

Science Curriculum Intent

At Meynell Primary School, we recognise the importance of science in every aspect of daily life. We aspire to help our children develop as scientists through a range of learning experiences that are underpinned by our key intentions for learning in this subject:

1. We intend that that children will develop scientific knowledge and conceptual understanding through the different principles of science: Biology, Chemistry and Physics.
2. We intend that our children will develop understanding of the nature, processes and methods of science through different types of enquiries that help them to answer scientific questions about the world around them, including the role science plays in **conservation**.
3. We intend that children at Meynell will be equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future both globally and within our **community**, in particular how science has and will impact upon **health**.
4. We intend that children will develop the essential scientific enquiry skills to deepen their scientific knowledge and use this to understand the concept of **fairness** from a scientific point of view.
5. We intend that children will learn to use a range of methods to communicate their scientific information and present it in a systematic scientific manner, including computing, diagrams, graphs and charts.
6. We intend to develop an enthusiasm and enjoyment of scientific learning and discovery within our children.
7. We intend to raise **aspirations** within science by exposing children to a variety of examples of success, from a wide range of backgrounds. Through this, children will explore **equality** within science.
8. We intend that the National Curriculum will provide a structure and skill development for the science curriculum being taught throughout the school, which is now linked, where possible to the theme topics to provide a creative scheme of work, reflecting a balanced programme of study.

Curriculum Drivers



EYES	
2	Explore natural materials inside and outside using fingers, feet or whole body. e.g. wet and dry sand, water, paint, playdough. Explore the natural world through the seasons - walking through leaves, splashing in puddles in wellies, collecting and looking at conkers, leaves. Explore materials that have different properties – could set up a treasure basket including different texture, things that have different smells, tastes, and sounds.
3/4	Plant bulbs and care for them with support Begin to understand what plants need in order to grow. Provide opportunities to talk about different materials and how they change. For example, melting ice, baking. Plant seeds and know how to care for them to ensure they grow Be able to discuss and explain what plants need to grow Be able to discuss lifecycles – support children to care for animals – this could be caterpillars/chicks. Develop vocabulary. Explore different forces and talk how about this feels, for example what happens to water when they push a boat into it? Magnetic repulsion and attraction, things that bend, snap or don't do either. Explore how things work – for example, wind-up toys, pulleys, cogs Use all of their senses and a hands-on approach to explore different natural materials, talk about what they see/feel/smell using a wide range of vocabulary.
FS2	Explore the natural world around them, making observations and drawing pictures of animals and plants; Describe what they see, hear and feel whilst outside encouraging children to name and describe some plants and animals they are likely to see and know. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

KS1

Long term Science plan						
	A1	A2	S1	S2	SU1	SU2
Y1		Where do leaves go in the winter? (Seasonal changes)	What types of Materials are there? (Everyday materials)	What makes a plant? (Plants)	What is an animal? (Animals including humans)	What makes a person? (Animals including humans)
Y2	How can materials change? (Everyday materials)	What makes a good habitat? (Living things and their habitats)		How can we stay healthy? (Animals including humans)	How do you grow a plant? (Plants)	

KS2

	A1	A2	S1	S2	SU1	SU2
Y3	How can we attract and repel? (Forces and magnets)	How does our body support itself? (Animals including humans)		How do plants survive? (Plants) What stops it being dark? (Light)		Can we make a circuit? (Electricity)
Y4		What happens to the food we eat? (Animals including humans)	What makes a rock? (Rocks)	Can we classify like a scientist? (Living things and their habitats)	How do we hear? (Sound)	What are the states of matter? (States of matter)
Y5		Will we ever send another human into space? (Space)	What is a life cycle? (Living things and their habitats)	Are these changes reversable? (States of matter)	What is a force? (Forces)	How do humans grow? (Animals including humans)
Y6		What would a journey through your body look like? (Animals including humans)		How can we make a bulb shine brighter? (Electricity)	How do we see light? (Light)	Can we use characteristics to classify? (Living things and their habitats) How have living things changed over time? (Evolution and inheritance)

Science Progression									
	2 - 3	3 - 4	FS2	Y1	Y2	Y3	Y4	Y5	Y6
Working scientifically.	Explore natural materials inside and outside using fingers, feet or whole body. e.g. wet and dry sand, water, paint, playdough.	Use all of their senses and a hands-on approach to explore different natural materials, talk about what they see/feel/smell using a wide range of vocabulary.	Explore the natural world around them, making observations and drawing pictures of animals and plants;  Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;	Asking simple questions and recognising that they can be answered in different ways.  Observing closely, using simple equipment.  Performing simple tests.  Identifying and classifying.  Using their observations and ideas to suggest answers to questions.  Gathering and recording data in tables to help in answering questions.	Asking simple questions and recognising that they can be answered in different ways.  Observing closely, using simple equipment.  Performing simple tests.  Identifying and classifying.  Using their observations and ideas to suggest answers to questions.  Gathering and recording data in tables and bar charts to help in answering questions.	Asking relevant questions and using different types of scientific enquiries to answer them.  Setting up simple practical enquiries, comparative and fair tests.  Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.  Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.  Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.  Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.  Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.  Identifying differences, similarities or changes related to simple scientific ideas and processes.  Using straightforward scientific evidence to answer questions or to support their findings.	Asking relevant questions and using different types of scientific enquiries to answer them.  Setting up simple practical enquiries, comparative and fair tests.  Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.  Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.  Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.  Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.  Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.  Identifying differences, similarities or changes related to simple scientific ideas and processes.  Using straightforward scientific evidence to answer questions or to support their findings.	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.  Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.  Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs.  Using test results to make predictions to set up further comparative and fair tests.  Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.  Identifying scientific evidence that has been used to support or refute ideas or arguments.	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.  Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.  Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.  Using test results to make predictions to set up further comparative and fair tests.  Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.  Identifying scientific evidence that has been used to support or refute ideas or arguments.
Plants	Explore plants in the setting  Name common plants and flowers in the setting  Water the plants in the setting	Plant bulbs and care for them with support  Begin to understand what plants need in order to grow.  Plant seeds and know how to care for them to ensure they grow.  Be able to discuss and explain what plants need to grow	Explore the natural world around them, making observations and drawing pictures of animals and plants;  Describe what they see, hear and feel whilst outside encouraging children to name and describe some plants and animals they are likely to see and know.	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.	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 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.			
Animals including humans	Explore the natural world through the seasons  Name common	Explore the natural world through the seasons  Name common animals found	Explore the natural world around them, making observations and drawing pictures	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.	Notice that animals, including humans, have offspring which grow into adults.  Find out about and describe the basic needs of animals,	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.	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.	Describe the changes as humans develop to old age.	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.

	animals found naturally in the setting	naturally in the setting.	of animals and plants;  Describe what they see, hear and feel whilst outside encouraging children to name and describe some plants and animals they are likely to see and know.	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.	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.	Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Construct and interpret a variety of food chains, identifying producers, predators and prey.		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.
Everyday Materials	Explore natural materials inside and outside using fingers, feet or whole body. E.g. wet and dry sand, water, paint, playdough.  Explore materials that have different properties – could set up a treasure basket including different texture, things that have different smells, tastes, and sounds.	Provide opportunities to talk about different materials and how they change. For example, melting ice, baking.  Use all of their senses and a hands-on approach to explore different natural materials, talk about what they see/feel/smell using a wide range of vocabulary.		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.	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.				
Seasonal changes	Explore the natural world through the seasons – walking through leaves, splashing in puddles in wellies, collecting and looking at conkers, leaves.		Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Observe changes across the four seasons.  Observe and describe weather associated with the seasons and how day length varies.					
Living things and their habitats.	Name simple animals and begin to know where they live e.g. underground, in a nest in a tree.	Be able to discuss lifecycles – support children to care for animals – this could be caterpillars/chicks. Develop vocabulary.	Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	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,			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.	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.	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.

					<p>and how they depend on each other.</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats.</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p>			
Rocks						<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter.</p>		
Light					<p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</p> <p>Find patterns in the way that the size of shadows changes.</p>		<p>Recognise that light appears to travel in straight lines.</p> <p>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.</p> <p>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.</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</p>	
Forces and magnets		<p>Explore different forces and talk how about this feels, for example what happens to water when they push a boat into it? Magnetic repulsion and attraction, things that bend, snap or don't do either. Explore how things work – for example, wind-up toys, pulleys, cogs</p>			<p>Compare how things move on different surfaces.</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</p> <p>Observe how magnets attract or repel each other and attract some materials and not others.</p> <p>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.</p> <p>Describe magnets as having two poles.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>		<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction that act between moving surfaces.</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</p>	
States of matter			<p>Understand some important processes and changes in the natural world around them,</p>			<p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>Observe that some materials change state when they are</p>	<p>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.</p>	

			including the seasons and changing states of matter.				<p>heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</p>	
Sound							<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</p> <p>Find patterns between the pitch of a sound and features of the object that produced it.</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p> <p>Recognise that sounds get fainter as the distance from the sound source increases.</p>		
Electricity						<p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p>		<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</p> <p>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.</p> <p>Use recognised symbols when representing a simple circuit in a diagram</p>	
Earth and space								Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.	

								<p>Describe the movement of the Moon relative to the Earth.</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies.</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</p>	
Evolution and inheritance.									<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p>

	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Whole school drivers	Aspiration We intend to find out about the different types of jobs people do relating to the different seasons	Equality We intend to look at how toys are aimed at different people (e.g. boys and girls).	Health We intend to investigate how plants create healthy food.	Fairness We intend to investigate the fairness in how different animals are treat.	Community We intend to find out about how people's senses contribute to community
Topic title:	<u>Where do the leaves go in the winter?</u>	<u>What types of materials are there?</u>	<u>What makes a plant?</u>	<u>What is an animal?</u>	<u>What makes a person?</u>
Science strand	Seasonal changes	Everyday materials	Plants	Animals including humans	Animals including humans
Types of enquiry	Pattern seeking Identifying and classifying Observation over time Fair testing Research	Pattern seeking Identifying and classifying Observation over time Fair testing Research	Pattern seeking Identifying and classifying Observation over time Fair testing Research	Pattern seeking Identifying and classifying Observation over time Fair testing Research	Pattern seeking Identifying and classifying Observation over time Fair testing Research
Working scientifically skills	Asking simple questions and recognising that they can be answered in different ways. Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. Using their observations and ideas to suggest answers to questions. Gathering and recording data in tables to help in answering questions.	Asking simple questions and recognising that they can be answered in different ways. Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. Using their observations and ideas to suggest answers to questions. Gathering and recording data in tables to help in answering questions.	Asking simple questions and recognising that they can be answered in different ways. Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. Using their observations and ideas to suggest answers to questions. Gathering and recording data in tables to help in answering questions.	Asking simple questions and recognising that they can be answered in different ways. Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. Using their observations and ideas to suggest answers to questions. Gathering and recording data in tables to help in answering questions.	Asking simple questions and recognising that they can be answered in different ways. Observing closely, using simple equipment. Performing simple tests. Identifying and classifying. Using their observations and ideas to suggest answers to questions. Gathering and recording data in tables to help in answering questions.
Presentation of data	Tables	Tables	Table for classifying	N/A	Table for results
Prior knowledge	Recognise differences between two seasons: spring and winter. Types of weather include sunny, rainy, and windy	Materials melt when it is hot and freeze when it is cold	Recognise differences between two seasons: spring and winter.	A plant is a living thing that usually grows in one place Scientists group objects or living things based on their properties	Animals can be grouped into fish, amphibians, reptiles, birds and mammals (name common examples). Animals can be placed into different groups (carnivores, herbivores and omnivores) based the foods they eat. Materials have different physical properties, some materials are hard whilst others are soft, some can be described as rough whilst others are smooth, some are dull whereas others are shiny
Common misconceptions	Some pupils think that the reason it is hotter in the summer than the winter is that the Earth is closer to the Sun. Confusion around day and night terminology Pupils often think that the Moon only appears at night.	Confuse objects and materials. Pupils may have a preconception about what the term 'material' means in science.	Seeds are not living Trees are not plants or were plants when they were small. There are two types of things in a garden: plants and weeds.	Whales are fish because they swim in the sea. Starfish and jellyfish are types of fish. Lizards and snakes are amphibians	Vegetarians and vegans are herbivores. Many pupils think that the only reason that we eat is to give us energy. They do not appreciate that eating provides the body with the building blocks needed for growth and repair. We eat protein because it provides us with energy. All fat is bad for you.
Key vocabulary	<b>Autumn (noun):</b> one of four seasons, the season before winter <b>season (noun):</b> one of the four parts of the year <b>spring (noun):</b> one of four seasons, the season before summer <b>summer (noun):</b> one of four seasons, the season before autumn <b>winter (noun):</b> one of four seasons, the season before spring	<b>material:</b> [noun] what an object is made from. <b>object:</b> [noun] a thing that can be seen or touched. <b>purpose:</b> [noun] the reason something is created/made	<b>branch (noun):</b> a part of a tree that grows from the trunk <b>flower (noun):</b> the part of a plant that is brightly coloured and often has a pleasant smell <b>leaf (noun):</b> a flat green part of a plant joined at one end to a branch or stem <b>plant (noun):</b> a living thing that usually produces seeds, has a stem, leaves, roots and sometimes flowers <b>trunk (noun):</b> the main stem of a tree	<b>amphibian (noun):</b> Group of animals that live in water when it is young and on land when it is an adult, have gills when it is young and breathes air when it is an adult, usually have four limbs, that are fins when young and legs as an adult and are covered in smooth skin. <b>bird (noun):</b> Group of animals that Live on land, have a beak, breathe air, have two legs and two wings to help them move and are covered in feathers <b>fish (noun):</b> Group of animals that Live in water, have gills, have fins to help them move and are covered in scales <b>mammals (noun):</b> Group of animals that: live in land or water, breathe air, have four limbs and are covered in hair (sometimes fur) and usually have claws	<b>carnivore:</b> [noun] a living thing that only eats animals <b>herbivore:</b> [noun] a living thing that eats only plants <b>omnivore:</b> [noun] a living thing that can eat plants and animals <b>vegetarian:</b> [noun/adjective] a human who chooses not to eat animal meat but will eat foods that come from animals like eggs and milk / describing something (usually food) that does not contain meat <b>vegan:</b> [noun/adjective] a human who chooses not to eat animal meat or any foods that come from animals like eggs and milk / describing something (often

