

Science Curriculum

Curriculum Intent for Science

Science embodies the acquisition of knowledge and understanding of the natural world and beyond through the process of rigorous testing, observation and experimentation, which constantly challenge and build upon prior discoveries. This process results in technological advancements through the application of Science within engineering, which in turn has a profound impact on the world around us. Consequently, we believe that it is our duty to further develop this Science capital through the study of a diverse range of scientists, noting how these key individuals contributed to their fields.

Our **'Science Curriculum'** challenges us to develop children who understand what Science is, what it is for and its relevance in the world around us. We aim to nurture and develop their inquisitive nature in order to advance their knowledge using scientific vocabulary in order to discuss and confidently question the world around them, as they explore new concepts using a practical, 'hands-on' approach through scientific enquiry. Overall, we strive to expose the children to have a deeper understanding of the world, widening their opportunities for science capital and fostering a life-long love of Science and STEM.

At Red Lane, Science is taught as a discrete subject in order that the development of knowledge, vocabulary and scientific enquiry skills are taught both meaningfully and explicitly. Naturally, links are made to other areas of the curriculum, especially English, Mathematics, Design Technology and Computing, but this does not dilute the quality and entitlement of high quality Science teaching.

The school's long-term plan for Science follows the Key Stage 1 and Key Stage 2 National Curriculum (2014) and sets out the content of teaching within in each year group. This is supported by the school's Science progression document which demonstrates learning outcomes and expectations for Biology, Chemistry, Physics and Working Scientifically within each Science stand and subsequent units of work. Short term planning details how this content is developed over a series of lessons within the unit of work. The organisation of the Science curriculum provides structured opportunities for pupils to:

- Develop and use key scientific vocabulary within their correct contexts.
- Explore concepts and dispel common misconceptions through the use of investigation.
- Explore the world around them, developing their understanding of key physical and biological processes.
- Approach Science through practical scientific enquiry, through the process of enquire, explore, record and explain.

- Opportunities for working scientifically are provided, using a combination of observation over time, pattern seeking, identifying, classifying and grouping, comparative and fair testing and research using secondary sources of information.
- Devise their own lines of enquiry, which can be planned and subsequently implemented.
- Understand the essential role of Mathematics as a quantifiable source of evidence for scientific understanding.
- Understand the role of Science in the wider world, including its cultural impact on our everyday lives.
- Develop their Science capital through their understanding of the work of scientists and naturalists, from a range of times and cultures, understanding how their discoveries contribute to the cumulative nature of scientific understanding. This is covered through year-group unit linked scientists and Red Lane's four House Teams (Marie Curie, Stephen Hawking, Isaac Newton and Katherine Johnson).

Teaching and Learning Science

In addition to the conscious structure and design of the Science curriculum, great consideration has been paid to the design of the implementation of the curriculum in the classroom. Teaching delivery will vary according to the activities being undertaken, but will follow the principles set out in the Teaching, Learning and Implementation policy and will include class, group and individual instruction and guidance, exposition and demonstration, and the use of questioning and discussion. The following resources and approaches are adopted across all year groups in order to ensure effective delivery of the intended curriculum.

The teaching of substantive knowledge and disciplinary knowledge (Working Scientifically) are, where possible, taught in unison, rather than as separate entities, within the majority of Science lessons.

The school's vocabulary progression document (Science) provides a clear focus for the development and exploration of key words, working in conjunction with knowledge organisers, classroom displays of key vocabulary and the use of varied concept and vocabulary exploration activities.

For consistency of approach, the use of adapted Lancashire Planning Posters (physical and electronic) are used to support the teaching of planning practical investigations, guiding pupils to generate focussed scientific enquiry questions.

All year groups undertake a biographical study of a famous scientist linked to specific, identified units of work outlined in the Science long-term plan.

National Curriculum

The national curriculum for science aims to ensure that all pupils:

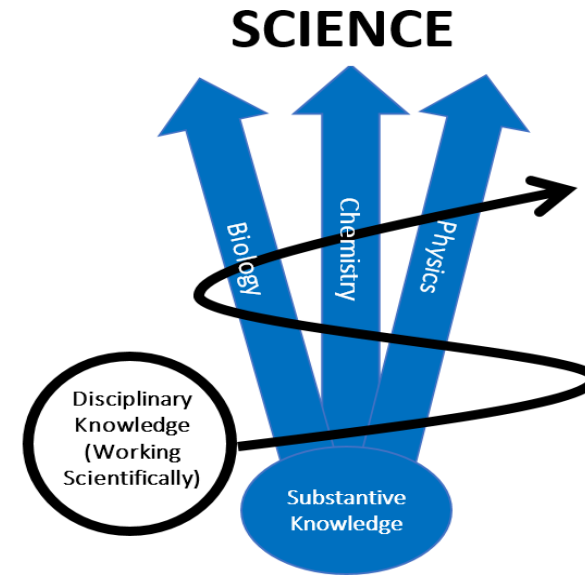
- Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

End of EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
<p>Understanding the World ELG: The natural World</p> <p>Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>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.</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>	<p>The principal focus of science teaching in Key Stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly - constructed world around them.</p> <p>They should be encouraged to be curious and ask questions about what they notice.</p> <p>They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.</p>	<p>The principal focus of science teaching in Lower Key Stage 2 is to enable pupils to broaden their scientific view of the world around them.</p> <p>They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions.</p> <p>They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.</p>	<p>The principal focus of science teaching in Upper Key Stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas.</p> <p>They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.</p> <p>At Upper Key Stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.</p> <p>They should also begin to recognise that scientific ideas change and develop over time.</p>

	<p>They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.</p> <p>‘Working scientifically’ is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.</p> <p>Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at Key Stage 1.</p>	<p>They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.</p> <p>‘Working scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.</p> <p>Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.</p>	<p>They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.</p> <p>‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.</p> <p>Pupils should read, spell and pronounce scientific vocabulary correctly.</p>
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Disciplinary Knowledge: Working Scientifically

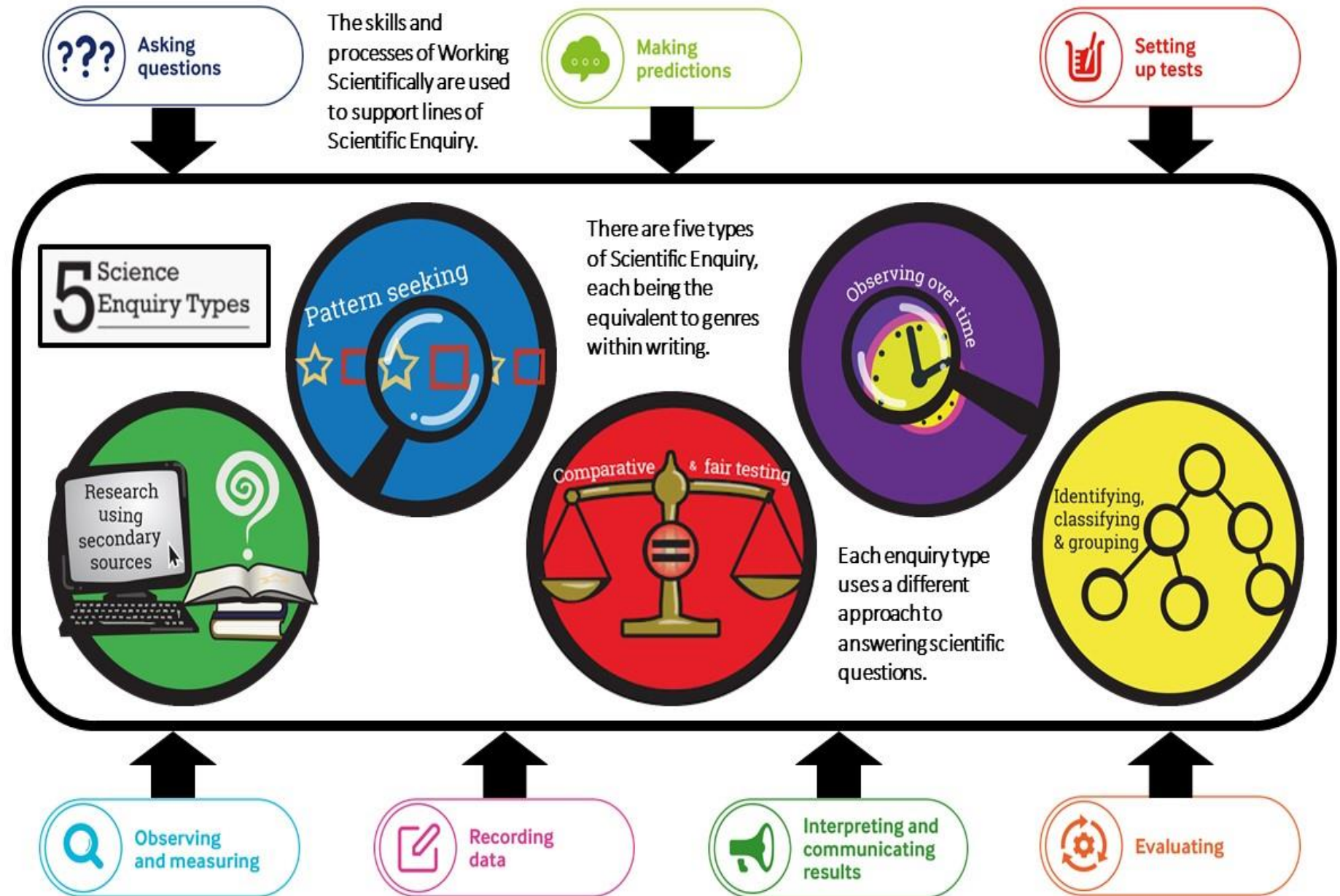
Working scientifically is a series of processes and skills, which pupils need in order to answer and make sense of scientific questions. They use these skills to answer scientific questions using the most appropriate types of scientific enquiry.



Working scientifically is integrated throughout the Science curriculum, rather than being separate from it.



Scientific Enquiry

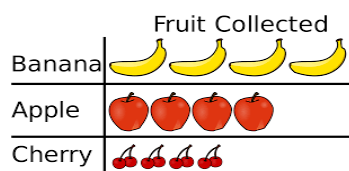


Recording and Representing Data

'... Scientific process is infused with maths; maths changes the look of science in a way that one cannot separate it from the other. So if maths is the language of science, then is science the reason for maths?' (Primary Science 124 Sept/Oct 2012)

Working scientifically and the scientific process both create discrete and continuous numerical data. Consequently, pupil's understanding and application of Maths skills are vital. Therefore, not only must children be taught how to accurately measure using a variety of units of measurement, they must also be taught to collate this data in a variety of formats, which are best suited to their age and the type of data being collected.

KS1 pupils will more commonly represent data in the form of pictograms and tally charts, which in turn may lead on to form tables and simple bar charts. Within KS2, continuous data sets involving measurements over time will result in the need for line graphs, whilst pattern-seeking lines of enquiry using two variables will require x/y scatter graphs.



