (Electrical Circuits) **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 (Ecosystems) (Adaptations) • Recognise that environments can change and that this can sometimes pose danger and have an impact on living things (Ecosystems) (Adaptations) **Sound** • Identify how sounds are made, associating some of them with something vibrating (Sound) • Recognise that vibrations from sounds travel through a medium to the ear (Sound) • Find patterns between the volume of a sound and the strength of the vibrations that produced it (Sound) • Recognise that sounds gets fainter as the distance from the sound source increases (Sound) **States of Matter** • Compare and group materials together, according to whether they are solids, liquids or gases (States of Matter) • Observe some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (States of Matter) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature (States of Matter)

Year 5	**Chemistry: Separating Mixtures**	**Chemistry: Physical and Chemical Changes**	**Physics: Magnetism**	**Physics: Space**	**Biology:**	**Biology: Reproductive Cycles**

					Humans and Animals Over Time	
Knowledge	To know what a pure substance is. To give examples of some pure substances. To know how we can tell if something is pure or not. To know what a mixture is. To give examples of mixtures of substances from the same state. To describe examples of mixtures with substances in different states. To know what a formulation is. To explain why formulations are useful. To give examples of formulations.	To know how particles are arranged in solids, liquids and gases. To explain what happens to particles in substances that change state. To identify phase changes, present in a range of examples. To know what a physical change. To describe signs that a physical change has taken place. To give examples of physical changes. To know what a chemical change. To describe signs that a chemical change has taken place. To give examples of chemical changes. To describe the similarities and differences between	To know what forces are. To know what contact and non-contact forces. To name contact and non-contact forces. To know what magnets are. To describe when magnets attract and repel. To describe how to test the strength of a magnet. To explain what a compass is. To describe what a compass does. To know how to make a compass. To describe how field lines help us to understand the effect of an invisible force.	To know how the Moon, Earth and Sun move around each other. To know what happens during a lunar eclipse. To know what happens during a solar eclipse. To explain what the solar system is. To name the parts of the solar system. To explain the difference between comets, meteors and meteorites. To name the planets of the solar system. To describe the difference between the inner and outer planets. To identify which planets are inner rocky planets and which planets are outer gas giants. To know what stars are.	To know how random changes in characteristics lead to an advantage in an organism. To know how the survival of these organisms leads to evolution. To know how Charles Darwin came up with the Theory of Evolution. To know what a fossil is and how it is made. To know what fossils show us about changes in species over time. To know why fossils do not give us a complete record of past organisms. To know the name of each of the animal kingdoms. To know the key traits of each animal kingdom.	To label parts of a flower. To describe stages of the life cycle of a flower plant. To know the different methods of pollination and seed dispersal. To know how new plants can be grown from cuttings and bulbs. To know how to take a cutting. To compare sexual and asexual reproduction and talk about the advantages and disadvantages of both. To explain metamorphosis. To describe the main stages of the life cycle of an insect and an amphibian.

	To know how to remove large solid particles from a mixture. To know how to remove insoluble substances from a mixture. To know how to remove soluble substances from a mixture. To define solution, solute, solvent, soluble and insoluble. To know how to use filtration to separate some mixtures. To describe how you can use evaporation to separate some mixtures. To carry out separation of substances in river water. To know how to evaluate the method for separating substances in river water. To suggest how an environmental scientist	physical and chemical changes. To identify whether a physical or chemical change has taken place. To know when a physical or chemical change may be useful. To know how to tell which reaction is larger. To describe what the variables will be in an acids-metals investigation. To know how to give a method for investigating a reaction between acids and metals. To know how to complete an investigation into acid and metal reactions. To use evidence to make a conclusion. To know how to compare your results with other sets of results.	To know how field lines around a magnet can be mapped out. To use a diagram of field lines to see where the force will be strongest and where it will be weakest. To know how to find out if a material is magnetic or not. To state the difference between permanent magnets and temporary magnets. To know examples of magnetic and non-magnetic materials. To know what an electromagnet is. To know how to make an electromagnet. To give examples of uses of magnets and electromagnets.	To describe some types of stars. To know what star constellations are. To know what we mean by the universe. To explain what a galaxy is. To know what the Milky Way is. To explain the difference between astrology and astronomy. To know what astronomy is. To identify influential astronomers.	To know how the evolutionary tree shows us how animal kingdoms are related. To know the names of the main periods of time. To know which groups of organisms existed in each period. To know the reasons why some organisms became extinct. To know the key stages in the development of homo sapiens. To know the impact of homo sapiens on plants. To know the impact of homo sapiens on animals. To know the decline in numbers of species over the last 200 years. To know the impact of homo sapiens hunting animals and cutting down forests.	To compare similarities and differences between the life cycles of amphibians and insects. To describe the process of sexual reproduction. To describe the life cycles of different types of mammal. To compare life cycles of different types of mammal. To identify the stages of a bird's life cycle. To label the parts of an egg. To describe how some birds attract a mate. To describe differences in life cycles of different animals. To explain differences between life cycles of different animals.