				<p><b>reptiles (noun):</b> Group of animals that Live in land or water, sometimes have claws breathe air, have four limbs or no limbs and are covered in scales</p>	<p>food but not always) that does not contain any animal product</p>
Focus scientists	<b>Dr. Steve Lyons</b>	<b>Lonnie Johnson</b>	<b>Dr. Tanisha Williams</b>	<b>Steve Irwin</b>	<b>David Attenborough</b>
Progression coverage	<p><b>Learning Question 1: How many seasons are there? (Observations over time)</b></p> <ul style="list-style-type: none"> <li>Know there are four seasons: spring, summer, autumn and winter</li> <li>Know the names of the seasons and put in the correct order</li> <li>Know which months are in which season.</li> </ul> <p><b>Learning Question 2: What is the weather like in each season? (Observations over time)</b></p> <ul style="list-style-type: none"> <li>Know that the weather changes gradually as we move from season to season</li> <li>Know that the weather can change rapidly in one day (e.g. sunny morning and rainy afternoon)</li> <li>Track weather over a period of time (e.g. a fortnight). <b>(WS)</b></li> <li>Gathering and recording data in tables to help in answering questions. <b>(WS)</b></li> </ul> <p><b>Learning Question 3: What happens in in Autumn and Winter? (Identifying classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know the differences between four seasons in terms of living things (trees lose leaves; flowers drop and we see different animals, such as butterflies in the summer)</li> <li>Gathering and recording data in tables to help in answering questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: What is the purpose of an object? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know that an object is a 'thing' that can be seen and touched</li> <li>Know that objects have a name and often have a purpose. For example, a cup is the object, and its purpose is for drinking from.</li> <li>Classification of what is and isn't an object. <b>(WS)</b></li> </ul> <p><b>Learning Question 2: What is a material? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know the <b>material</b> is what an object is made of, for example a cup can be made of paper or plastic</li> <li>Know that common materials include <b>wood, paper, metal, glass, plastic, water, rock and fabric</b></li> <li>Explore materials so that they can identify features. <b>(WS)</b></li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> <li>Gathering and recording data in tables to help in answering questions. <b>(WS)</b></li> </ul> <p><b>Learning Question 3: What are physical properties? (Identifying classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know that materials have different physical properties, some materials are hard whilst others are soft, some can be described as rough whilst others are smooth, some are dull whereas others are shiny.</li> <li>Experience materials that have particular properties, and use the words like soft, hard, rough and smooth to describe the properties of some of the materials they have encountered this far. <b>(WS)</b></li> </ul> <p><b>Learning Question 4: How do we choose a material? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know the material that we choose to make an object from</li> </ul>	<p><b>Learning Question 1: What is a plant? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know that plants are living things.</li> <li>Know that plants are classed as living things because they grow, move, reproduce, and need nutrition (food).</li> <li>Classification of what is and isn't a plant.</li> <li>Use observations to suggest answers to questions <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – What are the parts of a plant? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Children can identify similarities and differences <b>(WS)</b></li> <li>Know flower, stem, flower and root.</li> </ul> <p><b>Learning Question 3 – What are the parts of a tree? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know that the basic parts of a tree are leaves, flowers, roots, trunk and branch</li> <li>Know how to identify these parts.</li> <li>Make close observations. <b>(WS)</b></li> </ul> <p><b>Learning Question 4 – What is a deciduous tree? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know that deciduous plants lose their leaves in winter (e.g. oak, silver birch, horse chestnut, sycamore, ash)</li> <li>Ask simple questions <b>(WS)</b></li> <li>Answer simple questions in different ways <b>(WS)</b></li> </ul> <p><b>Learning Question 5 – What is a coniferous tree? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know that coniferous plants keep their leaves all year round (e.g. pine, yew, juniper in UK)</li> <li>Ask simple questions. <b>(WS)</b></li> <li>Answer simple questions in different ways <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: What makes an animal? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know that animals are different to plants because they usually move around, rather than stay in the same place.</li> <li>Know that animals can be placed into different groups (carnivores, herbivores and omnivores) based the foods they eat.</li> <li>Know that Animals have different features, including fins, wings, scales, legs, feathers, claws, paws etc.</li> <li>Classify animals based on features <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – What is a mammal? (Identifying, classifying and grouping/Research)</b></p> <ul style="list-style-type: none"> <li>Know that animals can be placed into different groups (carnivores, herbivores and omnivores) based the foods they eat.</li> <li>Know that animals have different features, including fins, wings, scales, legs, feathers, claws, paws etc.</li> <li>Know that Some animals can be grouped into fish, amphibians, reptiles, birds and mammals (name common examples).</li> <li>Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> </ul> <p><b>Learning Question 3: What is a bird? (Identifying, classifying and grouping/Research)</b></p> <ul style="list-style-type: none"> <li>Know that animals can be placed into different groups (carnivores, herbivores and omnivores) based the foods they eat.</li> <li>Know that animals have different features, including fins, wings, scales, legs, feathers, claws, paws etc.</li> <li>Know that Some animals can be grouped into fish, amphibians, reptiles, birds and mammals (name common examples).</li> <li>Classify animals based on features <b>(WS)</b></li> </ul> <p><b>Learning Question 4 – What is a fish? (Identifying, classifying and grouping/Research)</b></p> <ul style="list-style-type: none"> <li>Know that animals can be placed into different groups (carnivores, herbivores and omnivores) based the foods they eat.</li> <li>Know that animals have different features, including fins, wings, scales, legs, feathers, claws, paws etc.</li> <li>Know that Some animals can be grouped into fish, amphibians,</li> </ul>	<p><b>Learning Question 1: What body parts do humans have? (Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>Know that humans are made of many different body parts including head, neck, back, ears, eyes, nose, mouth, arms, shoulders, elbows, hands, fingers, legs, knees, feet, toes, face, legs etc.</li> <li>Humans are made of many different body parts including head, neck, back, ears, eyes, nose, mouth, arms, shoulders, elbows, hands, fingers, legs, knees, feet, toes, face.</li> <li>Observe closely <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – What are the five senses? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that humans have five senses, smell, taste, touch, sight and hearing.</li> <li>Know that the five senses are each associated with different body parts (eyes, ears, nose, tongue)</li> <li>Know that in some people some senses are impaired.</li> <li>Perform simple tests to Investigate each of the five senses – how do they work?</li> <li>Record data in a table <b>(WS)</b></li> </ul>

	<p><b>Learning Question 4: What happens in in Spring and Summer?</b> <b>(Identifying classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>• Know the differences between four seasons in terms of living things (trees lose leaves; flowers drop and we see different animals, such as butterflies in the summer)</li> <li>• Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> <li>• Gathering and recording data in tables to help in answering questions. <b>(WS)</b></li> </ul>		<p>depends on its purpose (e.g., no chocolate kettle)</p> <ul style="list-style-type: none"> <li>• Test materials for appropriate uses <b>(WS)</b></li> <li>• Perform simple tests <b>(WS)</b></li> <li>• Gather and record data in tables <b>(WS)</b></li> </ul>	<p><b>Learning Question 6 –</b> What is the same and different about coniferous and deciduous trees? <b>(Identifying, classifying and grouping)</b></p> <ul style="list-style-type: none"> <li>• Know that coniferous plants keep their leaves all year round (e.g. pine, yew, juniper in UK)</li> <li>• Know that deciduous plants lose their leaves in winter (e.g. oak, silver birch, horse chestnut, sycamore, ash)</li> <li>• Use a table to classify. <b>(WS)</b></li> </ul>	<p>reptiles, birds and mammals (name common examples).</p> <ul style="list-style-type: none"> <li>• Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> </ul>	
	<p><b>Learning Question 4: What IS the difference between day and night?</b> <b>(Research)</b></p> <ul style="list-style-type: none"> <li>• Know that daytime is when the Earth is facing the Sun; nighttime is when the Earth is facing away from the Sun</li> <li>• Know that in the summer that there are more hours of daylight and in winter there are fewer hours of daylight.</li> <li>• Know that in the summer, we face the sun for more of the day and so it is lighter/darker when we travel to school in summer/winter</li> <li>• Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> </ul>		<p><b>Learning Question 5: Can we create a new bed?</b> <b>(Fair test)</b></p> <ul style="list-style-type: none"> <li>• Know the material that we choose to make an object from depends on its purpose (e.g., no chocolate kettle)</li> <li>• Test materials for appropriate uses <b>(WS)</b></li> <li>• Perform simple tests <b>(WS)</b></li> <li>• Gather and record data in tables <b>(WS)</b></li> <li>•</li> </ul>		<p><b>Learning Question 3: What are amphibians and reptiles?</b> <b>(Research)</b></p> <ul style="list-style-type: none"> <li>• Know that animals can be placed into different groups (carnivores, herbivores and omnivores) based the foods they eat.</li> <li>• Know that animals have different features, including fins, wings, scales, legs, feathers, claws, paws etc.</li> <li>• Know that Some animals can be grouped into fish, amphibians, reptiles, birds and mammals (name common examples).</li> <li>• Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> <li>• Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul>	

Medium term Science plan Year 2				
	Autumn 1	Autumn 2	Spring 2	Summer 2
Whole school drivers	Equality We intend to investigate if everyone has access to the same materials and how that impact equality.	Aspiration We intend to look at how we can aspire to keep different habitats safe.	Health We intend to understand how to keep ourselves and other healthy	Community We intend to look at community projects locally themed around plants e.g. Allotment projects.
Topic title:	<u>How can materials change?</u>	<u>What makes a good habitat?</u>	<u>How can we stay healthy?</u>	<u>How do we grow a plant?</u>
Science strand	<u>Everyday materials</u>	<u>Living things and their habitats</u>	<u>Animals including humans</u>	<u>Plants</u>
Types of enquiry	Pattern seeking Identifying and classifying Observation over time Fair testing Research	Pattern seeking Identifying and classifying Observation over time Fair testing Research	Pattern seeking Identifying and classifying Observation over time Fair testing Research	Pattern seeking Identifying and classifying Observation over time Fair testing Research
Working scientifically skills	Asking simple questions and recognising that they can be answered in different ways.  Observing closely, using simple equipment.  Performing simple tests.  Identifying and classifying.  Using their observations and ideas to suggest answers to questions.  Gathering and recording data in tables to help in answering questions.	Asking simple questions and recognising that they can be answered in different ways.  Observing closely, using simple equipment.  Performing simple tests.  Identifying and classifying.  Using their observations and ideas to suggest answers to questions.  Gathering and recording data in tables to help in answering questions.	Asking simple questions and recognising that they can be answered in different ways.  Observing closely, using simple equipment.  Performing simple tests.  Identifying and classifying.  Using their observations and ideas to suggest answers to questions.  Gathering and recording data in tables to help in answering questions.	Asking simple questions and recognising that they can be answered in different ways.  Observing closely, using simple equipment.  Performing simple tests.  Identifying and classifying.  Using their observations and ideas to suggest answers to questions.  Gathering and recording data in tables and bar charts to help in answering questions.
Presentation of data	Bar charts for results	N/A	Tables and bar charts for exercise experiment	Tables and bar charts for results
Prior knowledge	An object is a 'thing' that can be seen and touched. Objects have a name and often have a purpose for example a cup is the object and its purpose is for drinking from. The material is what an object is made of, for example a cup can be made of paper or plastic. Common materials include wood, paper, metal, glass, water, rock. Materials have different physical properties, some materials are hard whilst others are soft, some can be described as rough whilst others are smooth, some are dull whereas others are shiny. Materials can be grouped in a number of ways based on their physical properties. The material that we choose to make an object from depends on its purpose (e.g. no chocolate kettle).	Animals can be placed into groups (carnivores, herbivores and omnivores) based on the foods they eat Temperature is a measure of how hot or cold something is	Animals can be grouped into fish, amphibians, reptiles, birds and mammals (name common examples.) Temperature is a measure of how hot or cold something is.	The basic parts of a plant are leaves, flowers, roots, stem/trunk/branch. Plants are classed as living things because they grow, move, reproduce, and need nutrition.
Common misconceptions	Pupils can often confuse objects and materials. Pupils may have a preconception about what the term material means in science.	Reproduction is rarely used as a criterion for life Seeds, bulbs and pupae are dead. Camels store water in their humps Adaptation happens in an organism's lifetime Adaptation is done by choice by the organism. Adaptation is a predetermined journey that starts and stops. Many pupils think the arrow in a food chain means 'eats' and draw a reversed arrow.	Some pupils think that the only reason we eat is to give us energy	Seeds are not alive Seeds are not plants/do not become alive until they have grown The soil provides food for the seeds Germination is where the leaves of a plant emerge from the seed Growth is dependent on age
Key vocabulary	<b>bend:</b> [verb] to shape a material into a curve or angle without breaking it <b>dull:</b> [adjective] something that is not bright or shiny <b>stretch:</b> [verb] to make something longer or wider without breaking or tearing it <b>squash:</b> [verb] to crush or squeeze a material or object so that it changes shape <b>twist:</b> [verb] to change something's shape by curling it	<b>adaptation (noun):</b> features that help organisms survive in its environment. <b>camouflage (noun):</b> be hidden by blending in with the surroundings (things around it). <b>environment (noun):</b> the environment is the surroundings. It includes the living and non-living parts. <b>nutrition (noun):</b> the process of getting food <b>sensitivity (noun):</b> being able to detect changes in the environment <b>shelter (noun):</b> a place that provides protection	<b>diet:</b> (noun) the food and drink that an animal or person eats. <b>energy:</b> (noun) what we need to move, grow, think and everything else we do <b>exercise: (noun)</b> an activity that needs physical effort <b>food: (noun)</b> anything that can be eaten <b>hygiene: (noun)</b> the practice of keeping clean to stay healthy <b>temperature: (noun)</b> how hot or cold something is	<b>bulb (noun):</b> an underground storage organ in some plants <b>root (noun):</b> the part of a plant that attaches it to the ground and absorbs water <b>seed (noun):</b> a small hard part of a plant from which a new plant can grow <b>stem (noun):</b> the main stalk of a plant <b>soil (noun):</b> the upper layer of earth where plants grow
Focus scientist	Theo and Ora Coster	Sylvia Earle	Dasia Taylor	Tayshan Hayden-Smith