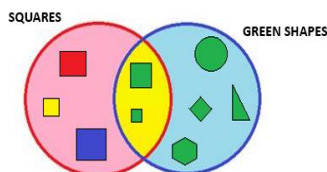
Pictogram: Numbers represented by images / pictures.

Favorite Pets		
Pet	Tally Marks	Number
	### ##	10
		4
	###	6

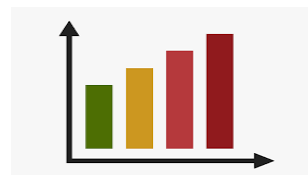
Tally Chart / Frequency Table: A method of recording the number of things seen using tally lines, with totals (frequencies) counted at the end of data collection.

Water temperature (°C)	Time taken for sugar to dissolve (seconds)
20	55
30	41
40	27

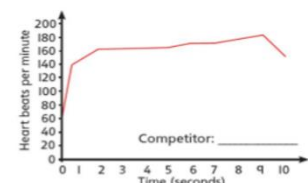
Table: Boxes (rows and columns) where numerical data can be studied.



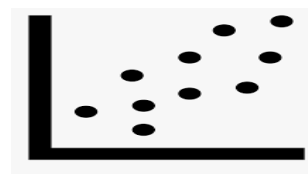
Venn Diagram: A pictorial method for sorting and separating according to properties (usually non-numerical within Science).



Bar Chart / Graph: Used to compare the numerical values of discrete data sets.



Line Graph: Used to plot continuous data that changes over time or distance.



X / Y Scatter Graph: Use to find patterns and trends using two sets of numerical data in order to plot points.



Pie Chart: Similar in function to bar graphs, looking at the frequencies of discrete data sets. These are used to illustrate the proportion of values of the whole.

Overview of Science Content

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery	Changes All Around - Weather (Taught throughout the year at the appropriate time) Identifying the weather and signs of the current season.		Amazing Animals – Floating and Sinking		Grow With Us – Plants	
	Scientific Enquiry: <i>Observing over Time</i> How much has it rained?		Scientific Enquiry: Will it float or will it sink?			
Reception	Changes All Around – Autumn (Taught throughout the year at the appropriate time) Observing and identifying the changes between seasons..		Amazing Animals – Changing states		Grow With Us – Habitats & Plants	
			Scientific Enquiry: How can we get the animals out of the ice?			
Year 1	Physics: Seasonal Changes (Taught throughout the year at the appropriate time)	Chemistry: Everyday Materials	Biology: Animals, Including Humans		Biology: Plants	
	Four seasons, changes between them, connection to weather, changes in plants and daylight.	Material vs Object, natural or manmade, float or sink.	Grouping by observable characteristics, vertebrate groupings, senses and human body.		Identify common and local plants and trees, basic plant structure.	
	Scientific Enquiry: <i>Observing over Time</i> <i>Pattern Seeking</i> Is the weather the same every day?	Scientific Enquiry: Comparative & Fair Testing Are all materials the same?	Scientific Enquiry: <i>Pattern Seeking</i> Are all animals very different?		Scientific Enquiry: <i>Research using secondary sources</i> What parts is a plant made of?	

	Key Scientist Robert Fitzroy		Biography: Key Scientist Steve Irwin		
	Y1 Seasonal Changes LBQ Assessment	Y1 Everyday Materials LBQ Assessment		Y1 Animals, Including Humans LBQ Assessment	Y1 Plants LBQ Assessment
Year 2	Biology: Living Things & their Habitats	Chemistry: Uses of everyday materials	Biology: Animals, Including Humans		Biology: Plants
	MRS GREN, basic food chains.	Identifying and grouping materials. Uses of everyday materials.	Lifecycle of animals, what humans need to survive and to be healthy.		Functions of parts of plant, simple lifecycle, flowering plant reproduction, plant growth.
	Scientific Enquiry: Identifying, classifying & grouping Is everything on Earth alive?	Scientific Enquiry: Identifying, classifying & grouping Comparative & Fair Testing What materials could be used to make a good raincoat?	Scientific Enquiry: Pattern Seeking Do all animals start off small?		Scientific Enquiry: Observing over Time Do plants grow the same amount every day?
		Biography: Key Scientist John Boyd Dunlop	Key Scientist Joan Beauchamp Procter		
	Y1 Living Things and Their Habitats LBQ Assessment	Y1 Materials LBQ Assessment	Y1 Animals, Including Humans LBQ Assessment		Y2 Plants LBQ Assessment
Year 3	Chemistry: Rocks	Physics: Light	Physics: Forces and Magnets	Biology: Animals, Including Humans	Biology: Plants
	Types and properties of rocks, fossils.	Light sources; transparent, translucent, opaque; exploring shadows.	Pushes and pulls, friction, magnets.	Food groups, balanced diets and functions of the skeleton.	Parts and functions of different plants, pollination and seed dispersal, what plants need to thrive.
	Scientific Enquiry: Identifying, classifying & grouping Are all rocks made in the same way?	Scientific Enquiry: Observing over Time Why do shadows change during the day?	Scientific Enquiry: Identifying, classifying & grouping Are all metals attracted to magnets?	Scientific Enquiry: Research using secondary sources How does our body move and stand up?	Scientific Enquiry: Observing over Time Comparative & Fair Testing Do all plants need exactly the same things?
	Biography: Key Scientist Mary Anning		Key Scientist Michael Faraday		Key Scientist Beatrix Potter
	LBQ Vocabulary: 10626	LBQ Vocabulary: 11262	LBQ Vocabulary: 11040	LBQ Vocabulary: 10711 LBQ Vocabulary: 10596	LBQ Vocabulary: 10565 LBQ Vocabulary: 10512

	<p>10669: Fossil Formation 10927: Rock properties and uses</p>	<p>11262: Light and Dark 11253: Shadows</p>	<p>10894: Forces 11256: Magnets</p>	<p>10560: Different Animal Diets 10605: Skeletons, Muscles and Joints 11498: Food and Diet: Food Groups</p>	<p>11258: What Plants Need to Grow 10500: Life Cycle of a Flowering Plant</p>
Year 4	Physics: Electricity	Physics: Sound	Chemistry: States of Matter	Biology: Animals, Including Humans	Biology: Living Things and Their Habitats
	Creating and testing series circuits, understanding different components.	How sounds are made, how it travels and how we hear them, pitch, volume.	Solids, liquids and gases; changing states; water cycle	Human digestive system (inc Teeth) and food chains.	Animals, plants and changing habitats
	<p>Scientific Enquiry: Identifying, classifying & grouping Comparative & Fair Testing Does Electricity flow easily through all objects?</p>	<p>Scientific Enquiry: Pattern Seeking How do instruments make different sounds?</p>	<p>Scientific Enquiry: Observing over Time Comparative & Fair Testing Does ice always melt at the same speed?</p>	<p>Scientific Enquiry: Comparative & Fair Testing Research using secondary sources How do different liquids affect our teeth?</p>	<p>Scientific Enquiry: Identifying, classifying & grouping Are some animals more alike than others?</p>
	Key Scientist Benjamin Franklin				Biography: Key Scientist David Attenborough
	LBQ Vocabulary: 11034	N/A	LBQ Vocabulary: 10629	LBQ Vocabulary: 10451	LBQ Vocabulary: 10499 LBQ Vocabulary: 10550 LBQ Vocabulary: 10607
	10893: Electrical Circuits	<p>11251: Sound 11272: Changing the Volume of a Sound 11257: Changing the Pitch of a Sound</p>	<p>10638: Processes of Changing State 10642: Properties of Solids, Liquids and Gases 11250: The Water Cycle</p>	<p>10452: The Human Digestive System 10455: Types and Functions of Teeth</p>	<p>10548: Parts of a Food Chain 10496: Classification Keys and Grouping Organisms 10608: Environmental Changes in Habitats</p>
Year 5	Physics: Forces	Physics: Earth and Space	Biology: Living Things and Their Habitat	Chemistry: Properties and Changes of Materials	Biology: Animals including humans

	Gravity, forms of friction, levers, pulleys and gears.	Planets in our solar system and their orbits. The moon's orbit and phases.	Life cycles of different types of animals (including mammals and insects). Plant lifecycles.	Solubility, solutions and mixtures; reversible/irreversible changes; uses of materials based on their properties	Human Lifecycle including foetus and puberty, comparing gestation periods of different mammals.
	Scientific Enquiry: Comparative & Fair Testing How do parachutes work?	Scientific Enquiry: Observing over Time Research using secondary sources What shape is the moon and does it change?	Scientific Enquiry: Research using secondary sources If life has existed for billions of years, why are there still people alive today?	Scientific Enquiry: Pattern Seeking Is it possible to separate materials?	Scientific Enquiry: Research using secondary sources Pattern Seeking Does the size of an animal affect its gestation period?
	Key Scientist Isaac Newton (House Team) Key Scientist: Galileo Galilei	Biography: Key Scientist Galileo Galilei		Key Scientist Marie Curie (House Team)	
	N/A	LBQ Vocabulary: 10653	LBQ Vocabulary: 10577 LBQ Vocabulary: 10492	LBQ Vocabulary: 10888	N/A
	11255 : Friction 10171 : Gravity and the Difference Between Mass and Weight	10652 : Earth, Sun and Moon 11261 : Our Solar System 10654 : Relative Movement of the Moon and Earth	10570 : Comparing Life Cycle of Different Animals 11259 : Parts of a Flower 10557 : Plant Reproduction	10666 : Irreversible Changes (Levels 1-2 Q1-13) 10662 : Separating Solutions (Levels 1-2 Q1-16) 10698 : Dissolving (Q1-19) 10661 : Reversible changes (Level 1 Q1-8)	10575 : Life Cycle of a Human
Year 6	Biology: Animals, Including Humans	Physics: Electricity	Biology: Evolution and Inheritance	Physics: Light	Biology: Living Things and Their Habitats
	Components and functions of the human circulatory system. Exercise, diet and lifestyle.	Circuit diagrams with symbols, how changing a component or voltage affects the circuit.	Animal adaptation, variation with species, Darwin and evolution through natural selection.	How light travels, reflection, the human eye, shape and size of shadows, spectrum.	Identification of plants and animals; classification; vertebrates in environments; Carl Linnaeus.
	Scientific Enquiry: Pattern Seeking Is our heart rate always the same?	Scientific Enquiry: Pattern Seeking Is it possible to change how bright a bulb is?	Scientific Enquiry: Identifying, classifying & grouping Why do species of animals look different?	Scientific Enquiry: Pattern Seeking Why can I hear round corners but not see round corners?	Scientific Enquiry: Observing over Time Comparative & Fair Testing What makes bread rise?
			Biography: Key Scientist Charles Darwin Key Scientist: Jane Goodall		Key Scientist Carl Linnaeus
	LBQ Vocabulary: 10630	LBQ Vocabulary: 10891	LBQ Vocabulary: 10627	LBQ Vocabulary: 11254	LBQ Vocabulary: 10551

	11263: The human circulatory system 11264: The heart and the blood	11045: Cells and Circuits	10648: Evolution	11214: How Light Travels and How We See	10480: Grouping Organisms: Plants, Animals and Microorganisms
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SCHEME OF WORK: EYFS - NURSERY

Term:	Nursery – Autumn then throughout the year as seasons change	Key Text(s):	Rosie’s Hat
Unit Title:	Changes All Around – Weather The aim of this unit is for pupils to: <ol style="list-style-type: none"> 1. Know what the weather is. 2. Experience different types of weather e.g. rain/sun/snow. 3. Name different types of weather. 		