	could check the water quality in a river.				To know what a conservationist is and what they are trying to do.	To know how to report and present scientific findings.
Key Vocabulary	substance, separate, mixture, formulation, solute, solvent, solution, soluble, insoluble	independent, dependent, control, variables, melting, boiling, freezing, condensing, reversible, irreversible, dissolving, evaporation	forces, contact forces, non-contact forces, electromagnet, gravity, gravitational force, repel, attract, magnetic field	sun, planet, moon, asteroid, meteor, meteorite, comet, dust and gas, universe, galaxy, dwarf star, astrology, astronomy, atmosphere, lunar eclipse, solar eclipse	theory, evolution, species, variation, environment, fossilisation, adaptation	pollination, fertilisation, sexual reproduction, asexual reproduction, larva, gestation, metamorphosis, germination, flowering, seed dispersal, pupa, chrysalis, embryo
National Curriculum	**Year 5 National Curriculum Science Statements** **Working Scientifically** • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary (Separating Mixtures) (Physical and Chemical Changes) (Magnetism) (Space) (Humans and Animals Over Time) (Reproductive Cycles) • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (Separating Mixtures) (Physical and Chemical Changes) (Magnetism) (Space) (Humans and Animals Over Time) (Reproductive Cycles) • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Use test results to make predictions to set up further comparative and fair tests (Separating Mixtures) (Physical and Chemical Changes) (Magnetism) (Space) (Humans and Animals Over Time) (Reproductive Cycles) • Report and present findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations ((Separating Mixtures) (Physical and Chemical Changes) (Magnetism) (Space) (Humans and Animals Over Time) (Reproductive Cycles) • Identify scientific evidence that has been used and to support or refute ideas or argument (Separating Mixtures) (Physical and Chemical Changes) (Magnetism) (Space) (Humans and Animals Over Time) (Reproductive Cycles) **Animals, Including Humans** • Describe the changes as humans develop to old age (Humans and Animals Over Time) (Reproductive Cycles)					

Earth and Space

- Describe the movement of the Earth, and other planets, relative to the Sun in the Solar system (Space)
- Describe the movement of the moon relative to the Earth (Space)
- Describe the sun, Earth and Moon as approximately spherical bodies (Space)
- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky (Space)

Forces and Magnets

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object (Magnetism)
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces (Magnetism)
- Recognise that some mechanisms, including levels, pulleys and gears, allow a smaller force to have a greater effect (Magnetism)

Living things and their Habitat

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (Humans and Animals Over Time) (Reproductive Cycles)
- Describe the life processes of reproduction in some plants and animals (Humans and Animals Over Time) (Reproductive Cycles)

Materials

- 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 (Separating Mixtures) (Physical and Chemical Changes)
- Recognise that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (Separating Mixtures) (Physical and Chemical Changes)
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (Separating Mixtures) (Physical and Chemical Changes)
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (Separating Mixtures) (Physical and Chemical Changes)
- Demonstrate that dissolving, mixing, and changes of state are reversible changes (Separating Mixtures) (Physical and Chemical 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 (Separating Mixtures) (Physical and Chemical Changes)

Year 6	Biology: Diet and Lifestyle	Physics: Energy and Heat	Chemistry: Particles in Physical and Chemical Changes	Chemistry: Sustainability	Physics: Heat	Chemistry: Raw and Synthetic Materials
Knowledge	To describe the key parts of a healthy diet. To explain why different people may need different diets. To give examples of nutritional deficiencies. To explain why diversity is important. To discuss impacts of agriculture. To debate pros and cons of different diets. To describe what happens to muscles during exercise. To describe the parts of the circulatory system. To describe the changes that will occur during exercise.	To know what an energy store is. To know the names of different energy stores. To know how to identify the energy stores in a range of objects. To know what initial and final energy stores are. To identify the initial and final energy stores in a range of scenarios. To know the energy transformations that may take place. To know what useful, wasted and input energy stores are. To know what efficiency is.	To draw particle diagrams to represent states of matter. To name the physical changes that convert substances between states of matter. To know the physical properties of solids, liquids and gasses. To define pure, impure and mixture. To draw particle diagrams to represent pure and impure materials. To give examples of useful mixtures. To define solvent, solute and solution.	To describe the properties of glass, ceramics and plastics. To explain the uses of glass, ceramics and plastics based on their properties. To explain what happens to glass, ceramics and plastics in landfill sites. To know the definition of recycling. To describe how to identify plastics that can and can't be recycled. To explain why recycling plastic is important for sustainability. To know the definition of a life cycle assessment.	To describe how particles behave in solids, liquids and gases. To know what happens to particles when they are heated. To explain what happens to particles when they change state. To know what happens to a substance when it is heated. To predict whether an object will expand or contract. To suggest some engineering applications of this knowledge. To know what we mean by a thermal equilibrium.	To name the seven processes all living things carry out. To identify things as living or non-living. To explain the history of classification of living things. To describe what an organ system is. To give examples of organ systems in animals. To give examples of organ systems in plants. To describe how organ systems are made from organs. To explain how organs are made from tissues which are made from cells.