Progression coverage	<p><b>Learning Question 1: What are properties? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that everyday materials such as wood, metal, plastic, brick, rock, paper and cardboard have physical properties (from Y1) to different extents</li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: What is alive? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that everything in the world can be categorised as either alive, used to be alive or has never been alive.</li> <li>Know that living things are called organisms</li> <li>Know that living things move, reproduce, are sensitive to their surroundings, grow, need oxygen, get rid of their waste, and need nutrition.</li> <li>Know that animals move from place to place, while plants move on the spot</li> <li>Identifying and classifying. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: Do all animals need food? (research)</b></p> <ul style="list-style-type: none"> <li>Know that animals, including humans, need food to survive.</li> <li>Know that humans need to eat a healthy and balanced diet.</li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: What is a seed? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that a seed is living</li> <li>Know that a seed is the embryonic stage of the plant life cycle.</li> <li>Know that a seed consists of three parts, the seed coat, the endosperm, and the embryo</li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> </ul>
	<p><b>Learning Question 2 – How are matter and materials linked?? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that matter is all the 'stuff' that we experience in everyday life, including air, water, tables and us!</li> <li>Know that materials have different physical properties such as malleable, waterproof, heatproof, windproof and absorbent</li> <li>Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 2: What is a habitat? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that habitats are the places that living things live</li> <li>Know that animals and plants in a habitat depend on each other e.g. for food or shelter</li> <li>Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> </ul>	<p><b>Learning Question 2: Do all animals need water and oxygen? (research)</b></p> <ul style="list-style-type: none"> <li>Know that animals, including humans, need water and oxygen to survive.</li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 2 – What is germination? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that germination is the development of a plant from a seed, during germination roots and shoots emerge and grow</li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul>
	<p><b>Learning Question 3 – What is absorbency? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Investigate the best material to use to make an umbrella that is waterproof (and windproof) <b>(WS)</b></li> <li>Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> <li>Performing simple tests. <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> <li>Gathering and recording data in tables to help in answering questions</li> </ul>	<p><b>Learning Question 3: What is a microhabitat? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that a very small habitat is called a micro-habitat, these can be found within larger habitats</li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3: What is the best temperature to survive? (research)</b></p> <ul style="list-style-type: none"> <li>Know that animals, including humans need the right temperature to survive</li> <li>Know how different animals survive in different temperatures.</li> <li>Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3 – What do seeds need to germinate? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that to germinate a seed needs water and a certain temperature</li> <li>Know that temperature is a measure of how hot or cold something is</li> <li>Performing simple tests. <b>(WS)</b></li> </ul>
	<p><b>Learning Question 4: What is the best material for a roof? (fair test?)</b></p> <ul style="list-style-type: none"> <li>Investigate the best material to use to make an umbrella that is waterproof (and windproof)</li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> <li>Performing simple tests... <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions... <b>(WS)</b></li> <li>Gathering and recording data in tables to help in answering questions... <b>(WS)</b></li> </ul>	<p><b>Learning Question 4: How do living things live in the desert? (research)</b></p> <ul style="list-style-type: none"> <li>Know that living things are adapted to their environment. This means they may not be able to survive in other habitats</li> <li>Know that some animals and plants are adapted to life in a hot desert: camels and cacti.</li> <li>Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4: How do animals reproduce and grow? (pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know that animals, including humans, reproduce. This means they have offspring that grow into adults</li> <li>Know that as animals grow they get bigger.</li> <li>Know that some animals change during their life cycle as the mature (e.g. tadpole to frog)</li> <li>Identifying and classifying. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4: What is growth and how do we measure it? (Observation over time)</b></p> <ul style="list-style-type: none"> <li>Know that some plants grow from bulbs. A bulb is a resting stage for certain plants.</li> <li>Know that plants have a large underground food store, short stems and fleshy leaves.</li> <li>Know that when a plant grows it gets bigger.</li> <li>Plant bulbs and track their growth – observation over time. <b>(WS)</b></li> <li>Gathering and recording data in tables and bar charts to help in answering questions. <b>(WS)</b></li> </ul>
	<p><b>Learning Question 5 – Can we combine materials? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that different combinations of materials can be used to create different objects, for example a saucepan or a mop.</li> <li>Asking simple questions and recognising that they can be answered in different ways... <b>(WS)</b></li> <li>Identifying and classifying... <b>(WS)</b></li> </ul>	<p><b>Learning Question 5: How do living things adapt to the cold? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that living things are adapted to their environment. This means they may not be able to survive in other habitats</li> <li>Know that some animals and plants are adapted to life in a cold desert: Arctic fox and shrubs.</li> <li>Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> </ul>	<p><b>Learning Question 5: Do humans need exercise? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that humans need exercise to stay healthy.</li> <li>Performing simple tests. <b>(WS)</b></li> <li>Gathering and recording data in tables to help in answering questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 5 – What do plants need to grow? (Observation over time)</b></p> <ul style="list-style-type: none"> <li>Know that plants need water, light and a suitable temperature to grow</li> <li>Know that temperature is a measure of how hot or cold something is</li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> <li>Perform simple tests. <b>(WS)</b></li> </ul>
	<p><b>Learning Question 6: Can an object change shape? (Pattern seeking)</b></p> <ul style="list-style-type: none"> <li>The shape of some solid objects made from some materials can be changed by squashing, bending, twisting or stretching the material.</li> <li>Asking simple questions and recognising that they can be answered in different ways... <b>(WS)</b></li> <li>Identifying and classifying... <b>(WS)</b></li> </ul>	<p><b>Learning Question 6: Where do living things find their food? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that animals get their food from plants and other animals, this food provides the energy animals need.</li> <li>Know most plants produce their own food and are called producers.</li> <li>Know that in a food chain, the arrows show where the energy is being transferred from and to</li> </ul>	<p><b>Learning Question 6: How important is hygiene? (research)</b></p> <ul style="list-style-type: none"> <li>Know that humans need to practice hygiene to stay healthy</li> <li>Asking simple questions and recognising that they can be answered in different ways. <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 6 – How do plants make food? (Observation over time)</b></p> <ul style="list-style-type: none"> <li>Know that many plants make fruits or vegetables; some of these grow below ground</li> <li>Observing closely, using simple equipment. <b>(WS)</b></li> <li>Using their observations and ideas to suggest answers to questions. <b>(WS)</b></li> <li>Perform simple tests. <b>(WS)</b></li> </ul>

Medium term Science plan Year 3						
	Autumn 1	Autumn 1	Autumn 2	Spring 2	Spring 2	Summer 2
Whole school drivers	Equality We intend to look at	Equality	Aspiration We intend to look at prominent sports stars from varying backgrounds.	Health We intend to look at the unhealthy aspects of some plants and how to avoid them.	Health We intend to explore how to stay safe from sunlight.	Community We intend to explore the role electricity plays in modern communities including changing communication.
Topic title:	<u>How can we attract and repel?</u>	<u>How can we attract and repel?</u>	<u>How does our body support itself</u>	<u>How do plants survive?</u>	<u>What stops it being dark?</u>	<u>Can we make a circuit?</u>
Science strand	<u>Forces</u>	<u>Magnetism</u>	<u>Animals including humans</u>	<u>Plants</u>	<u>Light</u>	<u>electricity</u>
Types of enquiry	Pattern seeking Identifying and classifying Observation over time Fair testing Research					
Working scientifically skills	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.</p> <p>Reporting on findings from enquiries, including oral and written 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Presentation of data	Tables and Bar graphs for results	Tables and Bar graphs for results	Table and bar graph	Labelled diagrams	Labelled diagrams	Labelled diagrams
Prior knowledge	<p>How slow/fast a vehicle moves along a track depends on how hard/gently it is pushed/pulled, how steep the slope is, or whether there is an obstacle in its way</p> <p>How slow/fast a boat moves across the water depends on how hard/gently we blow at them through straws</p> <p>Solids keep their shape unless a force is put on it. They will change their shape if you cut or squash them</p>	<p>Magnetic materials are attracted to magnets.</p> <p>Magnets can repel or attract each other, depending on which way they are held to each other.</p> <p>Objects have a name and often have a purpose. For example, a cup is the object, and its purpose is for drinking from. The material is what an object is made of, for example a cup can be made of paper or plastic</p> <p>Forces are pushes or pulls.</p> <p>Forces can cause a change in speed, direction or shape of an object.</p>	<p>Children looked at how to group animals including based on their diet.</p> <p>Children studied animals and their offspring and the basic needs that animals need to survive</p>	<p>Basic parts of a plant</p> <p>What plants need to grown</p> <p>How the process of germination works.</p> <p>The names of some common plants.</p> <p>Where plants grow best.</p>	<p>Know that the sun is a light source.</p> <p>Children know that light changes in the different seasons.</p>	<p>Common materials include wood, paper, metal, glass, water, rock.</p> <p>Materials have different physical properties, some materials are hard whilst others are soft, some can be described as rough whilst others are smooth, some are dull whereas others are shiny.</p> <p>Materials can be grouped in a number of ways based on their physical properties.</p> <p>The material that we choose to make an object from depends on its purpose (e.g. no chocolate kettle).</p>

		<p>Forces act in particular directions. Forces that act in opposite directions are called opposing forces.</p> <p>Forces that are equal and act in opposite directions are described as balanced forces, they cancel each other out.</p> <p>Friction is a force between two surfaces that are sliding or trying to slide over each other</p>				
Common misconceptions	Some pupils may not associate throwing and kicking with a push. Using the statement "Forces always act in pairs" can cause confusion.	<p>Magnets stick to objects</p> <p>If you break a magnet in half, you will get a part with only a north pole and another part that is only the south pole</p> <p>If you break a magnet in half, you will get a part with only a north pole and another part that is only the south pole</p> <p>Magnets will only attract magnetic materials through air.</p> <p>The size of the magnet dictates the strength of the magnet.</p>	<p>Food is just a thing we eat.</p> <p>Fat is bad for you.</p> <p>Our skeleton is one continuous bone.</p> <p>Snakes are like worms, so can't have a skeleton.</p>	<p>Plants need soil to grow.</p> <p>A flower is the whole plant.</p> <p>A tree is not a plant.</p> <p>Insects eat pollen.</p>	<p>Sight is a human sense.</p> <p>Reflective surfaces emit light</p> <p>Only shiny surfaces or water reflect light</p> <p>Opaque objects do not reflect light</p> <p>Opaque surfaces give out colour or 'darkness'</p>	<p>The components in the circuit "use up" the energy in the cell/battery.</p> <p>Batteries store electricity inside of them.</p> <p>Only metals conduct electricity.</p>
Key vocabulary	<p><b>balanced forces:</b> [noun] when opposing (opposite) forces are the same size</p> <p><b>force:</b> [noun] a push or a pull experienced by one object</p> <p><b>friction:</b> [noun] a force acting on an object when two surfaces slide over each other</p> <p><b>opposing forces:</b> [noun] forces that act in opposite directions</p> <p><b>unbalanced forces:</b> [noun] when opposing (opposite) forces are different sizes</p>	<p><b>attract: (verb)</b> when magnets attract, they pull towards each other (this happens when place the north pole of a magnet near the south pole of another magnet)</p> <p><b>repel: (verb)</b> when magnets repel, they push away from each other (this happens when you try and put them.</p> <p><b>magnetic force: (noun)</b> the pulling forces or pushing forces happens when magnets are close to each other.</p> <p>magnetic poles: magnets have 2 poles: a north pole and a south pole.</p> <p><b>non-contact force: (noun)</b> non-contact forces are forces that can act at a distance, for example magnetic force, and gravity.</p> <p><b>north pole: (noun)</b> this is one of a magnet's poles. A north pole will repel (push away) another north pole, but will be attracted to a south pole.</p> <p><b>south pole: (noun)</b> this is one of a magnet's poles. A south pole will repel (push away) another south pole, but will be attracted to a north pole.</p>	<p><b>Nutrition (noun)</b> – food or nourishment</p> <p><b>Skeleton (noun)</b>– the framework of bones that supports the body of an animal</p> <p><b>Muscles (noun)</b> – a bundle of tissue in the body of an animal that can contract</p> <p><b>enabling movement healthy</b> – good for your health</p> <p><b>Vertebrate (noun)</b> – an animal with a backbone (spine)</p> <p><b>Invertebrate (noun)</b> - an animal without a backbone (spine)</p>	<p><b>Stem (noun)</b> – Main body or stalk of a plant.</p> <p><b>Root (noun)</b> – part of the plant which connects it to the ground.</p> <p><b>Function (noun)</b> – Activity which is the purpose of the thing.</p> <p><b>Xylem (noun)</b> – Small tubes inside the stem which carry water and nutrients.</p> <p><b>Pollination (noun)</b> – the transfer of pollen to the stigma, flower, ovule or plant to allow fertilisation.</p>	<p><b>light ray (noun)</b> - an imaginary line that represents the line of light</p> <p><b>light source (noun)</b> - something that makes light</p> <p><b>transparent (adjective)</b>- can see through</p> <p><b>translucent (adjective)</b> - can be seen through, but not clearly</p>	<p><b>buzzer: (noun)</b> the buzzer changes the electrical energy to sound energy (the buzzer will make a sound).</p> <p><b>cell/ battery: (noun)</b> cell/ battery provides energy to push the electricity around the circuit.</p> <p><b>component: (noun)</b> things we use to build our circuit, e.g. bulbs, wires, cells, batteries, switches, motors.</p> <p><b>motor: (noun)</b> a component used in a circuit.</p> <p><b>switch: (noun)</b> a switch completes or breaks the circuit. when the switch is closed, the circuit is complete, and the electrical energy can flow around the circuit.</p> <p><b>wires: (noun)</b> a component used to connect other components in a circuit</p>
Focus scientist	<b>William Gilbert</b>	<b>William Gilbert</b>	<b>Marie Curie</b>	<b>Agnes Arber</b>	<b>Albert Einstein</b>	<b>Nikola Tesla</b>
Progression coverage	<p><b>Learning Question 1: Push or Pull? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that forces are pushes or pulls</li> <li>Know that forces arise when objects interact with each other</li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 –What does a force do? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that forces arise when objects interact with each other</li> <li>Know that forces can cause a change in speed, direction or shape of an object</li> <li>Setting up simple practical enquiries, comparative and fair tests. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: What is a magnet? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that magnetism is the force exerted by magnets when they attract or repel each other</li> <li>Know that magnets have a north and a south pole.</li> <li>Know that if opposite poles are facing the magnets will be attracted to one another (the magnets pull towards each other). If the same poles are facing the magnets will repel (the magnets will push away from each other).</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(WS)</b></li> <li>Setting up simple practical enquiries, comparative and fair tests. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: How does our skeleton help us? (Research)</b></p> <ul style="list-style-type: none"> <li>Know our skeleton is made of lots of bones.</li> <li>Know that our skeleton helps us move, protects us and supports us.</li> <li>Know that where bones meet is called a joint.</li> <li>Know that without our skeleton we wouldn't be able to stand or move.</li> </ul> <p><b>Learning Question 2 –Do our bones effect what we can do? (fair test)</b></p> <ul style="list-style-type: none"> <li>Know that bones influence our movement.</li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: What do plants need? (Investigation over time)</b></p> <ul style="list-style-type: none"> <li>Know plants need nutrients, water, light, air and room to grow.</li> <li>Setting up simple practical enquiries, comparative and fair tests. <b>(ws)</b></li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(ws)</b></li> </ul>	<p><b>Learning Question 1: What is light? (research)</b></p> <ul style="list-style-type: none"> <li>Know that we need light to see things.</li> <li>Know that dark is the absence of light.</li> <li>Know a light source makes or emits light.</li> <li>Know that light travels in straight lines.</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(ws)</b></li> </ul> <p><b>Learning Question 2 –What is reflected light? (pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know that reflected light is light that bounces off a surface.</li> <li>Know that a reflected light and a light source are difference.</li> <li>Know examples of reflective materials.</li> </ul>	<p><b>Learning Question 1: What is an electrical appliance? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that appliances use electricity to serve a purpose (e.g. toaster, kettle, fan, phone, game)</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> </ul>