The purpose of this unit is for children to begin to explore different types of weather. The children will play outside in all different seasons so that they explore and feel different types of weather. Staff will name and describe different types of weather. Children will be given the opportunity to talk about the weather outside each day. This will be built upon in Reception when children will learn the names of the 4 seasons and look at changes to trees and plants during this time as each season occurs. This is built upon in year 1 when they begin to learn more about the 4 seasons, including the months that fall into each season and the weather patterns they follow. This is then developed further in year 2 as children learn about what plants need to grow well and when plants grow best.

End of Unit Outcome: Children have experienced playing outside in different types of weather. They can name different types of weather including rain, sun, snow and wind.

<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> Children may have experienced some weather types already so could talk about these experiences. Played in snow eg made footprints, snowballs or in puddles Listened to stories at Christmas time set in winter and stories about a sunny day. Explored and handled wet and dry materials e.g. ice 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Sun – a star which goes round the earth. Rain – water falling from the sky Wind – movement of air Cloud – evaporated water which floats in the sky Snow – white flakes which fall from the sky (water has frozen as it falls) Hot – a high temperature Cold – a low temperature Weather – what the weather it is like outside Coat – a jacket you wear to keep you warm. Hat - a hat you wear on your head to keep you warm. Scarf – a piece of material you put round your neck to keep you warm. Gloves – two gloves go on your hands to keep you warm. Wellies – a type of boots used in the rain to keep you dry T-shirt - a thin material you wear in hot weather to keep you cool Shorts – a pair of cropped pants you wear in hot weather to keep you cool</p>
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<p><u>Composite – The Big Idea</u></p> <p>There are lots of different types of weather around us and the weather can change every day. The children will be able to identify sunny, rainy, windy and snowy weather.</p>	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> Retrieval of previous learning – Talk to the children about the weather. What do they already know? Has anyone been outside before in the rain or snow? Teach new Vocabulary Read a story – Rosie’s Hat. Talk about what happens to Rosie and what caused it. Talk about their experiences of being outside in the wind. Show the children the different types of weather – sunny, rainy, windy and snowy. Talk about the photos of the children in the different types of weather. Teach the children which clothes they will need in different types of weather.
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	<p>6. Go outside and explore the different weather today. Talk about the weather. What do we need to wear? Why?</p> <p>7. Outcome – children can talk about the different types of weather as they happen outside.</p> <p><i>Please note – the same structure will be applied during the other seasons but children will be taught at the appropriate time of the year so they can experience the seasons as they happen.</i></p>
<p><u>Scientific Enquiry:</u></p>	<p><u>Working scientifically:</u></p> <p>Create sensory bottles to represent different types of weather e.g. dark coloured water for rain; cotton wool in bottles for clouds; yellow water and glitter for sunshine; ice for cold; polystyrene balls for snow. Talk about different types of weather. Observe them outside and experience them.</p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking 5. Research using secondary sources <p>Begin to collect data – take measurements of rainfall over time using a measuring jug. Talk about how it is full or empty.</p>
<p><u>Maths Links:</u></p>	<p>Link to capacity – full and empty language.</p>

<p><u>Developing a sense of the natural world</u></p> <p>Throughout the year pupils will study discrete scientific content through the units of Changes all around; traditional tales and grow with us.</p> <p>In addition to this we recognise that pupils will learn a lot through exploring books and reading stories. Within our book talk sessions pupils read a range of texts which expose them to the wider world around them. Discussions will take place in the moment and will vary depending on the children’s interests and their prior knowledge.</p> <p>Teachers will develop scientific knowledge and scientific enquiry within conversations as opportunities arise for example children will seek out patterns whilst playing in the maths area or in the water tray. Children will notice changes</p>	<p>Books:</p> <p>Rosie’s Hat</p> <p>Links to further study:</p> <p>Reception – Autumn 1 – Changes all around me - Seasons</p> <p>Year 1 – Autumn 1 – Physics: seasonal changes.</p>
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<p>by observing over time when playing in the outdoor provision. Staff will draw children’s attention to these things as they play.</p> <p>Continuous provision plays a huge part in learning in Reception. The environment will be set up to allow children to learn through play. Carefully planned role play areas will provide experiences to expose children to science. For example setting up small world trays with ice play in.</p>	
<p><u>Direct Links to the EYFS Early Learning Goals</u></p> <p>ELG: The Natural World</p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> • Explore the natural world around them, making observations and drawing pictures of animals and plants. • 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. <p>ELG: People, Culture and Communities</p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> • Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps. 	<p><u>Other wider curriculum links to the EYFS Early Learning Goals</u></p> <p>This also links to other areas of learning within the Early Learning Goals including:</p> <p>ELG: Listening, attention and understanding.</p> <p>ELG: Speaking</p> <p>ELG: Comprehension</p> <p>ELG: Past and present</p>

Term:	Nursery – Spring 1	Key Text(s):	Commotion in the Ocean
Unit Title:	<p>Amazing Animals – Floating and Sinking</p> <p>The aim of this unit is for pupils to:</p> <ol style="list-style-type: none"> 1. Know what floating is. 2. Know what sinking is. 		

	<p>3. Name some items which float and some which sink.</p> <p>The purpose of this unit is for children to begin to explore floating and sinking. Children will learn about land and sea animals during this topic and explore which animals live under the water. Staff will provide the children with experiences of water play in the water area. Some objects may sink and go under the water like the fish whereas other items may float like the boats. Children will begin to learn what floating and sinking is. This is built upon in year 1 when they begin to learn about materials and whether all materials are the same.</p> <p>End of Unit Outcome: Children can talk about which items will float and which items will sink</p>
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> Children will have played in water before. Children will know which animals live in the water. 	<p>Key Vocabulary for the Unit:</p> <p>Floating – suspended in water or air Sinking – go down below the surface of the water Cup – a small bowl shaped container for drinking from Sponge - a soft light absorbent substance Stone – a hard material Spoon – an object that we use to eat liquids with Heavy – of high mass Light – of light mass Under – directly below On – physically in contact with</p>
<p>Composite – The Big Idea</p> <p>Floating and sinking are two concepts which will be explored in this topic. Children will learn which items can float and which items can sink.</p>	<p>Components – Sequence of Learning</p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – Talk to the children about the weather. Talk about water play and what it is like to play in the water. 2. Teach new Vocabulary 3. Read a story – Commotion in the Ocean. Talk about the animals which live under the water. 4. Introduce the concept of sinking. Explore how things that are heavy sink under the water. 5. Introduce the concept of floating. Explore how things that are light float on the water. 6. Scientific enquiry - Engage the children in water play with different objects such as a spoon, stone, sponge, cup. Talk about what happens when the items are in the water. 7. Outcome – children can talk about floating and sinking. They know which objects float and which sink.
<p>Scientific Enquiry:</p>	<p>Working scientifically:</p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time

	<p>4. Pattern seeking</p> <p>5. Research using secondary sources.</p> <p>Will it float or will it sink? Give the children some objects to explore. What happens to them in the water? Do they float or do they sink?</p>
<p>Maths Links:</p>	<p>Link to capacity – full and empty language. Link to mass – heavy and light</p>
<p>Developing a sense of the natural world</p> <p>Throughout the year pupils will study discrete scientific content through the units of Changes all around; traditional tales and grow with us.</p> <p>In addition to this we recognise that pupils will learn a lot through exploring books and reading stories. Within our book talk sessions pupils read a range of texts which expose them to the wider world around them. Discussions will take place in the moment and will vary depending on the children’s interests and their prior knowledge.</p> <p>Teachers will develop scientific knowledge and scientific enquiry within conversations as opportunities arise for example children will seek out patterns whilst playing in the maths area or in the water tray. Children will notice changes by observing over time when playing in the outdoor provision. Staff will draw children’s attention to these things as they play.</p> <p>Continuous provision plays a huge part in learning in Reception. The environment will be set up to allow children to learn through play. Carefully planned role play areas will provide experiences to expose children to science. For example setting up a shop with fruit and vegetables to talk about harvest.</p>	<p>Books:</p> <p>Commotion in the Ocean</p> <p>Links to further study: Reception – Spring 1 – Changing states Y1 – Autumn 2 – Everyday materials.</p>
<p>Direct Links to the EYFS Early Learning Goals</p> <p>ELG: The Natural World</p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants. 	<p>Other wider curriculum links to the EYFS Early Learning Goals</p> <p>This also links to other areas of learning within the Early Learning Goals including:</p> <p>ELG: Listening, attention and understanding. ELG: Speaking ELG: Comprehension ELG: Past and present</p>

- 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.

ELG: People, Culture and Communities

Children at the expected level of development will:

- Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.

Term:	Nursery – Summer 1	Key Text(s):	The Tiny Seed
Unit Title:	Grow With Us - Plants		
	The aim of this unit is for pupils to:		

	<ol style="list-style-type: none"> 1. Observe plants in their environment growing 2. Know that a plant needs water to grow. 3. Help to care for their plants by helping adults to water them. <p>The purpose of this unit is for children to begin to observe plants in their own environment. Children will be given opportunities to observe plants in their outdoor environment and in the classroom. This is built upon in Reception when children begin to explore life cycles and again in year 1 when they begin to learn the different parts of a plant.</p> <p>End of Unit Outcome: Children know what a plant is and can identify flowers and plants in their environment. They know plants need water to grow.</p>
<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • Children will have played in water before. • Children will know which animals live in the water. 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Plant – a living thing which grows and absorbs water through it’s roots.</p> <p>Flower – a part of a plant</p> <p>Grow – increase in size</p> <p>Water – a clear liquid.</p>
<p><u>Composite – The Big Idea</u></p> <p>Children will begin to notice and observe plants and flowers growing in their outdoor environment. They will help to water the plants knowing that plants need water to grow.</p>	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – Talk to the children about their outdoor environment. What do they know is outside? 2. Teach new Vocabulary 3. Read a story – the tiny seed. Talk about what happens in the story. 4. Scientific enquiry – Observe the plants in the outdoor area. Take the children for a walk and look for different flowers. 5. Teach the children that flowers need water to grow. Ask the children to help adults look after the plants by watering them each day. 6. Discuss what will happen to the plant when we water it. Talk about growing. 7. Outcome – children can talk about plants and what they need to grow.
<p><u>Scientific Enquiry:</u></p>	<p><u>Working scientifically:</u></p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking

	<p>5. Research using secondary sources.</p> <p>How can we help the plant grow? Allow the children to help water the plants – watch what happens when we water the plant.</p>
Maths Links:	Link to size – big and small.