	To describe what is meant by medicinal drugs. To give some examples of common medicinal drugs. To describe how medicinal drugs may affect the body. To describe what nicotine and alcohol are. To explain how nicotine and alcohol came to be used by humans. To describe some effects of using nicotine and alcohol to excess. To describe the work and major discoveries of a range of scientists To explain the impact of a range of scientific discoveries on human health. To explain how scientific knowledge changes over time.	To calculate efficiency of a given machine. To define power. To know the equation for power. To know how to compare the power ratings of a range of appliances. To know what we mean by speed. To describe the method for calculating an object's speed. To know how to calculate the speed of a range of objects. To know where kinetic energy may be found. To know how the kinetic energy of an object can be changed. To know how to calculate the kinetic energy of a number of objects.	To draw particle diagrams to represent a solution. To describe what happens to particles during dissolving. To know three methods of separating mixtures. To select an appropriate separation technique for a given mixture. To plan an experiment to isolate components of a mixture. To define chemical reaction, physical process. To know the 5 indicators of a chemical reactions. To know how to identify examples of chemical reaction and physical changes. To define the word combustion, fuel, reactant and product. To write a word equation for the	To know how to use data to make a life cycle assessment. To compare reusable and one-use coffee cups over their lifetime. To define what is meant by a fuel and combustion. To represent combustion reaction using word equations. To know the impact of burning fuels on the environment. To know what global warming is. To describe the evidence for global warming. To describe the causes of global warming. To know what climate change is. To describe the effects of climate change.	To describe how thermal equilibrium can be reached. To suggest ways that thermal equilibrium is reached more quickly. To know how heat is transferred by particles through conduction. To describe a method to demonstrate the speed of conduction through metal. To explain why it is difficult to conduct heat directly through a liquid or a gas. To know how heat is transferred by particles through conduction. To describe a method to demonstrate the speed of conduction through metal. To explain why it is difficult to conduct heat directly through a liquid or a gas. To create a design to keep an ice cube frozen for as long as possible. To explain why your	To describe how cells can build tissues. To name the parts of an animal cell. To label the parts of an animal cell on a diagram. To know what each part of an animal cell does. To name the parts of a plant cell. To label the parts of a plant cell on a diagram. To describe what each part of a plant cell does. To know what a specialised cell is. To give examples of specialised cells. To explain how root cells and sperm cells are specially adapted.

			combustion of common fuels. To compare different fuels using experimental data.	To suggest how humans can reduce their impact on climate change.	design will help the ice cube to stay frozen. To evaluate your design and suggest ways it could have been improved.	
Key Vocabulary	nutrients, diet, deficiency, circulatory system, medicine, symptoms, alcohol, nicotine, addictive, antagonistic muscles	gravitational potential energy, kinetic energy, chemical energy, elastic potential energy, heat energy, vibrations, transformation, transfer, efficiency, speed, power	solid, liquid, gas, particle, reactant, product, temperature, melting point, boiling point, solute, solvent, solution, soluble, insoluble, mixture, substance, pure, sieving, filtration, evaporation, combustion	sustainability, natural resources, combustion, reactions, global warming, climate change, greenhouse effect, transparent, opaque, brittle, malleable, conductor	transfer, thermal equilibrium, conduction, insulator, conductor, elements	organism, organ, tissue, cell, mitochondria, photosynthesis, nucleus, cytoplasm, membrane, respiration, vacuole, chloroplast, digestive, circulatory, muscular, skeletal, respiratory
National Curriculum	**Year 6 National Curriculum Science Statements** **Working Scientifically** - Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables where necessary (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells) - Take measurements, using a range of scientific equipment with increasing accuracy and precision, taking repeat readings when appropriate (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells) - Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells) - Use test results to make predictions to set up further comparative and fair tests (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells) - Report and present findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results in oral and written forms such as displays and other presentations (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells) - Identify scientific evidence that has been used to support or refute ideas or arguments (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells) - Describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells)					

- Group and classify things and recognise patterns (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells)
- Find things out using a wide range of secondary sources of information (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells)
- Use appropriate scientific language and ideas from the national curriculum to explain, evaluate and communicate his/her methods and findings (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells)

Animals, Including Humans

- Identify and name the main parts of the human circulatory system and describe the functions of the heart, blood vessels and blood (Diet and Lifestyle) (Cells)
- Recognise the impact of diet and exercise, drugs and lifestyle on the way their bodies function (Diet and Lifestyle) (Cells)
- Describe the ways in which nutrients and water are transported within animals, including humans (Diet and Lifestyle) (Cells)

Electricity

- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit (Energy)
- 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 (Energy)
- Use recognised symbols when representing a simple circuit in a diagram (Energy)

Evolution and Inheritance

- Recognise that living things have changed over time 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 planets are adapted to suit their environment in different ways and that adaptations may lead to evolution

Light

- Recognise that light appears to travel in straight lines (Energy)
- 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 (Energy)
- 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 (Energy)
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them (Energy)

	Classification • 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 (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells) • Give reasons for classifying plants and animals based on specific characteristics and based on similarities and differences, including microorganisms, plants and animals (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells) • Give reasons for classifying plants and animals based on specific characteristics (Diet and Lifestyle) (Energy) (Particles in Physical and Chemical Changes) (Sustainability) (Heat) (Cells)