<ul style="list-style-type: none"> <li>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> </ul> <p><b>Learning Question 3: Can you balance a force? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that forces act in particular directions.</li> <li>Know that we use arrows to show the size of the force and the direction it acts in.</li> <li>Know that forces that are equal and act in opposite directions are described as balanced forces, they 'cancel each other out'</li> <li>Know that when forces are balanced, an object will move at a constant speed in the same direction. This includes being stationary!</li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 –What happens if a force is unbalanced?? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that when the forces acting in the opposite directions are not equal, this can cause the object they are acting on to move at a different speed or in a different direction.</li> <li>Know that unbalanced forces can change the shape of an object.</li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(WS)</b></li> </ul> <p><b>Learning Question 1: What is friction? (Pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know that friction is a force between two surfaces that are sliding or trying to slide over each other</li> <li>Know that the bumpier or rougher the surfaces, the more friction there will be</li> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – How does friction effect movement? (Fair test) Investigation in full.</b></p> <ul style="list-style-type: none"> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(WS)</b></li> <li>Setting up simple practical enquiries, comparative and fair tests. <b>(WS)</b></li> </ul>	<p><b>Learning Question 2 –is the difference between a contact and non-contact force? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that contact forces require contact between two objects (e.g. friction). Non-contact forces can affect an object at a distance (e.g. magnetism)</li> <li>Know that friction is a contact force because it requires the two objects to be touching</li> <li>Know that magnetic forces act a distance, which is called a non-contact force</li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(WS)</b></li> </ul> <p><b>Learning Question 3 –are all materials magnetic?? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Magnets attract objects made from magnetic materials</li> <li>Some metals are magnetic but not all are. Plastics, wood, fabric, glass are all non-magnetic</li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, <u>bar charts, and tables.</u> <b>(WS)</b></li> <li>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> <li>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. <b>(WS)</b></li> </ul> <p><b>Learning Question 4 –Does distance effect magnetism? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that the closer to the poles of the magnet, the stronger the magnetic force</li> <li>Setting up simple practical enquiries, comparative and fair tests.</li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways</li> </ul>	<ul style="list-style-type: none"> <li>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables <b>(WS)</b></li> </ul> <p><b>Learning Question 3: What do our muscles do? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that muscles have different jobs.</li> <li>Know muscles help pump blood, help lift things and work with our bones to help us move.</li> <li>Know we have voluntary and involuntary muscles.</li> <li>Explain how contraction helps movement</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(WS)</b></li> </ul> <p><b>Learning Question 4 –Do all animals have the same skeleton? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that different animal's skeletons look different.</li> <li>Know that vertebrate have a spine.</li> <li>Know that invertebrate do not have a spine.</li> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> </ul> <p><b>Learning Question 5: What types of nutrition do we need? (Research)</b></p> <ul style="list-style-type: none"> <li>know nutrition is one of the seven life processes.</li> <li>Know nutrition is eating food to gain energy.</li> <li>Know that food is broken down into categories.</li> <li>Know how much of each category is needed.</li> <li>Know what the eatwell plate shows.</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(WS)</b></li> </ul>	<p><b>Learning Question 2 –Do the different parts of a flower have a function? (Research)</b></p> <ul style="list-style-type: none"> <li>Know the name of: Flower Leaf Root Stem</li> <li>Know that the flower is brightly coloured to attract insects</li> <li>Know the stem holds the plant up</li> <li>Know the plant takes in water and nutrients.</li> <li>Know the leaf catches sunlight so the plant can make its own food.</li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(ws)</b></li> </ul> <p><b>Learning Question 3: What do roots do? (Research)</b></p> <ul style="list-style-type: none"> <li>Know roots take up water and nutrients from the soil.</li> <li>Know roots keep a plant steady.</li> <li>Know roots anchor the plant.</li> <li>Know roots keep the plant upright.</li> <li>Making systematic observations <b>(WS)</b></li> </ul> <p><b>Learning Question 4 – How do plants transport water? (Observation over time)</b></p> <ul style="list-style-type: none"> <li>Know that water is transported through the stem.</li> <li>Know the stem is made up of tiny tubes called xylem.</li> <li>Know xylem run from the roots to deliver water to all parts of the plant.</li> <li>Setting up simple practical enquiries, comparative and fair tests. <b>(ws)</b></li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(ws)</b></li> </ul> <p><b>Learning Question 5: How do flowers pollinate? (Research)</b></p> <ul style="list-style-type: none"> <li>know the petal attracts insects.</li> <li>know the anther contains pollen.</li> <li>Know the filament holds the anther up.</li> <li>Know the sepal protects the flower as it starts to grow.</li> <li>Know the ovary is where the seeds are formed.</li> <li>Know the stigma catches the pollen grains.</li> <li>Know the style holds up the stigma.</li> </ul>	<ul style="list-style-type: none"> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(ws)</b></li> </ul> <p><b>Learning Question 3: Is the sun dangerous? (research)</b></p> <ul style="list-style-type: none"> <li>Know the sun is a light source.</li> <li>Know the sun provides light and height.</li> <li>Know that the sun can damage your eyes.</li> <li>Know ways to protect their eyes from the sun.</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(ws)</b></li> </ul> <p><b>Learning Question 4 –What is a shadow? (research)</b></p> <ul style="list-style-type: none"> <li>Know a shadow is a dark area or shape caused by a solid object blocking the rays of light from a light source.</li> <li>Know opaque lets no light through.</li> <li>Know translucent lets some light through.</li> <li>Know transparent allows light through.</li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(ws)</b></li> </ul> <p><b>Learning Question 5: Does moving the light source change the shadow? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that the shadow gets larger as the light source moves away. Setting up simple practical enquiries, comparative and fair tests.</li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(ws)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(ws)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables. <b>(ws)</b></li> </ul>	<p><b>Learning Question 2 – Can we create a simple circuit? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that a lamp in a circuit will only light if there is a complete circuit.</li> <li>Know that a complete circuit must have at least one cell and have all the components connected in a loop. Components include wire, lamp, buzzer, motor or switch</li> <li>Know that a short circuit can be created by accident by connecting just the wire to the cell in a circuit. They can be dangerous.</li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, <u>labelled diagrams,</u> bar charts, and tables. <b>(WS)</b></li> </ul> <p><b>Learning Question 3 How do we complete a circuit? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that a lamp in a circuit will only light if there is a complete circuit.</li> <li>Know that a complete circuit must have a power source (cell/batteries) and have all the components connected in a loop. If it is missing any of these things it is an incomplete circuit</li> <li>Know that components include wire, lamp, buzzer, motor or switch</li> <li>Know that Switches complete or break a circuit.</li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables. <b>(WS)</b></li> <li>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> </ul>
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Medium term Science plan Year 4					
	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Whole school drivers</b>	Aspiration We intend to investigate successful chefs from varying backgrounds	Conservation	Health We intend to investigate how ongoing damage to polar environments is impacting on our long-term health.	Fairness We intend to look at the difficulties of the deaf community and how society is/isn't fair for them.	Community We intend to investigate the role the water cycle plays in community
Topic title:	<u>What happens to the food we eat?</u>	<u>What makes a rock?</u>	<u>Can we classify like a scientist?</u>	<u>How do we hear?</u>	<u>What are the states of matter?</u>
Science strand	<u>Animals including humans</u>	<u>Rocks</u>	<u>Living things and their habitats</u>	<u>Sound</u>	<u>States of matter</u>
Type of enquiry	Pattern seeking Identifying and classifying Observation over time Fair testing Research				
Working scientifically skills	Asking relevant questions and using different types of scientific enquiries to answer them.  Setting up simple practical enquiries, comparative and fair tests.  Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.  Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.  Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.  Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.  Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.  Identifying differences, similarities or changes related to simple scientific ideas and processes.  Using straightforward scientific evidence to answer questions or to support their findings.	Asking relevant questions and using different types of scientific enquiries to answer them.  Setting up simple practical enquiries, comparative and fair tests.  Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.  Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.  Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.  Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.  Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.  Identifying differences, similarities or changes related to simple scientific ideas and processes.  Using straightforward scientific evidence to answer questions or to support their findings.	Asking relevant questions and using different types of scientific enquiries to answer them.  Setting up simple practical enquiries, comparative and fair tests.  Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.  Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.  Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.  Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.  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Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.  Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.  Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.  Identifying differences, similarities or changes related to simple scientific ideas and processes.  Using straightforward scientific evidence to answer questions or to support their findings.
Presentation of data	drawings, labelled diagrams, keys,	drawings, labelled diagrams	Keys	Labelled diagram, line graph, bar graph	Line graph, table, labelled diagram.
Prior knowledge	Deciduous plants lose their leaves in winter (e.g. oak, silver birch, horse chestnut, sycamore, ash). Animals can be placed into groups (carnivores, herbivores and omnivores) based on the food they eat. Humans are omnivores, but some choose to eat only plants. Animals get their food from plants and other animals; this food provides the energy animals need Humans need to practice hygiene to stay healthy. Most plants produce their own food and are called producers. In a food chain, the arrows show where the energy is being transferred from and to. Different animals have different nutritional needs. Organs are parts of the body that do a particular job, like the heart pumps blood around the body and the lungs are used for breathing, which gets air into the body.	Know the properties of different materials. Experience of sorting and classifying. May understand there are a variety of rocks with different appearances.	Plants are classed as living things because they grow, move, reproduce, and need nutrition. Animals can be grouped into fish, amphibians, reptiles, birds and mammals (name common examples). Animals can be placed into groups (carnivores, herbivores, omnivores) based on what they eat. Animals, including humans, reproduce. This means they have offspring that grow into adults. Living things are called organisms. Animals move from place to place, while plants move on the spot. Habitats are the places that living things live. A very small habitat is called a micro-habitat. Living things are adapted to their environment. This means they may not be able to survive in other habitats.	Humans have features that are associated with each sense (eyes, ears, nose, mouth and tongue)	Materials melt when it is hot and freeze when it is cold. All materials are made of a single substance or a mixture of substances. There are three states of matter: solids, liquids and gases.
Common misconceptions	Teeth is made from the same materials as bone. Some pupils think that naturally occurring sugar cannot cause tooth decay.	Bricks and concrete are rocks. Rocks don't change. Soil is just dirt.	Animals are furry and have four legs Lizards and snakes are amphibians Whales are fish because they swim in the sea.	Sound waves travel in one direction from the source of the sound.	Only materials that are hard are solids. Some materials, such as sand and salt, are both solid and liquid at the same time.