<p>Developing a sense of the natural world</p> <p>Throughout the year pupils will study discrete scientific content through the units of Changes all around; traditional tales and grow with us.</p> <p>In addition to this we recognise that pupils will learn a lot through exploring books and reading stories. Within our book talk sessions pupils read a range of texts which expose them to the wider world around them. Discussions will take place in the moment and will vary depending on the children’s interests and their prior knowledge.</p> <p>Teachers will develop scientific knowledge and scientific enquiry within conversations as opportunities arise for example children will seek out patterns whilst playing in the maths area or in the water tray. Children will notice changes by observing over time when playing in the outdoor provision. Staff will draw children’s attention to these things as they play.</p> <p>Continuous provision plays a huge part in learning in Reception. The environment will be set up to allow children to learn through play. Carefully planned role play areas will provide experiences to expose children to science. For example, planting flowers outside to help the children learn to look after plants.</p>	<p>Books:</p> <p>The Tiny Seed</p> <p>Links to further study: Reception – Summer 1 – Grow with us – life cycles Y1 – Summer 1 – Biology plants.</p>
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<p>Direct Links to the EYFS Early Learning Goals</p> <p>ELG: The Natural World</p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> • Explore the natural world around them, making observations and drawing pictures of animals and plants. 	<p>Other wider curriculum links to the EYFS Early Learning Goals</p> <p>This also links to other areas of learning within the Early Learning Goals including:</p> <p>ELG: Listening, attention and understanding. ELG: Speaking ELG: Comprehension</p>
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- 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.

ELG: People, Culture and Communities

Children at the expected level of development will:

- Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.

ELG: Past and present

SCHEME OF WORK: EYFS - RECEPTION

Term:	Rec – Autumn then throughout the year as seasons change.	Key Text(s):	The Squirrels Who Squabbled
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Unit Title:	<h2 style="text-align: center;">Changes All Around - Seasons</h2> <p>The aim of this unit is for pupils to:</p> <ol style="list-style-type: none"> 1. Name the 4 seasons 2. Observe changes to plants and trees during each season. <p>The purpose of this unit is for children to begin to learn then names of the 4 seasons and look at changes to trees and plants during this time as each season occurs. Within this unit children will begin to talk about and observe the changes in their environment. This is built upon in year 1 when they begin to learn more about the 4 seasons, including the months that fall into each season and the weather patterns they follow. This is then developed further in year 2 as children learn about what plants need to grow well and when plants grow best.</p> <p>End of Unit Outcome: Children can name the four seasons and talk about environmental changes during each season.</p>	
<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • Know what the weather is • Experience different types of weather • Name different types of weather. 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Season: Different times of the year, where weather patterns change along with temperature. The seasons are spring, summer, autumn and winter.</p> <p>Spring: The time of year between March and May. There is usually lots of signs of new growth in Spring.</p> <p>Summer: The hottest season in the UK. It happens between June and August.</p> <p>Autumn: Leaves fall off of trees, the days become shorter and in begins to get colder and wetter.</p> <p>Winter: The coldest season in the UK. Usually have snow in this season. Occurs between December and February.</p> <p>Day: The time where sunlight can be seen.</p> <p>Night: Between sunrise and sunset, where it is dark.</p> <p>Weather: Weather is what the sky and the air outside are like, such as cold and cloudy.</p>	
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>There are four seasons – Autumn, Winter, Spring and Summer. Each season has different weather and plants and trees change during each season.</p>	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – Talk to the children about the weather. What do they already know? Has anyone been outside before in the rain or snow? 2. Teach new Vocabulary 3. Read a story – The squirrels who squabbled. Talk about what happens in the story. Talk about the environment. 4. Introduce the season – Autumn. Talk about what autumn is and how plants and trees change during Autumn. 5. Scientific enquiry - Go on an Autumn Walk. Observe the changes to plants and trees during each season. 	

	<p>6. Outcome – children can name the 4 seasons by the end of the year and talk about how the environment changes.</p> <p><i>Please note – the same structure will be applied during the other seasons but children will be taught at the appropriate time of the year so they can experience the seasons as they happen.</i></p>
<p><u>Scientific Enquiry:</u></p>	<p><u>Working scientifically:</u></p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking 5. Research using secondary sources. <p>How do the seasons change? Take the children on a nature walk around the school grounds. Collect natural resources that they find e.g. leaves, sticks, fir cones. Talk about the evergreen trees that do not lose their leaves. Create nature pictures. Create a STEM journey stick, recording what we saw and found.</p> <p><u>Working Scientifically</u></p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking 5. Research using secondary sources
<p><u>Maths Links:</u></p>	
<p><u>Developing a sense of the natural world</u> Throughout the year pupils will study discrete scientific content through the units of Changes all around; traditional tales and grow with us.</p> <p>In addition to this we recognise that pupils will learn a lot through exploring books and reading stories. Within our book talk sessions pupils read a range of texts which expose them to the wider world around them. Discussions will take place in the moment and will vary depending on the children’s interests and their prior knowledge.</p>	<p><u>Books:</u> The Squirrels Who Squabbled</p> <p>Links to further study: Year 1 – Autumn 1 – Physics: seasonal changes.</p>

Teachers will develop scientific knowledge and scientific enquiry within conversations as opportunities arise for example children will seek out patterns whilst playing in the maths area or in the water tray. Children will notice changes by observing over time when playing in the outdoor provision. Staff will draw children's attention to these things as they play.

Continuous provision plays a huge part in learning in Reception. The environment will be set up to allow children to learn through play. Carefully planned role play areas will provide experiences to expose children to science. For example setting up a shop with fruit and vegetables to talk about harvest.

Direct Links to the EYFS Early Learning Goals

ELG: The Natural World

Children at the expected level of development will:

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

ELG: People, Culture and Communities

Children at the expected level of development will:

- Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.

Other wider curriculum links to the EYFS Early Learning Goals

This also links to other areas of learning within the Early Learning Goals including:

ELG: Listening, attention and understanding.

ELG: Speaking

ELG: Comprehension

ELG: Past and present

Term:	Reception – Spring 1	Key Text(s):	Poles Apart
Unit Title:	<p>Amazing animals – Changing States</p> <p>The aim of this unit is for pupils to:</p> <ol style="list-style-type: none"> 1. Know what a solid and liquid is. 2. Know that ice will melt and become water when it is heated. 3. Know that water can freeze and becomes ice when it is frozen. <p>The purpose of this unit is for children to begin to learn about the different states of matter. Children will learn what a solid and what a liquid is. They will explore ice play and talk about how it can melt. Children will discover what makes ice melt. They will also explore how water can be frozen in the freezer to make ice. This is built upon in year 4 when children study states of matter again. In Year 4 children will learn that materials can change state depending on their temperature (heated or cooled), by taking measurements to determine the temperature at which this happens.</p> <p>End of Unit Outcome: Children can talk about melting and freezing. They know that something will melt when it is heated and it will freeze when it cools.</p>		
<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • Know what the weather is • Experience different types of weather • Name different types of weather. • Explored floating and sinking 		<p><u>Key Vocabulary for the Unit:</u></p> <p>Solid – a hard object which is firm and stable in shape. Liquid – a substance that flows freely. Ice – frozen water Iceberg – a large floating mass of ice that has been carried out to sea. Water – a liquid that forms the seas, rivers and rain. Melting – becoming a liquid from being heated Freezing – below 0°c Heated – made hot Frozen – Being turned to ice as a result of cold temperatures. Hot – a high temperature Cold – a low temperature</p>	
<p><u>Composite – The Big Idea</u></p> <p>There are four seasons – Autumn, Winter, Spring and Summer. Each season has different weather and plants and trees change during each season.</p>	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – Talk to the children about the weather. What do they already know? Has anyone been outside before in the rain or snow? 2. Teach new Vocabulary 		

	<ol style="list-style-type: none"> 3. Read a story – Poles Apart. Talk about the snow and ice. Explore the geography elements with the children first. See Geography progression document. Some children may know that the icebergs are melting. Discuss this if the children bring it up. 4. Allow the children time to play with water and ice. Set up two small world trays so they can explore freely. Discuss floating and sinking. Will ice float or sink? 5. Teach the children about melting and freezing. 6. Set up a scientific enquiry – how can we get the animals out of the ice? 7. Outcome – children can name the 4 seasons by the end of the year and talk about how the environment changes. <p><i>Please note – the same structure will be applied during the other seasons but children will be taught at the appropriate time of the year so they can experience the seasons as they happen.</i></p>
<p><u>Scientific Enquiry:</u></p>	<p><u>Working scientifically:</u></p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking 5. Research using secondary sources. <p>How can we get the animals out of the ice? Freeze some animals inside blocks of ice. Present them to the children. Allow them to watch the ice for a period of time. What do they notice is happening? Talk to the children about what we could do to get the animals out? Discuss how we can melt the ice. After the experiment talk about how we could get them back in ice?</p>
<p><u>Maths Links:</u></p>	<p>Capacity – full and empty discussions. Mass – heavy and light</p>
<p><u>Developing a sense of the natural world</u> Throughout the year pupils will study discrete scientific content through the units of Changes all around; traditional tales and grow with us.</p> <p>In addition to this we recognise that pupils will learn a lot through exploring books and reading stories. Within our book talk sessions pupils read a range of texts which expose them to the wider world around them. Discussions will take place in the moment and will vary depending on the children’s interests and their prior knowledge.</p>	<p>Books: Poles Apart</p> <p>Links to further study: Year 4 – Chemistry States of Matter</p>

Teachers will develop scientific knowledge and scientific enquiry within conversations as opportunities arise for example children will seek out patterns whilst playing in the maths area or in the water tray. Children will notice changes by observing over time when playing in the outdoor provision. Staff will draw children's attention to these things as they play.

Continuous provision plays a huge part in learning in Reception. The environment will be set up to allow children to learn through play. Carefully planned role play areas will provide experiences to expose children to science. For example playing in the water tray, playing outside in the cold snowy weather and through scientific experiments planned for them.

Direct Links to the EYFS Early Learning Goals

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

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

ELG: People, Culture and Communities
Children at the expected level of development will:

- Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.