	Some pupils think all birds are herbivores; they eat berries, seeds, and fruit. Herbivores are small animals, no bigger than the size of a rabbit. Many pupils think that the only reason that we eat is to give us energy, they do not appreciate that eating provides the body with the building blocks needed for growth and repair. Pupils are often unaware of actual the location of the stomach, many think it is located around the navel area.	Fossils are all the same.	Starfish and jellyfish are types of fish. A crab is a vertebrate because it has a hard shell. Snakes are invertebrates, like earthworms All creepy crawlies are insects. All plants have flowers with coloured petals, green leaves and a stem	The particles in a liquid are further apart than the particles in a solid. Sound needs an unobstructed pathway to travel All low pitch sounds are quiet and all high pitch sounds are loud.	The particles in a liquid are further apart than the particles in a solid. Many pupils find it difficult to distinguish between chemical and physical changes. Boiling and evaporation are irreversible changes. Liquids that evaporate disappear forever.
Key vocabulary	<b>absorb (noun):</b> to take or soak in. After the food has been digested (broken down into tiny molecules), they move into the blood in your body – we say that the body absorbs the nutrients. <b>nutrients (noun):</b> nutrients are what we need to keep healthy. Carbohydrates, proteins and fats are the main nutrient groups. <b>digestive system (noun):</b> the group of organs that work together to break down food into small soluble molecules which can be absorbed by the body to be used for energy, growth and repair. <b>digestion (noun):</b> the process where your body breaks down food into small soluble molecules which can be absorbed by the body. <b>enzymes (noun):</b> are found in the digestive system and help with the chemical breakdown of food <b>incisors (noun):</b> incisors are the teeth at the front of the mouth, they are used for biting and cutting food.	<b>Igneous (adjective)</b> – solidified from lava or magma <b>Metamorphic (adjective)</b> – a rock changed by heat, pressure or other natural process. <b>Sedimentary (adjective)</b> – a rock formed by sediment from air or water. <b>Permeable (adjective)</b> – allows liquid or gas to get through. <b>Impermeable (adjective)</b> – does not allow liquid or gas to get through.	<b>characteristic (noun):</b> the qualities of that particular animal or plant. <b>classification (noun):</b> sorting or grouping things according to their characteristics. <b>classification key (noun):</b> a set of questions about living organisms' characteristics that will help you identify them. <b>dichotomous key (noun):</b> a tool that can help you identify organisms by splitting organisms into two groups until there is just one organism left in each group	<b>absorbs:</b> (verb) when a material or object "takes in" the sound wave, it has absorbed the sound. <b>reflects:</b> (verb) when a sound wave bounces off an object or material, the object or material has reflected the sound. <b>vibrate:</b> (verb) to move back and forth very quickly. of thunder and a bass drum. <b>particles:</b> (noun) everything in the universe is made up of particles. Particles are too small for our eyes to see. Particles are arranged differently in solids, liquids and gases. <b>pitch:</b> (noun) how high or low a sound is. A mouse squeak is a high pitch sound. Thunder produces low pitch sounds.	<b>boiling point (noun):</b> the temperature where all of a liquid will change into a gas <b>condensation (noun):</b> the process in which a substance changes from a gas to a liquid <b>evaporation (noun):</b> the process in which a substance changes from a liquid to a gas <b>variable (noun):</b> something that can change
Focus scientist	<b>Marie M. Daly</b>	<b>Mary Anning</b>	<b>Al-Jahiz</b>	<b>Alexander Graham Bell</b>	<b>Amedeo Avogadro</b>
Progression coverage	<p><b>Learning Question 1: What types of teeth do we have? (observation over time)</b></p> <ul style="list-style-type: none"> <li>Know that there are four main types of teeth: incisors, canines, pre-molars and molars. They each have a different purpose.</li> <li>Know that babies' teeth develop before they are born, deciduous (milk) teeth push through the gums when a child is about 6 months.</li> <li>Know that deciduous teeth fall out from the age of 5 and are replaced with adult teeth.</li> <li>Recording findings using simple <u>scientific language, drawings, labelled diagrams, keys, bar charts, and tables. (WS)</u></li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – Do all animals have the same teeth? (Pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know that Herbivores, carnivores and omnivores have these types of teeth in different proportions.</li> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: How are rocks formed? (identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that there are three types of rock – metamorphic, igneous and sedimentary.</li> <li>Know that igneous rocks form from lava.</li> <li>Know that sedimentary rocks form from sediment from air or water.</li> <li>Know that metamorphic rock forms from pressure</li> <li>Know that rocks are natural and not made by humans.</li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> <li></li> </ul> <p><b>Learning Question 2 – What types of rocks are there? (identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know examples of each type of rock (suggestion : igneous – granite, pumice, basalt. Metamorphic – slate, marble Sedimentary – <b>limestone, chalk, mudstone.</b>)</li> <li>Know metamorphic rocks have a crystal and "squashed" texture.</li> <li>Know that igneous rocks are formed out of large crystals.</li> </ul>	<p><b>Learning Question 1: What is classification? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that classification refers to a method used to place all living things into groups.</li> <li>Know that organisms can be classified in a number of ways</li> <li>Know that vertebrates have endoskeletons made of bone</li> <li>Know that invertebrates can be placed into groups based on their skeletons: exoskeletons, or hydrostatic skeletons</li> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> <li>Recording findings using simple <u>scientific language, drawings, labelled diagrams, keys, bar charts, and tables. (WS)</u></li> </ul> <p><b>Learning Question 2 – How are vertebrates and invertebrates different? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>know that fish, amphibians, reptiles, birds and mammals are all vertebrates</li> <li>know that vertebrates can be grouped in a number of ways based on their characteristics, e.g. warm/cold blooded; or physical features like fur, beak, wings etc.</li> <li>know that invertebrates can be grouped based on their characteristics as snails and slugs; worms; spiders and insects</li> </ul>	<p><b>Learning Question 1: What is sound? (research)</b></p> <ul style="list-style-type: none"> <li>Know that sounds are made when objects vibrate.</li> <li>Know that sound is transmitted from a source to a detector.</li> <li>Recording findings using simple <u>scientific language, drawings, labelled diagrams, keys, bar charts, and tables. (WS)</u></li> <li></li> </ul> <p><b>Learning Question 2 – How does sound travel? (Pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know that vibrations are passed on from one particle to the next, and so it travels more easily when particles are closer together (solids and liquids)</li> <li>Know that sound cannot travel in a vacuum</li> <li>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. <b>(WS)</b></li> </ul> <p><b>Learning Question 3 – How do we hear? (research)</b></p> <ul style="list-style-type: none"> <li>Know that Vibrations are passed on from one particle to the next, and so it travels more easily when particles are closer together (solids and liquids)</li> <li>Know that Vibrations travel through a medium (e.g. air, water) to the ear</li> <li>Know that vibrations enter the ear, our inner ear vibrates and we hear them as sound.</li> </ul>	<p><b>Learning Question 1: What are the three states of matter? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that there are three states of matter: solids, liquids, and gases</li> <li>Know that liquids take the shape of the container they are in, when you move the liquid into a different container the shape will change</li> <li>Know that solids keep their shape unless a force is put on it. They will change their shape if you cut them or squash them</li> <li>Know that gases have no fixed shape or volume, they spread out to fill a container. If they are not in a container, they will keep spreading out</li> <li>Know that we can decide if a substance is a solid, liquid or gas by looking at its properties</li> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 What is a particle? (Pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know that the different substances in their different forms (solids, liquids and gases) are all made of particles</li> <li>Know that the particles in the different states of matter are arranged differently</li> <li>Know that in a solid the particles are packed tightly together, they vibrate slowly and are unable to move away from their neighbours</li> </ul>

<p><b>Learning Question 3 – How do we digest food? (research)</b></p> <ul style="list-style-type: none"> <li>Know that animals and plants need to digest food to transfer energy from it</li> <li>Know that the digestive system is the group of organs that help your body digest food. Digestion in humans is chemical and mechanical</li> <li>Know that chemical and mechanical digestion takes place in the mouth (saliva and chewing)</li> <li>Know that food travels down the oesophagus from the mouth into the stomach</li> <li>Know that in the stomach, mechanical (churning) and chemical digestion takes place to break down food further</li> <li>Know that food is further broken down (chemical digestion) in the small intestines where most of the nutrients are absorbed</li> <li>Know that water is absorbed in the large intestine, leaving behind the faeces.</li> <li>Know that faeces are mainly made of food we could not digest; faeces are stored in the rectum and pass out of the human body via the anus.</li> <li>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> </ul>	<ul style="list-style-type: none"> <li>Know sedimentary rocks contain rounded grains.</li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> </ul>	<ul style="list-style-type: none"> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> </ul>	<ul style="list-style-type: none"> <li>Know that sounds get fainter as the distance from the sound source increases</li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> </ul>	<ul style="list-style-type: none"> <li>Know that in a liquid the particles are close together but they can slide past each other</li> <li>Know that in a gas the particles are spread out and can move freely</li> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> </ul>
<p><b>Learning Question 4 – What is a food chain? (research)</b></p> <ul style="list-style-type: none"> <li>Know that a food chain starts with a producer (usually a plant) who can produce its own food. Organisms that eat producers are called consumers</li> <li>Know that animals and plants need to digest food to transfer energy from it</li> <li>Know that a predator hunts prey to eat</li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3: Can rocks change? (fair test)</b></p> <ul style="list-style-type: none"> <li>Know igneous and sedimentary rocks can change into metamorphic rocks.</li> <li>Know igneous and sedimentary rocks can be reformed.</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(ws)</b></li> <li>Setting up simple practical enquiries, comparative and fair tests. <b>(ws)</b></li> </ul>	<p><b>Learning Question 3 – Can plants be classified? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know that plants can be grouped into flowering and non-flowering plants</li> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – How does volume change? (fair test)</b></p> <ul style="list-style-type: none"> <li>Know that the volume of a sound is how loud or quiet it is.</li> <li>Know that louder sounds are caused by bigger vibrations, smaller sounds are caused by smaller vibrations.</li> <li>Setting up simple practical enquiries, comparative and fair tests. <b>(WS)</b></li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> <li>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> <li>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3: Can particles change state? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that substances can change from one state of matter to another. Solids can change to become a liquid, liquids can change to become a gas, gases can change to become liquids and liquids can change to become a solid</li> <li>Know that the process that changes a solid to a liquid is called melting</li> <li>Know that the process that changes a liquid to a gas is called evaporating</li> <li>Know that evaporation happens when a liquid is heated. Evaporation is different from boiling.</li> <li>Know that the process that changes a gas to a liquid is called condensing</li> <li>Know that the process that changes a liquid to a solid is called freezing</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them.</li> <li>Setting up simple practical enquiries, comparative and fair tests. <b>(WS)</b></li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> <li>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> <li>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. <b>(WS)</b></li> </ul>
<p><b>Learning Question 4 – How does an ecosystem work? (research)</b></p> <ul style="list-style-type: none"> <li>Know that a food web shows the transfer of energy between different organisms (include water as well as land organisms)</li> <li>Know that an ecosystem is made up of all organisms living in an area and the non-living features of the environment</li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4: Is soil just dirt? (research)</b></p> <ul style="list-style-type: none"> <li>Know soil is made up of tiny pieces of organic matter and rocks.</li> <li>Know soil is made up of three parts – top soil, weathering soil and solid rock.</li> <li>I know top soil is rich in nutrients and is good for growing plants.</li> <li>Know that weathered soil is full of broken down rock.</li> <li>Know that solid rock is the foundation that soil sits on.</li> <li>Asking relevant questions and using different types of scientific enquiries to answer them. <b>(ws)</b></li> </ul>	<p><b>Learning Question 3 – How is a dichotomous key different? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know how to draw a dichotomous classification key to help others identify an object</li> <li>Identifying differences, similarities or changes related to simple scientific ideas and processes. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – How does pitch change? (fair test)</b></p> <ul style="list-style-type: none"> <li>Know the pitch of a sound is how high or low it is. Setting up simple practical enquiries, comparative and fair tests. <b>(WS)</b></li> <li>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> <li>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. <b>(WS)</b></li> <li>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> <li>Using results to draw simple conclusions, make predictions for</li> </ul>	
	<p><b>Learning Question 5: How are fossils formed? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>Know a fossil shows the remains of prehistoric life.</li> <li>Know the process of a fossil forming:             <ol style="list-style-type: none"> <li>1 – animal/plant dies</li> <li>2 – covered with sediment</li> <li>3 – under pressure turns into a rock</li> <li>4 – after thousands of years the rock is exposed</li> </ol> </li> <li>Know body fossils are the fossil of a plant or animal</li> <li>Know trace fossils are footprints, tracks, nests or other changes to the environment.</li> </ul>	<p><b>Learning Question 4 – How are habitats different to environments? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that a species is a group of one type of organism, individuals in this group can breed with each other to produce offspring that can go on to reproduce</li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(WS)</b></li> </ul>		
		<p><b>Learning Question 5 –What are the effects of damaging environments? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that buildings and new developments have destroyed many habitats. This means number and types of organisms in these areas has gone down</li> <li>Know that creating nature reserves is one way to prevent the loss of habitat. Setting aside land that cannot be used for building (greenbelt) helps keep habitats intact</li> <li>Using straightforward scientific evidence to answer questions or to support their findings. <b>(WS)</b></li> </ul>		

				<p>new values, suggest improvements and raise further questions. <b>(WS)</b></p> <ul style="list-style-type: none"> <li>•</li> </ul> <p><b>Learning Question 4 – Do we all hear the same? (Identifying and classifying)</b></p> <ul style="list-style-type: none"> <li>• Know that different animals hear different sounds.</li> <li>• Know that humans' hearing changes as we age.</li> <li>• Using straightforward scientific evidence to answer questions or to support their findings. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – How does temperature effect state? (Fair test)</b></p> <ul style="list-style-type: none"> <li>• Know that substances change state at different temperatures, i.e. they have different melting and boiling points</li> <li>• Know that different substances are different states at room temperature</li> <li>• Asking relevant questions and using different types of scientific enquiries to answer them.</li> <li>• Setting up simple practical enquiries, comparative and fair tests. <b>(WS)</b></li> <li>• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> <li>• Recording findings using simple scientific language, drawings, <u>labelled diagrams</u>, keys, <u>bar charts</u>, <u>and tables</u>. <b>(WS)</b></li> <li>• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> <li>• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. <b>(WS)</b></li> </ul> <p><b>Learning Question 4 – What is evaporation? (Fair test)</b></p> <ul style="list-style-type: none"> <li>• Setting up simple practical enquiries, comparative and fair tests. <b>(WS)</b></li> <li>• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <b>(WS)</b></li> <li>• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. <b>(WS)</b></li> <li>• Recording findings using simple scientific language, drawings, <u>labelled diagrams</u>, keys, <u>bar charts</u>, <u>and tables</u>. <b>(WS)</b></li> <li>• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. <b>(WS)</b></li> <li>• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. <b>(WS)</b></li> </ul>
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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 2
<b>Whole school drivers</b>	Fairness We intend to	Aspiration We intend to learn about astronauts who came from diverse backgrounds.	Conservation We intend to investigate how human actions are interrupting the natural process of a life cycle	Health We intend to	Community We intend to investigate how community supports each age stage.
Topic title:	<u>What is a force?</u>	<u>Will we ever send another human to the moon?</u>	<u>What is a life cycle?</u>	<u>Are changes reversible?</u>	<u>How do humans grow?</u>
Science strand	<u>Forces</u>	<u>Space</u>	<u>Living things and their habitats</u>	<u>States of matter</u>	<u>Animals including humans</u>
Type of enquiry	Pattern seeking Identifying and classifying Observation over time <b>Fair testing</b> Research	<b>Pattern seeking</b> Identifying and classifying Observation over time Fair testing <b>Research</b>	<b>Pattern seeking</b> Identifying and classifying Observation over time Fair testing <b>Research</b>	Pattern seeking <b>Identifying and classifying</b> Observation over time <b>Fair testing</b> Research	Pattern seeking Identifying and classifying Observation over time Fair testing <b>Research</b>
Working scientifically skills	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p><b>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</b></p> <p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs.</b></p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p><b>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</b></p> <p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments.</b></p>	<p><b>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</b></p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar, and line graphs.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p><b>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</b></p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<p><b>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</b></p> <p><b>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</b></p> <p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs.</b></p> <p><b>Using test results to make predictions to set up further comparative and fair tests.</b></p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p><b>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</b></p> <p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments.</b></p>
Presentation of data	bar graphs, line graphs	Scientific diagrams and labels	Labelled diagrams	Tables, bar graphs, line graphs	Labelled diagrams
Prior knowledge	<p>Forces are pushes or pulls that act in particular directions. They can cause a change in speed, direction or shape of an object</p> <p>Forces that act in opposite directions are called opposing forces</p> <p>Forces that are equal and act in opposite directions are described as balanced forces. They 'cancel each other out'</p> <p>When forces are balanced, an object will move at a constant speed in the same direction. This includes being stationary</p> <p>Contact forces require contact between two objects (e.g. friction). Non-contact forces can affect an object at a distance (e.g. magnetism)</p> <p>Friction is a force between two surfaces that are sliding or trying to slide over each other</p> <p>Friction is a contact force because it requires the two objects to be touching (The bumpier or rougher the surfaces, the more friction there will be)</p>	<p>Daytime is when the Earth is facing the sun; night-time is when the Earth is facing away from the sun.</p> <p>The Moon is more visible at night.</p> <p>Animals, including humans, need food, water, oxygen, and the right temperature to survive.</p> <p>Light travels in a straight line.</p> <p>Sources of light emit their own light, and others reflect light.</p> <p>Shadows form behind an opaque object when light from a source is blocked.</p> <p>Sound travels through a medium; it cannot travel in a vacuum.</p> <p>Gravity is a non-contact force that pulls all objects towards each other.</p>	<p>Germination is the development of a plant from a seed. During germination roots and shoots emerge and grow.</p> <p>Some plants grow from bulbs.</p> <p>A seed is the embryonic stage of the plant life cycle.</p> <p>Animals, including humans, reproduce. This means they have offspring that grow into adults.</p> <p>As animals grow they get bigger, some animals change during their life cycle as the mature (e.g. tadpole to frog).</p> <p>The four main stages of the plant's life cycle include germination, pollination, fertilisation and seed dispersal.</p> <p>Pollination and fertilisation usually takes place in flowers. Dispersal is important to make sure there is enough space for seeds to germinate and plants to grow.</p> <p>A species is a group of one type of organism, individuals in this group can breed with each other to produce offspring that can go on to breed.</p> <p>Fish, amphibians, reptiles, birds and mammals are all vertebrates.)</p> <p>Invertebrates can be grouped based on their characteristics as snails and slugs; worms; spiders and insects.</p>	<p>All materials are made of a single substance or a mixture of substances</p> <p>Each substance in its state of matter is made up of parts that are too small to see without magnification</p> <p>Magnets attract magnetic objects</p> <p>Some metals are magnetic but not all are. Plastics, wood, fabric, glass are all non-magnetic materials</p> <p>Materials are different states at room temperature</p> <p>Physical properties include electrical conductivity; melting and boiling points; thermal conductivity; being malleable; windproof; hard/soft; and magnetic</p>	<p>Humans are made of many different body parts including head, neck, back, ears, eyes, nose, mouth, arms, shoulders, elbows, hands, fingers, legs, knees, feet, toes, ears, eyes, nose, mouth, arms, legs, hands, feet, toes.</p> <p>Plants and animals look similar to their parents in many features because information is passed from one generation to the next. This information comes from the parents genome.</p> <p>Sexual reproduction is two parents - usually male and female - create a new organism by mixing their genomes</p> <p>Sexual reproduction begins with fertilisation of an egg, which mixes the genomes from two parents</p> <p>Fertilisation can be internal or external</p> <p>After an egg is fertilised, an embryo will develop.</p> <p>Almost all mammals are viviparous.</p> <p>Embryos develop inside the body in the gestation period for viviparous animals.</p> <p>Viviparous animals are born, oviparous animals hatch from eggs, plant seeds germinate</p>
Common misconceptions	Only the Earth has gravity.	Pluto is a planet There is only one moon.	Many pupils may have incomplete ideas about life cycles.	All metals are magnetic Heat accumulates in one area and then overflows.	You never stop growing taller

	Objects must be in contact to be affected by the gravitational pull.	Asteroids are always very close together, and asteroid belts would be very difficult to fly through There is only one type of eclipse The Moon changes shape/size at different times in its 28-day orbit A 'day' and a 'year' are the absolute measures of time. There is no gravity on the Moon	33 Hibernation is the same as sleeping. Sexual reproduction or copulation. Some pupils do not think pupa are alive. Pupils may confuse the process of fertilisation and the process that brings the sex cells together. Some pupils do not think dormant seeds are alive Some pupils do not know that all flowering plants bear fruit.	Heat moves towards something not away from something. 33 When a solute is dissolved in a solvent the solute disappears. All solutes dissolve in water. A solution is a single substance not a mixture. Some pupils think that when a solid object dries, the water disappears.	
Key vocabulary	<b>air resistance: (noun)</b> the frictional force between a moving object and the air. Air resistance slows down a moving object. <b>fulcrum: (noun)</b> the fulcrum is the point where the lever pivots. <b>Newton: (noun)</b> The unit in which force is measured in. <b>Newton meter: (noun)</b> used to measure the amount of force. <b>water resistance: (noun)</b> the frictional force between a moving object and the water. Water-resistance slows down an object that is moving in the water.	<b>axis (noun):</b> an imaginary pole that goes straight through the centre of the Earth (or another object) that it rotates around <b>orbit (noun/verb):</b> the path that an object takes as it travels around another object / to travel around another object in a roughly circular path <b>celestial body (noun):</b> a word to describe anything that exists in space, including stars, planets, moons and asteroids <b>universe (noun):</b> everything that exists in space, including galaxies and the solar systems within them <b>vacuum (noun):</b> a place that has no particles in it at all, including air	<b>dispersal (noun):</b> The process of spreading out, in this case the process of seeds being spread out by animals and wind. <b>generation (noun):</b> All the offspring – from the same or different parents – who were born around the same time <b>asexual reproduction (noun):</b> When the offspring (the young) gets its genome from only 1 parent. The young will have the same genome as that parent (they are genetically identical). <b>sexual reproduction (noun):</b> When the offspring (the young) gets their genome from both parents	<b>insoluble (adjective)</b> – a substance is insoluble if it cannot dissolve in the solvent. <b>irreversible changes (noun)</b> – changes that we cannot undo, such frying an egg (we can't get the egg back into the form we started out with). <b>soluble (adjective)</b> – a substance is soluble if it can dissolve in the solvent. <b>solute (noun)</b> – the substance that dissolves in the solvent. When we dissolve sugar in water, the sugar in the solute. <b>solution (noun)</b> – a solution is made when a solute dissolve in a solvent (e.g. when sugar dissolves in water, we have a solution).	<b>life cycle – (noun)</b> the changes an organism goes through from birth to old age. <b>adolescence – (noun)</b> the time between approximately 10 – 20 years old. <b>embryo – (noun)</b> an unborn baby that is under 8 weeks old. <b>fertilisation (conception) – (noun)</b> when the egg and sperm fuse (join). <b>foetus – (noun)</b> an unborn baby that is over 8 weeks old. gestation period – (noun) the time the offspring grows inside the womb (the length of the pregnancy).
Focus scientist	<b>Isaac Newton</b>	<b>Katherine Johnson</b>	<b>Paula Kahumbu</b>	<b>Gitanjali Rao</b>	<b>Rosalind Franklin</b>
Progression coverage	<b>Learning Question 1: What is gravity? (Fair test)</b> <ul style="list-style-type: none"> <li>Know that gravity is a non-contact force that pulls all objects towards each other. The greater the mass of the object, the greater the gravitational pull around it. Gravity is most commonly experienced as the pull of the Earth (and all objects on it) towards each other</li> <li>Know that the Earth's gravitational pull is so large that all objects - regardless of how heavy they are - are pulled towards Earth at the same rate</li> <li>Know that force is measured in newtons (N)</li> <li>Know that mass is a measure of how much matter something is made from, this is measured in kg. The mass of an object is always the same.</li> <li>Know that weight is a force, measured in newtons (N). The weight of an object will differ depending on the force of gravity.</li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs. <b>(WS)</b></li> </ul>	<b>Learning Question 1: What is the universe? (research)</b> <ul style="list-style-type: none"> <li>Know that the universe is made up of lots of galaxies. Our galaxy is called the Milky Way. The Milky Way is made up of lots of solar systems</li> <li>Know that our solar system consists of a star (Sun), planets (which orbit a star), satellites (which orbit planets), and other bodies including asteroids, meteoroids, meteors and meteorites.</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul> <b>Learning Question 2 – Are all the orbits in our solar system the same? (Pattern seeking)</b> <ul style="list-style-type: none"> <li>Know that the sun, planets and moons are approximately spherical bodies</li> <li>Know that the Sun is at the centre of the solar system - the heliocentric model</li> <li>Know that the planets orbit the Sun; moons orbit planets. They are held in orbit by gravity</li> <li>Know that the Earth takes 365.25 days to orbit the sun (one year); the Moon takes 28 days to orbit the Earth</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>	<b>Learning Question 1: How does sexual reproduction help a species survive? (research)</b> <ul style="list-style-type: none"> <li>Know that plants and animals look similar to their parents in many features because information is passed from one generation to the next. This information comes from the parents' genome.</li> <li>Know that sexual reproduction involves two parents - usually male and female - create a new organism by mixing their genomes</li> <li>Know that sexual reproduction begins with fertilisation of an egg, which mixes the genes from two parents. Fertilisation can be internal or external</li> <li>Know that after an egg is fertilised, an embryo will develop. Embryos develop inside the body in the gestation period for viviparous animals. Embryos develop outside the body in eggs for oviparous animals</li> <li>Know that viviparous animals are born, oviparous animals hatch from eggs, plant seeds germinate</li> <li>Know that almost all mammals are viviparous; all birds and most amphibians are oviparous</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>	<b>Learning Question 1: How can we group everyday materials? (Identifying and classifying)</b> <ul style="list-style-type: none"> <li>Know that different materials have different properties, and we can group materials in different ways (depending on their properties).</li> <li>Know that the suitability of a material for a certain purpose depends on the properties of the material.</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar, and line graphs. <b>(WS)</b></li> </ul> <b>Learning Question 2 – What are the effects of thermal insulation? (Fair test)</b> <ul style="list-style-type: none"> <li>Know that a thermal conductor is a material that allows energy in the form of heat to be transferred within it.</li> <li>Know that thermal insulators and thermal conductors are both useful.</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs. <b>(WS)</b></li> </ul>	<b>Learning Question 1: What is the human life cycle? (research)</b> <ul style="list-style-type: none"> <li>Know that the human life cycle goes through the same stages as those for other animals: fertilisation, gestation, growth</li> <li>Know that the human life cycle: embryo, foetus, infant, child, adolescent, adult, senior</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations <b>(WS)</b></li> </ul> <b>Learning Question 2 – What does gestation look like in humans? (research)</b> <ul style="list-style-type: none"> <li>Know that humans are viviparous and a foetus develops inside the mother (or surrogate mother)</li> <li>Know that a human embryo is considered a foetus at the end of the 8th week of pregnancy</li> <li>Know that the gestation period for humans is 40 weeks</li> <li>Know that a foetus is considered a baby when it is born</li> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul> <b>Learning Question 3 – What does gestation look like in animals? (pattern seeking)</b> <ul style="list-style-type: none"> <li>Know that the bigger the animal, the longer the gestation period</li> <li>Know that scientists look for patterns in data to try to identify correlations</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs. <b>(WS)</b></li> </ul>