Other wider curriculum links to the EYFS Early Learning Goals

This also links to other areas of learning within the Early Learning Goals including:


ELG: Listening, attention and understanding.
ELG: Speaking
ELG: Comprehension
ELG: Past and present

Term:	Reception – Summer 1	Key Text(s):	The Very Hungry Caterpillar
Unit Title:	<p>Grow With Us – Habitats</p> <p>The aim of this unit is for pupils to:</p> <ol style="list-style-type: none"> 1. Know what a habitat is 2. Name some minibeasts and their habitats. <p>The purpose of this unit is for children to begin to learn about different life cycles. Children will explore what happens to caterpillars and tadpoles. They will also talk about how seeds change into flowers. This will allow them to develop the concept of growing. Children will learn what a habitat is and how minibeasts have different habitats to live in. This is built upon in year 1 when children study biology – animals. In Year 1, pupils further develop their knowledge of animals as they are introduced to the concept of ‘families’ and how animals are grouped according to their shared properties including fish, amphibians, reptiles, birds and mammals.</p> <p>End of Unit Outcome: Children can talk about different minibeasts and their habitats.</p>		
<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • Know that plants need water to grow. • Name animals and their babies. 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Caterpillar – the larve of a butterfly Butterfly – a nectar feeding insect with brightly coloured wings Tadpole – a tailed larva of an amphibian. Frog – a tailless amphibian Life cycle – the changes in the life of a living thing. Growing – increasing in size and changing physically. Habitat - the natural home or environment of an animal plant or other organism.</p>		
<p><u>Composite – The Big Idea</u></p> <p>Habitats are the natural home or environment of an animal plant or other organism. The children will begin to name some minibeasts and their habitats.</p>	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – Talk to the children about the Amazing animal topic. Recall the names of some animals and their babies. 2. Teach new Vocabulary 3. Read a story – The very hungry caterpillar. Talk about the life cycles and how the minibeasts change. 4. Look at different types of minibeasts. 5. Teach the children about habitats. 6. Set up a scientific enquiry – observe caterpillars turning into butterflies. 7. Outcome – children can name minibeasts and their habitats. 		

<p><u>Scientific Enquiry:</u></p>	<p><u>Working scientifically:</u></p> <ol style="list-style-type: none"> 1. Comparative and fair testing 2. Identifying and classifying 3. Observing over time 4. Pattern seeking 5. Research using secondary sources. <p>How do caterpillars turn into butterflies? Observe caterpillars turning into butterflies in the classroom. Take them outside and release them.</p>
<p><u>Maths Links:</u></p>	
<p><u>Developing a sense of the natural world</u> Throughout the year pupils will study discrete scientific content through the units of Changes all around; traditional tales and grow with us.</p> <p>In addition to this we recognise that pupils will learn a lot through exploring books and reading stories. Within our book talk sessions pupils read a range of texts which expose them to the wider world around them. Discussions will take place in the moment and will vary depending on the children’s interests and their prior knowledge.</p> <p>Teachers will develop scientific knowledge and scientific enquiry within conversations as opportunities arise for example children will seek out patterns whilst playing in the maths area or in the water tray. Children will notice changes by observing over time when playing in the outdoor provision. Staff will draw children’s attention to these things as they play.</p> <p>Continuous provision plays a huge part in learning in Reception. The environment will be set up to allow children to learn through play. Carefully planned role play areas will provide experiences to expose children to science. For example children will have a garden centre set up and they will be exposed to a small world tray with different habitats and minibeasts.</p>	<p><u>Books:</u> The Very Hungry Caterpillar</p> <p>Links to further study: Year 1 – Biology Animals.</p>

<p><u>Direct Links to the EYFS Early Learning Goals</u></p> <p>ELG: The Natural World</p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> • Explore the natural world around them, making observations and drawing pictures of animals and plants. • 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. <p>ELG: People, Culture and Communities</p> <p>Children at the expected level of development will:</p> <ul style="list-style-type: none"> • Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps. 	<p><u>Other wider curriculum links to the EYFS Early Learning Goals</u></p> <p>This also links to other areas of learning within the Early Learning Goals including:</p> <p>ELG: Listening, attention and understanding.</p> <p>ELG: Speaking</p> <p>ELG: Comprehension</p> <p>ELG: Past and present</p>
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SCHEME OF WORK: YEAR 1

<p>Term:</p> <p>Scientist Study:</p>	<p>Y1 – Autumn then throughout the year as seasons change.</p> <p>Robert Fitzroy (1805-1865) English captain of HMS Beagle, the ship on which Charles Darwin travelled to the Galapagos Islands. He was a meteorologist, using his knowledge of weather helped him to establish the Met Office.</p>	<p>Key Text(s):</p>	
<p>Unit Title: Physics: Seasonal Changes</p> <p><u>Context for study:</u> This unit follows on from work in Reception where pupils study the names of the 4 seasons and look at changes to trees and plants during this time as each season occurs. In year 1 they begin to learn more about the 4 seasons, including the months that fall into each season and the weather patterns they follow. They will learn about the changes to the earth's light patterns through the seasons and how the seasons affect animals and plants. This unit comes before work studied in year 2 about what plants need to grow well and when plants grow best. They review work studied in year 1 about common plants and how seasons affect deciduous and evergreen plants.</p>			
<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • The names of the 4 seasons • The weather changes with the season • Some trees and plants change with the seasons 		<p><u>Key Vocabulary for the Unit:</u></p> <p>Season: Different times of the year, where weather patterns change along with temperature. The seasons are spring, summer, autumn and winter.</p> <p>Spring: The time of year between March and May. There is usually lots of signs of new growth in Spring.</p> <p>Summer: The hottest season in the UK. It happens between June and August.</p> <p>Autumn: Leaves fall off of trees, the days become shorter and in begins to get colder and wetter.</p> <p>Winter: The coldest season in the UK. Usually have snow in this season. Occurs between December and February.</p> <p>Day: The time where sunlight can be seen.</p> <p>Night: Between sunrise and sunset, where it is dark.</p> <p>Weather: Weather is what the sky and the air outside are like, such as cold and cloudy.</p>	
<p><u>Composite – The Big Idea</u></p> <p>Each year, the UK has four different seasons. Each season has different weather patterns and</p>		<p><u>Components – Sequence of Learning</u></p> <p>1. Retrieval of previous learning – see above</p>	

<p>temperatures, which affect the lives of plants and animals in different ways.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • it always snows in winter • it is always sunny in the summer • there are only flowers in spring and summer • it rains most in the winter 	<p>Introduce and explore knowledge organiser</p> <p>Teach new Vocabulary (inc LBQ vocab QS where appropriate)</p> <ol style="list-style-type: none"> 2. Order seasons with month of year 3. Seasonal events and changes 4. Plants through the seasons 5. Explain how much daylight is in each season 6. Type of weather for each season 7. Is the weather the same every day? 8. Key Scientist: Robert Fitzroy 9. LBQ Question Set
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<u>Maths Links:</u>	
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NC Objectives	Knowledge Content	Working Scientifically
<p><i>Observe changes across the four seasons.</i></p> <p><i>Observe and describe weather associated with the seasons and how day length varies.</i></p> <p><i>Working Scientifically:</i></p> <p><i>Gathering and recording data to help in answering questions.</i></p>	<ul style="list-style-type: none"> • Know that there are four seasons - Autumn, Winter, Spring and Summer. • Know that the seasons occur in a cycle and that they consist of months of the year. • Know how the environment changes in each season. <ul style="list-style-type: none"> • Autumn - Leaves change colour and fall from deciduous trees, harvest time, some birds migrate (e.g. swallows) • Winter - Some animals including hedgehogs and tortoises hibernate throughout Winter (identify these animals) water freezes to ice. Many plants stop growing. • Spring - Flowers begin to grow, associated with rebirth and growth, some baby animals are born (e.g. lambing season), • Summer - Flowers and trees are in bloom. • (Time-lapse video of seasons - https://vimeo.com/2639782) <ul style="list-style-type: none"> • Know that the length of daylight varies, with Winter having the shortest number of daylight hours and Summer having the longest. • Know that the Earth orbits the Sun with one orbit constituting a year of 365 days. 	<p><u>Scientific Enquiry:</u></p> <p>Observing over Time</p> <p>Pattern Seeking</p> <p>Is the weather the same every day?</p> <p><i>Children keep a weather diary across a period of time and compare this to a pre-made one for a different period of the year, drawing conclusions.</i></p> <p>Know how to gather information on rainfall and temperature at each season.</p> <p>Know that a thermometer is used to measure temperature. Know how to</p>

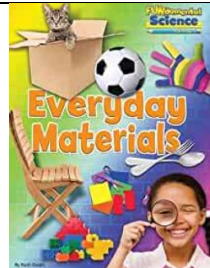
- Know the weather patterns associated with each season -
 - Autumn - Temperatures start to drop from Summer, overcast.
 - Winter - Coldest time of year, snow, frosty in the morning, sleet, blizzard, hail
 - Spring - Temperatures start to warm up.
 - Summer - Hottest time of the year, sunshine, generally dry weather but may be
 - Thunderstorms.

read a thermometer to find out the temperature outside.

Know that we measure temperature in degrees Celsius which is abbreviated to °C.

Know that when the temperature falls below 0°C then water turns to ice.

Know that the temperature on Earth is affected by the sun.

Term:	Y1 – Autumn 2 & Spring 1	Key Text(s):	
Scientist Study:	N/A		

Unit Title:	Chemistry: Uses of Everyday Materials <u>Context for study:</u> This unit is the first of five science units where pupils study materials as part of the discipline of chemistry - the identification of the properties a substance is made from. In this Year 1 unit, pupils identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Pupils distinguish between an object and the material from which it is made including if it is 'man-made' or 'natural'. New learning includes describing the simple physical properties of a variety of everyday materials. The knowledge acquired will help pupils at the end of the unit as they compare and group together a variety of everyday materials on the basis of their simple physical properties. This unit is the precursor to work in Year 2 as pupils compare the suitability of objects and compare how things move on different surfaces.		
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<u>Prior Knowledge Requirements</u> Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. (Early Learning Goal)	<u>Key Vocabulary for the Unit:</u> Rough: Something that feels and looks bumpy. Property: How a material behaves. Smooth: A flat surface that is not bumpy or rough. Material: What an object (thing) is made out of. Example: metal, plastic, glass, wood. Hard: Not easily broken, bent or squashed. Soft: Easy to cut, bend and fold. Its shape can be changed easily. Stretchy: It can be made longer without snapping. Dull: A surface which doesn't reflect light. It is not bright or shiny. Waterproof: Water cannot go through the material. Things underneath stay dry. Bendy: Can be bent side to side without snapping. Stiff: Does not bend easily.
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<u>Composite – The Big Idea</u>	<u>Components – Sequence of Learning</u>
	1. Retrieval of previous learning – see above

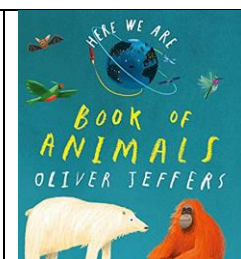
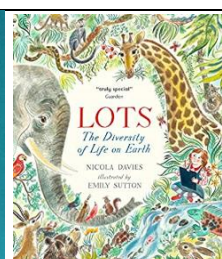
<p>All things (objects) are made out of different materials. These materials all have properties that make them useful for different jobs when making things. For example: glass is perfect for windows, as it is waterproof, hard and transparent (let's light in). These properties allow materials to be grouped together.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • only fabrics are materials • only building materials are materials • only writing materials are materials • the word 'rock' describes an object rather than a material • 'solid' is another word for hard. 	<p>Introduce and explore knowledge organiser</p> <p>Teach new Vocabulary (inc. LBQ vocab QS where appropriate)</p> <ol style="list-style-type: none"> 2. Tell the difference between an object and a material 3. Know the difference between natural and man-made materials. 4. Identify the materials that some objects are made from 5. Are all materials the same? 6. Investigate whether an object floats or sinks. 7. Information text and LBQ Question Set
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<u>Maths Links:</u>	
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NC Objectives	Knowledge Content	Working Scientifically
<p><i>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</i></p> <p><i>Describe the simple physical properties of a variety of everyday materials.</i></p> <p><i>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</i></p>	<ul style="list-style-type: none"> • Know that matter (stuff) is made from tiny building blocks. This comes in three forms - solids, liquids and gases. • Solids include glass, plastic and stone. • Liquids include water, blood, milk. • Gas includes air that we breathe. • Know that many materials are solid and have different properties. • Know that objects are made of different materials <ul style="list-style-type: none"> • Know that some materials are natural and others are man-made. • Natural materials come from materials found in nature and man-made materials are those which humans make. • Natural materials: iron, gold, silver, silk, cotton, leather, wood, water and rock. (know that iron, gold, silver are collectively known as metals) 	<p><u>Scientific Enquiry:</u></p> <p>Comparative & Fair Testing</p> <p>Are all materials the same?</p> <p><i>Children compare a variety of materials, deciding which are hard, soft, strong, weak, smooth, rough, etc.</i></p> <p>Test a range of materials and identify which properties they have.</p> <p>Group materials based on similar properties.</p>

Working scientifically:
Observing closely, using simple equipment
Performing simple tests

- Man-made materials: plastic, glass (know that glass is heated sand), brick, paper, concrete, rubber and some metals like steel.
- Identify different objects and name what material or materials they are made from.
e.g. Canoe: wood or plastic. Car: metal and rubber tyres.
- Recognise that objects are made of different materials.
- Know that some objects float in water, while others sink.

Term: Scientist Study: BIOGRAPHY	Y1 – Spring 2 Steve Irwin (1962-2006) Australian television personality, environmentalist and wildlife expert nicknamed 'The Crocodile Hunter.'	Key Text(s):		
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Unit Title:	Biology: Animals, Including Humans <u>Context for study:</u> This unit is the first of eight science units where pupils study animals, including humans, as part of the discipline of biology - the study of living organisms. From Reception, pupils can name common animals and their babies. Pupils also know that animals that live in particular habitats and know some common features of mini beasts. In Year 1, pupils further develop their knowledge of animals as they are introduced to the concept of 'families' and how animals are grouped according to their shared properties including fish, amphibians, reptiles, birds and mammals. Pupils learn the key features of each animal family and group them into their correct families. New learning includes identifying and naming a variety of common animals that are carnivores, herbivores and omnivores. Pupils identify, name, draw and label the basic parts of the human body. Pupils also learn about the senses. This unit is the precursor to work studied in Year 2 where pupils learn about how animals, and humans, grow and change. Pupils study life cycles of humans and animals such as butterflies, chickens and frogs.
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<u>Prior Knowledge Requirements</u> <ul style="list-style-type: none"> • The names of common farm animals and their young • Animals need food, water, shelter and warmth to keep • healthy • How chickens and frogs grow from eggs 	<u>Key Vocabulary for the Unit:</u> Mammal: Warm-blooded creatures which have fur, breathe air and give birth to live young (no eggs). Fish: A scaly skinned creature with a spine (back bone) which swims under water and breathes using gills. Reptile: Cold-blooded animals which mostly lay eggs and have hard, dry scales covering their body. Most live on land, but some, such as the turtle, live in water. All reptiles breathe air. Bird: Feathered animals which hare warm-blooded and lay eggs. Most, but not all, species of birds can fly. Amphibian: These creatures begin life in water as eggs, have a tadpole-like stage before spending most of their adult life on both land and in water. They have both lungs and gills. Example: Frog Herbivore: Animals which only eat plants. Carnivore: Animals which hunt and eat other animals (meat).
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		<p>Omnivore: An animal which eats both meat and plants.</p> <p>Nocturnal: Animals which spend most of their lives awake during the night and sleeping during the day.</p> <p>Human: Another word for people. Humans belong to the group of animals called mammals.</p> <p>Pet: An animal which lives with people in their homes.</p> <p>Senses: We use our senses to discover what is around us. There are five senses – sight, hear, smell, taste and touch.</p>
<u>Composite – The Big Idea</u>		<u>Components – Sequence of Learning</u>
<p>Animals are a type of life which are found almost everywhere in the world. There are many different types, coming in many shapes and sizes. Some are wild, whilst others are domesticated and kept as pets or farmed.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • only four-legged mammals, such as pets, are animals • humans are not animals • insects are not animals • all ‘bugs’ or ‘creepy crawlies’, such as spiders, are part of the insect group • amphibians and reptiles are the same. 		<ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Group animals by their body type (Include insects, spiders, worms etc. as well as vertebrates). 3. Place animals in the fish, amphibian, bird, reptile and mammal groups 4. Are all animals very different? 5. Explain what part of the body is to do with which sense 6. Label the main parts of the human body, including those linked to the five senses. 7. Sort animals according to their diets – carnivores, herbivores and omnivores. 8. BIOGRAPHY: Steve Irwin. 9. Information texts and LBQ Question Set
<u>Maths Links:</u>		
<u>NC Objectives</u>		<u>Knowledge Content</u>
<p><i>Pupils will be taught to: Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</i></p>		<ul style="list-style-type: none"> • Pupils will know that animals are grouped together in ‘families’ based on shared properties. They will name the groups fish, amphibians, reptiles, birds and mammals. • Know that fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons and organs; these are known as vertebrates, which means they are animals that have a backbone.
		<u>Working Scientifically</u>
		<p><u>Scientific Enquiry:</u> <u>Pattern Seeking</u> Are all animals totally different?</p>

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.

Working scientifically:

Asking simple questions and recognising that they can be answered in different ways

Identifying and classifying

Mammals	Fish	Bird	Reptile	Amphibian
Mouse	Carp	House Sparrow	Common lizard	Common toad
Fox	Stickleback	Blackbird	Adder	Common frog
Badger		Magpie	Grass snake	Smooth newts
Squirrel	<u>Wider World</u>	Starling		
Hedgehog	Cod	Robin	<u>Wider World</u>	
	Tuna		Iguana	<u>Wider World</u>
<u>Wider World</u>	Salmon	<u>Wider World</u>	Chameleon	Poison dart frog
Elephant		Flamingo	Crocodile	
Tiger		Penguin	Alligator	
Gorilla		Macaw		
Lion		Pelican		
Orangutan		Emu		

- Know the features of a fish - gills, scales, fins, water dwelling
- Know the features of mammals - hair or fur, babies drink mother's milk, live on land or water
- Know the features of amphibians - live on land or water when adults, soft skin, lay eggs in water, live in water when young
- Know the features of reptiles - dry scaly skin, lay eggs on land
- Know the features of birds - wings, feathers, beak/bill, hatch from eggs, most can fly but some can't (e.g., ostrich, penguin, kiwi)

Parts of the human body

- Know that we have five senses - smell, taste, touch, sight, hearing
- Know and identify (labelling) the following body parts, linking them to the senses.

Using pictures of animals, children find out if they can find anything that is the same for all of the animals, thinking about what they do and how they look. Show smaller and larger versions of each animal.

Sorting animals into the correct classification

Know that objects can be identified or sorted into groups based on their observable properties

Know that we can write down numbers and words or draw pictures to record what we find.

Know that herbivorous animals eat plants; a carnivorous animal eats other animals; omnivorous animals eat both animals and plants

Know that a cat is an example of a carnivore; that a rabbit is an example of a herbivore; know that many humans are examples of

Sense	Part of the body
sight	eyes
smell	nose
touch	hands, feet, arms, legs etc
hearing	ears
taste	tongue

omnivores (though not vegetarians)

- Know why we need the following body parts - ears, mouth, eyes, nose, tongue.
- Know that the brain controls the body and is where you think and remember things.
- Know the location of the brain.

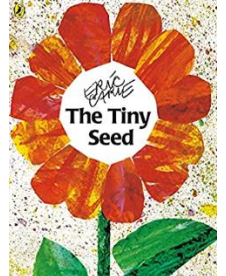
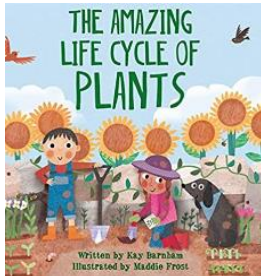
Carnivores, herbivores & Omnivores:

- Know that animals must eat and drink in order to survive.
- Understand that some animals only eat meat – carnivores (Identify / sort examples).
- Understand that some animals only eat plants – herbivores (Identify / sort examples).
- Understand that some animals eat both plants and meat – omnivores (Identify/sort examples).
- Introduce the children to basic food chains (Links to Y4 Animals, Including Humans (Digestion)).

Biography: Steve Irwin

- Australian naturalist and conservationist.
- Born: 1962; Died: 2006 (Stingray barb to the heart).
- Nicknamed: 'The Crocodile Hunter'.
- TV personality and owner of 'Australia Zoo', Queensland.



<p>Term:</p> <p>Scientist Study:</p>	<p>Y1 – Summer 1 & 2</p> <p>N/A</p>	<p>Key Text(s):</p>	 
<p>Unit Title: Biology: Plants</p> <p>Context for study: This unit follows on from learning in Reception about the seasons and changes that happen to the plants during those seasons. They have also recognised some fruits and vegetables and named the basic parts of a plant (petals, stem, flower, roots). In year 1 the pupils learn about the names of common plants and trees and learn to identify them by their leaves. They learn about the terms ‘evergreen’ and ‘deciduous’ and how deciduous plants fit into the change of the seasons. This unit is the precursor to work studied in year 2 where pupils will recap common plants and trees studied in year 1 before moving onto how plants grow (including germinations and pollination), what they need to grow healthily and differences between bulbs and seeds.</p>			
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> • For plants to grow they need water and light. • Plants can die • Some plants are food for us. • Plants have roots, stem, leaves and flowers • How to grow cress and bean plants 	<p>Key Vocabulary for the Unit:</p> <p>Plant: A living thing which uses leaves to capture sunlight to make sugars. Example: trees, grass, daisy.</p> <p>Deciduous: A tree or bush which loses its leaves in autumn each year. Example: oak tree.</p> <p>Evergreen: A tree or bush that keeps its leaves all year round, even during the winter months. Example: cedar.</p> <p>Trunk: The thick, woody stem of a tree. They are covered in bark.</p> <p>Root: Part of the plant which takes in water and nutrients from the soil.</p> <p>Branch: The woody, bark-covered parts of trees which join leaves and twigs to the trunk.</p> <p>Twig: A thin part of the branch, with leaves joined to the end.</p> <p>Stem: These hold the plant up and join all parts of the plant together. They carry water, sugars and nutrients to all parts of the plant.</p> <p>Seed: Seeds grow into new plants. Example: Sunflower.</p> <p>Blossom: Small flowers which grow of bushes and trees.</p>		