<p><b>Learning Question 2 – How do levers, pulleys and gears effect force? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that levers, pulleys and gears allow a smaller force to have a greater effect. Examples of levers, pulleys and gears include wheelbarrows, lifts, bicycle gears, in construction</li> <li>Know that levers consist of a beam and a fulcrum (pivot). Effort lifts a load</li> <li>Know that the greater the distance from the effort to the fulcrum, the less effort is required to move the load</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, <u>tables</u>, <u>bar</u> and <u>line graphs</u>. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3 – What causes day and night? (research)</b></p> <ul style="list-style-type: none"> <li>Know that at any one time, half of the earth is in daytime and the other half is in nighttime. Earth rotates in 24 hours, meaning that we experience daytime for half of the day and nighttime for the other half.</li> <li>Know that the Earth's rotation means that the sun appears to 'rise' in the east and 'set' in the west</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>	<p><b>Learning Question 2 – What do life cycles show us? (Pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know the life cycles of: hedgehog: internal fertilisation, gestation, hoglet, adult, peregrine falcon: internal fertilisation, embryo is incubated in eggs, hatchling, fledgling, adult</li> <li>Know that that life cycles show the main phases of an organism's life, to include growth, development and reproduction</li> <li>Know that amphibians and most insects undergo metamorphosis</li> <li>Know the life cycles of: frog: external fertilisation, frogspawn, tadpole, tadpole with legs, adult frog (metamorphosis) ladybird: internal fertilisation, eggs hatch, larva, pupa, adult</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3 – Are all substances soluble? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that a pure substance is one that contains only one substance and only type of particle, e.g. oxygen, iron, pure water</li> <li>Know that a mixture is two or more different substances, e.g. air, steel</li> <li>Know that mixtures can be made of two gases (e.g. air), two solids (e.g. steel), two liquids (e.g. squash and water), or a liquid and a solid (e.g. salt water)</li> <li>Know key terms: soluble, insoluble, solution</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, <u>tables</u>, <u>bar</u> and <u>line graphs</u>. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – How do humans grow up? (research)</b></p> <ul style="list-style-type: none"> <li>Know that cognitive, physical and social and emotional development takes place at the greatest rate during infancy</li> <li>Know that during puberty, adolescents' bodies change, e.g. pubic hair, voice deepen, hips widen</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>
<p><b>Learning Question 3 – How do we measure frictions? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know how to measure force using a newton meter</li> <li>Know that different force is needed to pull an object 9on different surfaces.</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, <u>tables</u>, <u>bar</u> and <u>line graphs</u>. <b>(WS)</b></li> <li>Using test results to make predictions to set up further comparative and fair tests. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – What are the phases of the moon? (fair test)</b></p> <ul style="list-style-type: none"> <li>Know that the Moon orbits the Earth in 28 days and, during this time, the sun shines on different parts</li> <li>Know that the phases of the Moon include new moon, quarter moon, gibbous moon, and full moon</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3 – How does sexual reproduction happen in plants? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that most plants have both male and female parts</li> <li>Know that the male part of the plant is called the stamen, made up of the anther and filament, and the anther produces pollen grains.</li> <li>Know that the female parts of the plant are the ovary (which produces the female sex cells which are contained in the ovule) and the stigma which collects pollen</li> <li>Know that plant seeds germinate</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – How do you saturate a solution? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know the key terms: solute, solvent, saturated</li> <li>Know when no more solute can dissolve in the solvent, the solution is saturated</li> <li>Know that solutes dissolve more quickly when the particles have more energy (i.e. when heated or stirred)</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, <u>tables</u>, <u>bar</u> and <u>line graphs</u>. <b>(WS)</b></li> </ul>	<p><b>Learning Question 5– How do humans get old? (research)</b></p> <ul style="list-style-type: none"> <li>Know that primary ageing of adults occurs naturally as our bodies get older (e.g. slower reaction time, reduced hearing)</li> <li>Know that secondary ageing relates to environmental factors, like poor diet, not enough exercise, smoking etc.</li> <li>Know that there are ages where humans at their peak for different things (e.g. reproduction, running etc.)</li> <li>Know that different cultures around the world have different perceptions around the life cycle and ageing</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>
<p><b>Learning Question 4 – How do air and water resistance effect movement?</b></p> <ul style="list-style-type: none"> <li>Know that air resistance is a frictional force that acts between air and a moving object to slow it down</li> <li>Know that surface area is the area that is facing the direction the object is travelling in. The larger the surface area of an object, the greater the air resistance</li> <li>Know that water resistance is a frictional force that acts between water and a moving object to slow it down</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, <u>tables</u>, <u>bar</u> and <u>line graphs</u>. <b>(WS)</b></li> </ul>	<p><b>Learning Question 5 – How many planets are in our solar system? (research)</b></p> <ul style="list-style-type: none"> <li>Know that there are eight planets (M, V, E, M, J, S, U and N). Each has distinct characteristics, e.g. temperature; time to orbit the sun; number of moons; size etc.</li> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – How does asexual reproduction occur? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that asexual reproduction does not involve sex cells or fertilisation. Only one parent is needed and offspring are (genetically) identical to the parent and each other.</li> <li>Know that potatoes develop tubers and daffodils have bulbs, which will grow to be identical copies of the plant</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> </ul>	<p><b>Learning Question 5 – Are all changes reversable? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that two solids can be separated by using magnets or filters (e.g. sieve)</li> <li>Know that a solid and a liquid can be separated by using filtration (if the solid is insoluble) or evaporation (if the solid is soluble)</li> <li>Know that a reversible change is a change that can be undone, where the original substances can be recovered. An irreversible change is a change that cannot be undone, where the original substances cannot be recovered</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, <u>tables</u>, <u>bar</u> and <u>line graphs</u>. <b>(WS)</b></li> </ul>	

	<ul style="list-style-type: none"><li>Using test results to make predictions to set up further comparative and fair tests. <b>(WS)</b></li></ul>			<ul style="list-style-type: none"><li>Using test results to make predictions to set up further comparative and fair tests. <b>(WS)</b></li></ul>	
				<p><b>Learning Question 6 – Can you separate a mixture? (Fair test)</b></p> <ul style="list-style-type: none"><li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li><li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li><li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, <u>tables</u>, <u>bar</u> and <u>line graphs</u>. <b>(WS)</b></li></ul>	

Medium term Science plan Year 6					
	Autumn 2	Spring 2	Summer 1	Summer 2	Summer 2
<b>Whole school drivers</b>	Aspiration We intend to find out about successful doctors from a range of backgrounds.	Conservation We intend to investigate the potential of electricity to help conservation efforts (e.g. electric cars)	Fairness We intend to investigate the fairness or lack of fairness provided to those with sight disability.	Community	Community We intend to investigate how communities adapt to changing environments.
Topic title:	What would a journey through your body look like?	How can we make a bulb shine brighter?	<u>How do we see light?</u>	<u>Can we use characteristics to classify?</u>	<u>How have living things changed over time?</u>
Science strand	Animals including humans	Electricity	Light	Living things and their habitats	Evolution and inheritance
Enquiry type	Pattern seeking Identifying and classifying Observation over time <b>Fair testing</b> <b>Research</b>	Pattern seeking Identifying and classifying Observation over time <b>Fair testing</b> <b>Research</b>	<b>Pattern seeking</b> Identifying and classifying Observation over time <b>Fair testing</b> <b>Research</b>	<b>Pattern seeking</b> <b>Identifying and classifying</b> Observation over time Fair testing Research	Pattern seeking Identifying and classifying Observation over time Fair testing Research
Working scientifically skills	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p><b>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</b></p> <p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</b></p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p><b>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</b></p> <p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments.</b></p>	<p><b>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</b></p> <p><b>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</b></p> <p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</b></p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments.</b></p>	<p><b>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</b></p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</b></p> <p><b>Using test results to make predictions to set up further comparative and fair tests.</b></p> <p><b>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</b></p> <p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments.</b></p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p><b>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</b></p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments.</b></p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p><b>Identifying scientific evidence that has been used to support or refute ideas or arguments.</b></p>
Presentation of data	Labelled diagram, line graph, scatter graph.	Scientific diagrams and labels, bar graph, line graph, scatter graph.	Scientific diagrams and labels.	Key, scientific diagrams and labels.	Key, scientific diagrams and labels.
Prior knowledge	<p>Humans are made of many different body parts.</p> <p>Humans need exercise to stay healthy.</p> <p>Living things move, reproduce, are sensitive to their surroundings, grow, need oxygen, get rid of their waste, and need nutrition.</p> <p>Humans need a balanced diet of these food groups.</p> <p>Organs are parts of the body that do a particular job, the heart pumps blood around the body and the lungs are used for breathing which gets air into your body.</p> <p>Oxygen and carbon dioxide are found in the air.</p> <p>The digestive system is the group of organs that help your body digest food. Food is further broken down (chemical digestion) in the small intestines where most of the nutrients are absorbed.</p> <p>A cell is the smallest building block of living things. All organisms are made of cells.</p>	<p>A complete circuit must have a power source (cell/batteries) and have all the components connected in a loop. If it is missing any of these things it is an incomplete circuit</p> <p>A short circuit is the easiest route for electricity to travel and can be created by accident by connecting just the wire to the cell in a circuit. They can be dangerous</p> <p>Components include wire, bulb, buzzer, motor or switch</p> <p>Materials that allow electricity to flow through them easily are called electrical conductors; materials that do not are called electrical insulators</p> <p>Appliances use electricity to serve a purpose (e.g. toaster, kettle etc.)</p> <p>Energy can be transferred from one store to another store</p>	<p>Light travels in straight lines</p> <p>We see when light enters our eyes</p> <p>Darkness is the absence of light</p> <p>Sources of light emit their own light, and others reflect light; both occur in nature as well as man-made objects.</p> <p>Opaque, translucent, and transparent materials allow no, some or all light to pass through them.</p> <p>Shadows form behind an opaque object when light from a source is blocked.</p> <p>The shape and position of shadows changes with the angle of the light source</p> <p>The size of shadows changes when the distance of the light source changes</p> <p>Light from the sun can be dangerous and there are ways to protect our eyes and skin.</p> <p>Light travels from the Sun to the Earth</p>	<p>The stem/trunk supports the plant and transports water up the plant. The xylem transports water and nutrients from the roots, and the phloem transports food from the leaves to the all parts of the plant.</p> <p>Seeds can be dispersed by wind (e.g. sycamore), by animals in their droppings (e.g. things that are eaten, like a raspberry), attached to animal fur (e.g. goose grass), or seeds can be self-propelled (pea pod).</p> <p>Classification refers to a method used to place all living things into groups. Organisms can be classified in a number of ways.</p> <p>A species is a group of one type of organism, individuals in this group can breed with each other to produce offspring that can go on to breed.</p> <p>Fish, amphibians, reptiles, birds and mammals are all vertebrates. Vertebrates have endoskeletons.</p> <p>Vertebrates can be grouped in a number of ways based on their characteristics, e.g. warm/cold blooded; or physical features like fur, beak, wings etc.</p> <p>Invertebrates can be grouped based on their characteristics as snails and slugs; worms; spiders and insects.</p>	<p>Living things have adapted to their environment. This means they may not be able to survive in other habitats.</p> <p>A fossil is physical evidence of an ancient plant or animal, this could be their preserved remains or other traces that they made when they were alive. Trace fossils are not physical remains of living things they are indirect evidence of life.</p> <p>A species is a group of one type of organism, individuals in this group can breed with each other to produce offspring that can go on to breed.</p> <p>Sexual reproduction is two parents - usually male and female - create a new organism by mixing their genomes (</p>