<p>Wild Plants: These plants grow wherever seeds fall. They do not need to be planted. Garden Plants: Plants chosen and planted in a place by people. Weeds: Wild plants growing where people don't want them to grow. Flowers: Used to attract insects using brightly coloured petals. Fruits grow from flowers. Fruit: These grow from flowers and contain the plant's seeds. They are often sweet tasting so that animals eat them. Example: apple. Bulb: Bulbs are short, fat stems which grow into new plants. Example: Daffodils. Leaf / Leaves: The part of a plant which captures sunlight.</p>		
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>Plants are living things, which need sunlight, water and air in order to grow. They usually have green leaves, roots, stems and often flowers. Trees are large plants, some of which lose their leaves in autumn. Plants grow from seeds and bulbs.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • plants are flowering plants grown in pots with coloured petals and leaves and a stem • trees are not plants • all leaves are green • all stems are green • a trunk is not a stem • blossom is not a flower. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (including LBQ vocab QS where appropriate) 2. Identify some common garden plants. 3. Identify some common trees using their shapes, leaves and seeds. 4. Identify plants in my local area 5. Label the main parts of a flowering plant. 6. Explain what the different parts of a flowering plant do 7. Information text and LBQ Question Set 	
<u>Maths Links:</u>		
<u>NC Objectives</u>	<u>Knowledge Content</u>	<u>Working Scientifically</u>
<p><i>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</i></p>	<ul style="list-style-type: none"> • Know the names of the following common plants - daisy, white clover, poppy, nettle, ivy, bramble and locate some in the local environment (also dandelion and grass). • Know the names of the following common trees - oak, elm, maple, silver birch, sycamore, horse chestnut. 	<p><u>Scientific Enquiry:</u> Research using secondary sources</p>

Identify and describe the basic structure of a variety of common flowering plants, including trees.

Working scientifically:

Asking simple questions and recognising that they can be answered in different ways

Observing closely, using simple equipment

Identifying and classifying

Using their observations and ideas to suggest answers to questions

- Know how to identify them from their leaves, fruit and shape.
- Know how to identify some of the trees in the grounds of Red Lane Primary School
- Know the term deciduous - a tree that sheds its leaves annually - this means every year the tree loses its leaves. The leaves of deciduous trees are often large and thin.
- Know the term Evergreen - a tree that has green leaves all year. These leaves are usually, waxy, thick, narrow and small.
- Know that oak, birch and sycamore are deciduous
- Know that holly and pine are evergreen.
- Know the names of the basic parts of a plant and their function - leaves, flower, stem, roots, petals

part	function
leaves	collect energy from the sun to help the plant grow
flower	creates seeds
stem	holds the flower and leaves up high and transports water
root	collects nutrients and water from the soil to help the plant grow
petals	the coloured part of a flower that attracts insects

- Know how to draw a diagram showing the parts of a plant.
- Know the names and function of parts of a tree - roots, trunk, branches, leaves.
- Know that a tree trunk is a type of stem.
- Know that flowers on a tree are often called 'blossom'.
- Know that fruit often grows on trees including - apples, oranges, cherries, lemons, bananas, mangoes, pears and plums.
- Know that the fleshy part of the fruit generally protects the seeds within.
- Recognise examples of seeds and pips found in apples, oranges, peaches and cherries. Know that seeds are buried in the ground (or planted) and grow into new plants.
- Know that bulbs are short stems with leaves built up around it.
- They are planted in the ground and new plants can grow.
- Know that onions are an example of a bulb that we can eat.

What parts is a plant made of?

Children use pages from a science encyclopaedia to draw and label different plants, spotting similarities and differences.


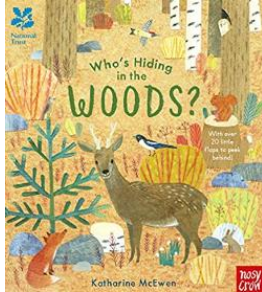
Know how to observe a plant growing in a transparent glass vase.

Know how to record observations about the roots and stem growing.

Know how to use a magnifying glass to study flowers and plants closely

Know how to record information about these flowers.

SCHEME OF WORK: YEAR 2

<p>Term:</p> <p>Scientist Study:</p>	<p>Y2- Autumn 1</p> <p>N/A</p>	<p>Key Text(s):</p>		
<p>Unit Title: Biology: Living Things and their Habitats</p> <p>Context for study: Prior to this unit pupils will have already started to study habitats by looking at minibeasts in Reception. In year 2 pupils will learn about the food chains of animals in varying habitats and will look at microhabitats and the animals that live there. They will also learn how to determine if something is alive, was once alive or never lived, using the acronym MRS NERG. This unit comes before work in Year 3 studying the animals native to sea, river and canals and the features that help them to live there. In year 4 pupils will continue learning about habitats by grouping animals into categories, such as vertebrates/invertebrates, before moving onto work in year 5, studying adaptation and eco-systems.</p>				
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> • Which things are living, dead and things which have never been alive • The names of some common plants and types of trees • Some animals are suitable to be kept as pets but others are not • All animals need water, air and food to survive • Animals can be grouped into vertebrates and invertebrates 		<p>Key Vocabulary for the Unit:</p> <p>Living: Something that is alive and not dead. Non-Living: Things that have never been alive. Dead: Were once alive but not anymore. Animal: Creatures which must eat other living things. These include, birds, mammals, reptiles, spiders, insects, amphibians, worms and fish. Habitat: The home or environment of a living thing. For example: a woodland could be the environment for a badger. Some habitats can be very smalls, such as a rotting log. These are called 'micro-habitats'. Food Chain: This shows us what different living tings eat and in what order. Prey: Animals which are eaten by predators. Predator: Animals which hunt and eat other animals.</p>		

<ul style="list-style-type: none"> Animals can be grouped into carnivores, herbivores and omnivores Animals, including humans, have offspring which grow into adults Different vegetation belts and biomes around the world 	<p>Carnivore: Animals, which eat only meat. Herbivore: Animals, which only eat plants. Omnivore: Animals, which eat both plants and animals. Human: People. Humans are mammals.</p>
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<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>All living things live in habitats, places, which give them everything that they need in order to survive (food, drink, shelter etc.). All living things must feed. Some create their own food (plants), whilst others eat each other (predators eat prey) in food chains.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> an animal’s habitat is like its ‘home’ plants and seeds are not alive as they cannot be seen to move fire is living arrows in a food chain mean ‘eats’. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (including LBQ vocab QS where appropriate) Is everything on Earth alive? MRS GREN (Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, Nutrition) Explain how some animals are adapted to their habitats Identify and name some plants and animals in the local area Create and describe a basic food chain. LBQ Question Set
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<u>Maths Links:</u>	
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NC Objectives	Knowledge Content	Working Scientifically
<p><i>Explore and compare the differences between things that are living, dead, and things that have never been alive.</i></p> <p><i>Identify that most living things live in habitats to which they are suited and describe how different</i></p>	<ul style="list-style-type: none"> To know which items, including those made from a variety of materials, fit into each category and place them in a table under the headings living (tree, person, animal, fish, grass) dead (paper, bunch of flowers, cotton shirt, wooden table) never been alive (plastic chair, pen, window, stone, metal) Understand that a flame is not alive and that a deciduous tree is not dead in Winter. 	<p><u>Scientific Enquiry:</u> Identifying, classifying & grouping Is everything on Earth alive? <i>Children sort pictures and specimens into alive,</i></p>

habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.

Identify and name a variety of plants and animals in their habitats, including microhabitats.

Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.

Working scientifically:

Observing closely, using simple equipment.

Identifying and classifying.

Using their observations and ideas to suggest answers to questions.

- Know that living things move, grow, consume nutrients and reproduce; that dead things used to do these things but no longer do; and that things that never lived have never done these things.
- Know the acronym MRS GREN (Movement, Respiratory, Sensitivity, Growth, Reproduction, Excretion and Nutrition) to teach about how to organise objects into each category.

- Know the meaning of these terms from this table:

MRS GREN



Movement: All things move, even plants.

Respiration: Getting energy from food.

Sensitivity: Detecting changes in the surroundings.

Growth: All living things grow.

Reproduction: Making more living things.

Excretion: Getting rid of waste.

Nutrition: Taking in and using food.

- Know that a species of animal or plant that is extinct no longer has any living members in the world. e.g. dinosaurs, dodo.
- Know that all creatures need air, food, shelter and water to survive
- Sea/underwater - A fish breathes through gills, has fins to swim, swim bladders for buoyancy, eat water insects and other sea creatures (shrimp)
- Woodland - A fox/badger, breathes through lungs, has fur for warmth, lives in a den underground, eats creatures found in the habitat (frogs, worms, berries, mice)
- Birds - breathe through lungs, have wings to fly to warmer places (migrate) or out of danger, eat worms and slugs found on the ground.

dead, and never alive.
(Include misconceptions like the sun and the sea.)

Use questions to sort different animals based on their characteristics and habitat.

- Know that animals and plants survive in a habitat because of each other and that different plants and animals live in different places because of their needs.
- Link to food chains for how they depend on each other to survive.


- Pupils should look at some habitats and microhabitats in the local area and record their findings.

- Recognise and name these larger habitats - ocean, tropical rainforest, desert, woodland, and polar ice.
- Know the names of plants in these habitats such as cactus, tumbleweed (desert), orchid, coffee plant (rainforest) dandelion, moss, clover, grass, shrub, conifer (woodland/grassland).
- Know the names of the following minibeasts - caterpillar, spider, woodlouse, beetle, worm, slug, water boatman, pond skater and observe where they live.
- Know that an insect has 6 legs.
- Know that a spider has 8 legs and is an arachnid.
- Know that a worm and a slug are not insects.
- Understand the term microhabitat: a small habitat specific to minibeasts within larger habitats. A woodland has many microhabitats - under a log or rock, a leaf pile, under a bush or a pond.

- Know the terms omnivore, carnivore and herbivore to describe the eating habits of animals in the food chain.
- Know that the arrows on a food chain show the direction that the energy travels.

- Use the terms Producer, Consumer, Prey, Predator to describe a food chain and use the terminology to organise and create food chains.