				<p>Invertebrates can be grouped based on their skeletons; endoskeletons, exoskeletons, or hydrostatic skeletons.</p> <p>Plants can be grouped into flowering and non-flowering plants.</p> <p>Asexual reproduction does not involve sex cells or fertilisation. Only one parent is needed, and the offspring are (genetically) identical to the parent and each other.</p>	
Common misconceptions	<p>Respiration 'makes' or 'produces' energy</p> <p>The heart is positioned on the left side of the chest.</p> <p>One side of the heart fills, then empties, then the other side of the heart fills and empties.</p> <p>All fat is bad for you.</p> <p>All drugs are bad for you</p>	<p>It is the size of the cell that determines the brightness of the bulb, not the voltage.</p> <p>Pupils think that voltage is the property of the current rather than a precondition for a current to flow.</p> <p>The components in the circuit use up the energy in the cell/battery.</p> <p>The closer the bulb is to the cell, the brighter it will be.</p>	<p>Reflections are the same as shadows</p> <p>Some pupils think that the reason we see things is because light travels from our eyes towards an object.</p> <p>We can see in total darkness</p> <p>White light is pure; coloured light is white light with impurities in it.</p> <p>Light only reflects off shiny surfaces.</p>	<p>A crab is a vertebrate because it has a hard shell.</p> <p>Snakes are invertebrates, like earthworms</p> <p>All plants have flowers with coloured petals, green leaves and a stem</p> <p>A spider is an insect.</p> <p>Mushrooms are plants</p> <p>All microorganisms make us ill.</p>	<p>Many pupils think that an animal (or plant) will change its appearance, therefore adapt itself to the environment during its lifetime.</p> <p>Pupils may think that all animals are perfectly adapted to their environment; and that evolution has produced perfect organisms</p> <p>Some pupils think that inherited characteristics come from one parent only, for example sons inherited their characteristics from their fathers and daughters from their mothers.</p> <p>Pupils may believe that all characteristics are inherited; for example, muscle mass and thinking that a bodybuilder inherited their muscles.</p> <p>Many pupils think humans evolved from chimpanzees.</p>
Key vocabulary	<p><b>artery (noun)</b>: an artery is a type of blood vessel that transports blood away from the heart to the organs and other tissues in the body.</p> <p><b>blood vessel (noun)</b>: a blood vessel allow blood to be transported to all the parts of the body. Arteries, veins and capillaries are blood vessels.</p> <p><b>circulatory system (noun)</b>: the system that moves blood around the body, consists of the heart and the blood vessels.</p> <p>deoxygenated blood: (noun) blood that is high in carbon dioxide and low in oxygen.</p> <p><b>respiration (noun)</b>: a process that provides the energy needed by our organs to function.</p>	<p><b>cell/battery (noun)</b>: cell/battery provides energy to push the electricity around the circuit.</p> <p><b>conductor (noun)</b>: an electrical conductor is a material that allows electricity to flow through it. Metals such as copper and steel are good electrical conductors.</p> <p><b>incomplete circuit (noun)</b>: a loop that is not complete. Electricity cannot flow through, so the components in the circuit will not work.</p> <p><b>insulator (noun)</b>: an insulator is a material that does not allow electricity to flow through it. Examples of insulators include wood and plastic.</p> <p><b>parallel circuit (noun)</b>: a circuit where the components are in more than one loop.</p> <p><b>series circuit (noun)</b>: a circuit where the components are in one continuous loop</p>	<p><b>emit (verb)</b>: produce and give off something. Sources of light, such as the Sun, emit light</p> <p><b>opaque (adjective)</b>: a material is opaque if you cannot see through it</p> <p><b>transparent (adjective)</b>: transparent materials let nearly all of the light pass through them</p> <p><b>translucent (adjective)</b>: translucent materials let some light pass through them.</p>	<p><b>annelids (noun)</b>: annelids are animals that do not have a backbone (they are invertebrates). They have soft, segmented bodies. Examples include earthworms and leeches.</p> <p><b>arachnids (noun)</b>: arachnids are animals that do not have a backbone (they are invertebrates). They have an exoskeleton (skeleton on the outside of their body), and they have eight legs.</p> <p><b>arthropods (noun)</b>: a group of animals that include insects, spiders, crustaceans and myriapods.</p> <p><b>molluscs (noun)</b>: animals that do not have a backbone (they are invertebrates). They have soft, unsegmented bodies. Examples include snail, slugs and octopuses.</p>	<p><b>characteristics (noun)</b>: the features or qualities of something. For example, characteristics of birds are wings, beaks, feathers, and being warm-blooded.</p> <p><b>behavioural adaptation (noun)</b>: adaptations in an animal's behaviour that give it an advantage, examples include mating rituals, working as a team or tool use.</p> <p><b>inheritance (noun)</b>: 'the process whereby the genetic material passes from the parents to the offspring (an animal's young). The genetic material determines some of your characteristics.</p> <p><b>natural selection (noun)</b>: the process by which organisms that are better adapted to their environment tend to survive, reproduce and pass on the advantageous inherited characteristic to their offspring.</p> <p><b>physiological adaptation (noun)</b>: internal functions and processes that allow animals to survive different environments</p> <p><b>structural adaptation (noun)</b>: physical characteristics that adapt the animal to its environment</p>
Focus scientist	<b>William Harvey</b>	<b>Florence Parpart</b>	<b>Thomas Edison</b>	<b>Jade Goodall</b>	<b>Charles Darwin</b>
Progression coverage	<p><b>Learning Question 1: What is respiration? (research)</b></p> <ul style="list-style-type: none"> <li>Know that living things move, reproduce, are sensitive to their surroundings, grow, respire, excrete, and need nutrition (MRS GREN)</li> <li>Know that respiration provides the energy needed for organisms to function.</li> <li>Know that oxygen and glucose (a sugar) are needed by cells for respiration.</li> <li>Know that carbon dioxide is a waste product of respiration and needs to be excreted.</li> <li>Know that blood carries oxygen, glucose, nutrients, and carbon dioxide to and from cells around the body</li> <li>Know that blood is made of plasma, red blood cells, platelets and white blood cells.</li> </ul>	<p><b>Learning Question 1: How do we draw a circuit? (research)</b></p> <ul style="list-style-type: none"> <li>Know that there are recognised symbols for cell, bulb, buzzer, motor, and switch. Wires are represented with straight lines</li> <li>Recording data and results of increasing complexity using <u>scientific diagrams and labels</u>, classification keys, tables, scatter graphs, bar and line graphs. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – What is the difference between a cell and a battery? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that as long as batteries have the same voltage, the size of the battery does not affect the brightness of the lamp/loudness of the buzzer (though the smaller batteries will not last as long as the larger ones)</li> <li>Know that adding more cells in the circuit increases the voltage. Increasing the voltage in a circuit makes the bulb in</li> </ul>	<p><b>Learning Question 1: How can we represent a shadow? (Pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know that when light meets an opaque object, some of the light is reflected and some of it is absorbed</li> <li>Know that shadows have the same shape as the objects that cast them because light travels in straight lines.</li> <li>Know that the size and shape of shadows behind an opaque object can be explained using ray diagrams</li> <li>Recording data and results of increasing complexity using <u>scientific diagrams and labels</u>, classification keys, tables, scatter graphs, bar and line graphs. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – How do we see? (Pattern seeking)</b></p> <ul style="list-style-type: none"> <li>Know that objects emit (give out) or reflect light into the eye. We see things because light travels from light sources to our eyes, or from light sources to objects and then to our eyes</li> <li>Know that in ray diagrams, straight lines with arrows show where the energy is being transferred from and to by light</li> <li>Know that the eye is made of many parts: the pupil is the circular black hole in the</li> </ul>	<p><b>Learning Question 1: How can we classify invertebrates? (Observation and classification)</b></p> <ul style="list-style-type: none"> <li>Know that invertebrates can be grouped based on their characteristics as poriferans (sponges) cnidarians, echinoderms, molluscs, annelids, platyhelminths and arthropods.</li> <li>Know that arthropods can be grouped into 4 subgroups: spiders, insects, crustaceans and myriapods.</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, <u>classification keys</u>, tables, scatter graphs, bar and line graphs. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – How do we classify plants? (Observation and classification)</b></p> <ul style="list-style-type: none"> <li>Know that plants can be grouped into moss, ferns, conifers and flowering plants</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, <u>classification keys</u>, tables, scatter graphs, bar and line graphs. <b>(WS)</b></li> </ul>	<p><b>Learning Question 1: How do animals and plants adapt? (Observation and classification)</b></p> <ul style="list-style-type: none"> <li>Know that variation occurs within and between species</li> <li>Know that these advantageous traits - adaptations - can be physiological, structural and behavioural</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul> <p><b>Learning Question 2 – What is the cause of variation? (Observation and classification)</b></p> <ul style="list-style-type: none"> <li>Know that variation occurs within species.</li> <li>Know that variation can be environmental or inherited, or a mixture of both</li> <li>Know that genetic variation happens randomly through the mixing of genomes in sexual reproduction.</li> <li>Know that some variation is advantageous to the organism in their environment; sometimes it is disadvantageous; and sometimes it gives no advantage/disadvantage</li> <li>Know that an organism with advantageous traits is more likely to survive.</li> </ul>

	<ul style="list-style-type: none"> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>	<p>the circuit get brighter or the buzzer get louder</p> <ul style="list-style-type: none"> <li>Know which graph is most appropriate for the enquiry</li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs <b>(WS)</b>.</li> </ul>	<p>centre of the eye, the iris is the coloured part of the eye that surrounds the pupil, and the lens is a structure found behind the pupil.</p> <ul style="list-style-type: none"> <li>Know that the pupils allow light to enter the eye</li> <li>Know that the iris controls how much light enters the eye by changing the size of the pupil.</li> <li>Know that the lens helps to focus the light rays entering the eye</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3 – How do we classify fungi? (Observation and classification)</b></p> <ul style="list-style-type: none"> <li>Know that fungi are different to plants and animals. They cannot make their own food (like animals) but do not move (like plants) Micro-organisms are organisms that are so small that we cannot see them with our eyes alone.</li> <li>Know that some fungi are microorganisms (e.g. yeast), but not all are (e.g. mushrooms) Bacteria are microorganisms. Some bacteria can cause disease in other organisms</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. <b>(WS)</b></li> </ul>	<ul style="list-style-type: none"> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul>
	<p><b>Learning Question 2 – How do the heart and circulatory system work together? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that the heart is a muscle that pumps the blood through the blood vessels.</li> <li>Know that the heart contains four chambers: the left and right atria and the left and right ventricles.</li> <li>Know that the heart pumps deoxygenated blood to the lungs, where oxygen is transferred to it and it flows back to the heart. The heart pumps oxygenated blood to the rest of the body, where the oxygen is transferred to the organs/muscles and carbon dioxide is transferred to the blood. Deoxygenated blood then travels back to the heart to begin the process again.</li> <li>Know that 3glucose and nutrients are absorbed by the blood along the small intestine and transported to cells in the body.</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</li> </ul>	<p><b>Learning Question 3 – How do we create a series circuit? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that in a series circuit, the bulbs are placed bulbs are placed in a continuous loop</li> <li>Know which graph is most appropriate for the enquiry</li> <li>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <b>(WS)</b></li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs <b>(WS)</b>.</li> </ul>	<p><b>Learning Question 3 – How do we see colour? (Fair testing)</b></p> <ul style="list-style-type: none"> <li>Know that white light, which comes from most light sources we use in the classroom, contains all the colours of the visible spectrum (red, orange, yellow, green, blue, indigo, violet)</li> <li>Know that when a light meets a surface, some colours are absorbed and some are reflected. We see the colour(s) that are reflected</li> <li>Know that objects appear black if they absorb all the colours in white light and reflect none. Objects appear white if they reflect all the colours in white light, and absorb none</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – How do we classify bacteria? (Observation and classification)</b></p> <ul style="list-style-type: none"> <li>Know that micro-organisms are organisms that are so small that we cannot see them with our eyes alone.</li> <li>Know that some fungi are microorganisms (e.g. yeast), but not all are (e.g. mushrooms) Bacteria are microorganisms. Some bacteria can cause disease in other organisms</li> <li>Know that some bacteria are helpful for other organisms (e.g. those that help break down food in our digestive system) and those that form part of a symbiotic relationship</li> <li>Know the harmful effects that bacteria can have on humans and other organisms.</li> <li>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. <b>(WS)</b></li> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul>	<p><b>Learning Question 3 – What is Darwin's theory of natural selection? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that an organism with advantageous traits are more likely to survive and reproduce, passing those traits to the next generation. This is called natural selection</li> <li>Know that over many generations, the species will evolve so that all organisms have this adaptation/advantageous trait</li> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul> <p><b>Learning Question 4 –How did Mary Anning contribute to the theory of evolution? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that Homo sapiens originated in many parts of Africa</li> <li>Know that fossils provide evidence for evolution, because they show how organisms have changed over time</li> <li>Know that science is never 'complete' and scientists are always working to make models more accurate or to discover new explanations</li> <li>Know that scientists involved in the development of evolutionary biology include Al-Jahiz, Charles Darwin, Alfred Wallace, Mary Anning and Dr Danielle Lee</li> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul>
	<p><b>Learning Question 3 – What is the job of a blood vessel? (research)</b></p> <ul style="list-style-type: none"> <li>Know that arteries carry blood away from the heart. Arteries have thick walls because they carry blood from the heart which is at a high pressure. Blood is being pumped through very quickly. Arteries mostly carry oxygenated blood.</li> <li>Know that veins carry blood back to the heart. They mostly carry deoxygenated blood.</li> <li>Know that arteries branch into smaller blood vessels called capillaries, which are very small and supply our cells with oxygen, glucose and nutrients. Capillaries collect carbon dioxide from the cells and merge into veins</li> <li>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – How do we create parallel circuits? (Fair test)</b></p> <ul style="list-style-type: none"> <li>In a parallel circuit the bulbs are placed in separate loops that both connect to the cell.</li> <li>Connecting bulbs in parallel means that if one bulb burns out the other will stay on and switches can be used to turn each bulb off independently.</li> <li>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. <b>(WS)</b></li> </ul>	<p><b>Learning Question 4 – Can everyone see in the same way? (Research)</b></p> <ul style="list-style-type: none"> <li>Know that many problems with our vision are caused by parts of the eye that are the not the right shape or size, or that have become cloudy. Many of these problems can be corrected through surgery or prescription glasses</li> <li>Know that people living with sight loss or blindness may use long canes or guide dogs when outside, talking books or Braille, and different devices in the home</li> <li>Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul>		
		<p><b>Learning Question 5 – How does electricity help us in the home? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that many of the appliances used in the home do not use batteries they use mains electricity.</li> <li>Know that mains electricity is generated in a power station and transferred to our homes by overhead cables. Power stations can use both renewable and non-renewable sources of energy to generate electricity.</li> <li>Know that a non-renewable energy source is one where we have a fixed amount of the source, and where it would take too long for more to be formed. Burning fossil fuels to transfer electrical energy is a non-renewable energy source</li> <li>Know that coal, oil and gas are all used to generate electricity.</li> </ul>	<p><b>Learning Question 4 How is light reflected? (Fair test)</b></p> <ul style="list-style-type: none"> <li>Know that on a flat surface, all light meeting a surface from one direction will be reflected in the same direction. This is known as specular reflection</li> <li>Know that on a rough surface, light will be reflected in all directions. This is known as diffuse reflection</li> <li>Know that specular reflection between mirrors allow us to see the objects that do not directly reflect light into our eyes (e.g. periscope).</li> <li>Using test results to make predictions to set up further comparative and fair tests. <b>(WS)</b></li> </ul>		

	<p><b>Learning Question 4 – How does exercise effect heart rate? (fair test)</b></p> <ul style="list-style-type: none"> <li>• Know that the heart rate is how quickly the heart pumps. It is usually measured in beats/min</li> <li>• Know that muscles need more oxygen when they are being used in exercise, so the heart rate increases</li> <li>• Investigate the effect of exercise on heart rate</li> <li>• Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. . <b>(WS)</b></li> <li>• Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. <b>(WS)</b></li> </ul> <p><b>Learning Question 5 – How do diet and lifestyle effect our bodies? (research)</b></p> <ul style="list-style-type: none"> <li>• Know that being healthy means we are in a state of physical, mental and social well-being and are free from disease</li> <li>• Know that diet and exercise can have a positive effect on our bodies.</li> <li>• Know that other lifestyle choices have an impact on our health.</li> <li>• Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)6</b></li> </ul> <p><b>Learning Question 5 How do drugs and smoking effect our health? (research)</b></p> <ul style="list-style-type: none"> <li>• Know that a drug is a substance that, when taken into the body, has an effect on it. Some drugs (medicines) are helpful, and some are only harmful. All drugs are harmful when taken in the wrong quantities.</li> <li>• Know that tobacco smoke contains nicotine, tar and carbon monoxide. These have a damaging effect on the body.</li> <li>• Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul>	<p>The store of chemical energy in the fuel is transferred electrically to the appliances that we use in the home</p> <ul style="list-style-type: none"> <li>• Know that renewable energy sources quickly replenish themselves, meaning that we can use them again and again. Wind, solar, geothermal and hydrological power are all examples of renewable energy sources</li> <li>• Identifying scientific evidence that has been used to support or refute ideas or arguments. <b>(WS)</b></li> </ul>			
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