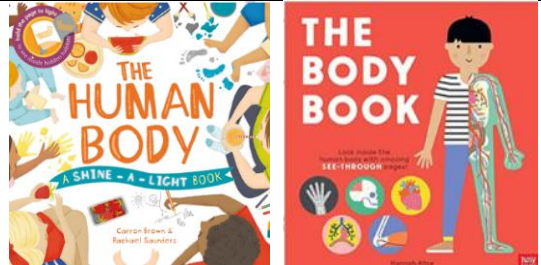
- Know the following food chains:
 - Sunlight, Clover, Snail, Songbird and Falcon
 - Sunlight, Ash Tree, Greenfly, Frog, Snake
 - Sunlight, Lettuce, Slug, Frog, Fox

<p>Term:</p> <p>Scientist Study:</p> <p>BIOGRAPHY</p>	<p>Y2- Autumn 2</p> <p>John Dunlop (1840-1921) Scottish inventor and veterinary surgeon who developed pneumatic rubber tyre for bicycles and cars.</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Chemistry: Uses of Everyday Materials</p> <p><u>Context for study:</u> This unit is the second of five science units where pupils study materials as part of the discipline of chemistry. Pupils have a secure knowledge of the properties of a variety of everyday materials. Pupils can identify, name and describe an object in terms of the material it is made from including if it is 'man-made' or 'natural'. Previous learning includes comparing and grouping together everyday materials on the basis of their simple physical properties. This year 2 unit builds on pupils' knowledge of materials of properties as pupils identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses. New learning includes comparing how things move on different surfaces. This unit will help pupils understand how squashing, bending, twisting and stretching can change the shapes of some solid objects. This is the precursor to work studied in Year 3 rocks and soils. The knowledge acquired will help pupils in Year 4 as pupils study materials in terms of solid, liquid and gases. Year 5 pupils learn about dissolving, mixing and changes of state, and reversible and irreversible changes. Pupils also build on previous knowledge of magnetic and non-magnetic metals.</p>		
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> • What materials some objects are made from • How to give simple descriptions of materials • Which materials are made/ natural 		<p>Key Vocabulary for the Unit:</p> <p>Flexible: An object that can be bent easily without breaking. Stiff: Something that is stiff is firm or does not bend easily. Rigid: A rigid substance or object is stiff and does not bend, stretch, or twist easily. Opaque: If an object or substance is opaque, you cannot see through it. Transparent: If an object or substance is transparent, you can see through it. Translucent: If a material is translucent, some light can pass through it. Brittle: An object or substance that is brittle is hard but easily broken.</p> <p>Material: What different objects/things are made from. Properties: What a material is like and how it behaves. Example: bending. Squashing: Pushing things closer together.</p>	

	<p>Bending / Flexible: Can change shape and direction easily.</p> <p>Twisting: Moving one part of an object clockwise and the other anti-clockwise.</p> <p>Stretching: Change the shape of things by pulling them apart and making them longer or wider.</p> <p>Hard: Hard or difficult to squash.</p> <p>Soft: Easy to squash.</p> <p>Rough: A bumpy surface.</p> <p>Smooth: A flat surface.</p> <p>Waterproof: Does not let water go through it. The water droplets stay on top.</p>
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>All objects are made from different materials. These materials have different properties and behave in different ways. This allows the correct materials to be used to the right job. Over the years, people such as John Dunlop, Charles Macintosh and John McAdam have used material properties to invent new things.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • only fabrics are materials • only building materials are materials • only writing materials are materials • the word rock describes an object rather than a material • solid is another word for hard. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Identify the materials that different objects are made from 3. Investigate the properties of different materials. 4. Group objects by the material that they are made from. 5. What materials could be used to make a good raincoat? 6. Suggest suitable materials for new situations. 7. BIOGRAPHY: John Boyd Dunlop 8. Information Texts and LBQ Question Set
<p style="text-align: center;"><u>Maths Links:</u></p>	

NC Objectives	Knowledge Content	Working Scientifically														
<p><i>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses</i></p> <p><i>Compare how things move on different surfaces.</i></p> <p><i>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</i></p> <p><i>Working scientifically:</i></p> <p><i>Performing simple tests</i></p> <p><i>Observing closely, using</i></p>	<ul style="list-style-type: none"> Know that matter (stuff) is made from tiny building blocks. Know the following properties of materials - flexible, stiff, rigid, stretchy, hard, soft, brittle, strong, weak, absorbent, heavy, light, solid, runny, smooth, rough, opaque, transparent and translucent. Know which materials have these properties (include plastic, wood, aluminium foil, copper, steel, iron, ceramic, glass, wool, cotton, silk, rubber). Know the following definitions: <table border="1" data-bbox="483 544 1769 1098"> <tbody> <tr> <td>flexible</td> <td>An object or material that can be bent easily without breaking.</td> </tr> <tr> <td>stiff</td> <td>Something that is stiff is firm or does not bend easily</td> </tr> <tr> <td>rigid</td> <td>A rigid substance or object is stiff and does not bend, stretch, or twist easily.</td> </tr> <tr> <td>opaque</td> <td>If an object or substance is opaque, you cannot see through it.</td> </tr> <tr> <td>transparent</td> <td>If an object or substance is transparent, you can see through it.</td> </tr> <tr> <td>translucent</td> <td>If a material is translucent, some light can pass through it.</td> </tr> <tr> <td>brittle</td> <td>An object or substance that is brittle is hard but easily broken.</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Use properties to compare what different materials would be used for and why. Know that a chair can be made of wood because wood is strong and rigid. Plastic would also be good for a chair because it is strong, flexible and smooth. Glass is a good material for a window because it is transparent and rigid. Fabric would be a good material for a jumper because it is flexible, soft and strong. 	flexible	An object or material that can be bent easily without breaking.	stiff	Something that is stiff is firm or does not bend easily	rigid	A rigid substance or object is stiff and does not bend, stretch, or twist easily.	opaque	If an object or substance is opaque , you cannot see through it.	transparent	If an object or substance is transparent , you can see through it.	translucent	If a material is translucent , some light can pass through it.	brittle	An object or substance that is brittle is hard but easily broken.	<p>Scientific Enquiry: Identifying, classifying & grouping Comparative & Fair Testing What materials could be used to make a good raincoat? <i>Children test whether different materials are waterproof, flexible and light.</i></p> <p>Make predictions and test how durable materials are.</p> <p>Make predictions and test items made from different materials against 4 forces: squashing, bending, twisting and stretching.</p> <p>Know that applying forces to</p>
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<p><i>simple equipment.</i></p> <p><i>Gathering and recording data to help in answering questions.</i></p>	<ul style="list-style-type: none"> • Know why some materials are not appropriate e.g. Why is glass not appropriate for a chair? Why is wood not appropriate for a window? • Know how to use a Venn diagram to sort a set of materials (e.g., one circle labelled 'flexible' and the other circle labelled 'opaque') • Know that materials can change shape when properties are flexible and soft but they cannot change shape when the properties are rigid, hard and stiff. 	<p>objects can change their shape.</p> <p>Record the results to see which can be changed or not by each force.</p>
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<p>Term:</p> <p>Scientist Study:</p>	<p>Y2- Spring 1 & 2</p> <p>N/A</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Biology: Animals including Humans</p> <p>Context for study:</p> <p>This unit is the second of eight science units where pupils study animals, including humans, as part of the discipline of biology. Pupils have a secure knowledge of common animals, their babies and their habitats. Pupils can identify and name a variety of common animals that are carnivores, herbivores and omnivores. Pupils can identify, name, draw and label the basic parts of the human body. In Year 2, pupils study life cycles and learn that animals, including humans, have offspring which grow into adults. New learning includes the basic needs of animals, including humans, for survival and the importance of exercise, eating the right amounts of different types of food, and hygiene. This unit is the precursor to work studied in lower key stage 2 where pupils learn to classify and group animals and learn about skeletons, vital organs and the digestive system. In Upper key stage 2 pupils continue their learning looking in more depth at food chains, life cycles, vital organs and the circulatory systems.</p>		

<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • There are 5 groups of animals (vertebrates) – mammals, fish, reptiles, amphibians, birds • Some animals are suitable to be kept as pets but others are not. • Some animals give birth to live young but others lay eggs. 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Healthy: Keeping healthy means doing things that are good for the body including sleeping, regular exercise and eating nutritious foods.</p> <p>Diet: The things that people eat and drink. A balanced diet included a mixture of foods, which contain the correct nutrients needed to repair the body and grow.</p> <p>Exercise: Moving all parts of the body so that different muscles are made to work. This helps people to burn off fat and to improve breathing, getting oxygen from the air around the body faster.</p> <p>Nutrients: The things that the body needs to grow and repair itself. These include vitamins and minerals.</p> <p>Hygiene: Taking care of our bodies by cleaning them. This stops us becoming ill from germs and also stops us smelling.</p> <p>Vegetables: Parts of plants usually found underground. They are good sources of vitamins, minerals and sugars in the form of starch. Example: Carrot.</p> <p>Fruit: Usually sweet-tasting parts of a plant, which are formed from flowers and often contain seeds. They are good sources of energy and nutrients.</p> <p>Carbohydrates: Stored sugars, which are found in vegetables such as potatoes and grains such as rice and wheat.</p> <p>Meat: The flesh from another animal that is eaten.</p> <p>Dairy: Food, which is made using milk.</p> <p>Grow: To get bigger.</p> <p>Sleep: The body rests, grows and repairs itself when we are asleep, usually at night.</p> <p>Off-Spring: A person or animal's children are their off-spring.</p>
<p><u>Composite – The Big Idea</u></p> <p>All living things need to stay healthy in order to live longer and avoid becoming ill. This includes people, who need to eat a balanced diet, take regular exercise and get enough sleep every day.</p> <p><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • an animal's habitat is like its 'home' • all animals that live in the sea are fish • respiration is breathing • breathing is respiration. 	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Do all animals start off small? 3. Sequence and describe the life cycle of different animals. 4. Sequence the different stages in a human life. 5. Explain what humans need to survive. 6. Explain how the different food groups help us to stay healthy. 7. Explain why it is important to be clean when eating food. 8. Information Text and LBQ Question Set

Maths Links:

NC Objectives	Knowledge Content	Working Scientifically																					
<p><i>Notice that animals, including humans, have offspring which grow into adults</i></p> <p><i>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</i></p> <p><i>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</i></p> <p><i>Working scientifically:</i></p> <p><i>Observing closely, using simple equipment.</i></p> <p><i>Identifying and classifying.</i></p>	<ul style="list-style-type: none"> Know the following animals and their babies and identify them in photos: <table border="1" style="width: 100%; text-align: center;"> <tr> <td>dog, puppy cat, kitten horse, foal bear, cub</td> <td>bird, chick cow, calf pig, piglet goat, kid</td> <td>duck, duckling lion, cub sheep, lamb snake, hatchling</td> </tr> </table> <ul style="list-style-type: none"> Know that animals grow and change over their lifetime. Know that animals grow in a womb, and are born or hatch. Know the following animals that hatch from eggs and those that have live young - (Watch video clip - https://www.bbc.com/bitesize/clips/zdw9wmn) <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Hatch from an egg:</th> <th style="width: 50%;">Live young :</th> </tr> </thead> <tbody> <tr> <td>➤ Crocodile</td> <td>➤ Horses</td> </tr> <tr> <td>➤ Swift</td> <td>➤ Cats</td> </tr> <tr> <td>➤ Mosquitos</td> <td>➤ Dogs</td> </tr> <tr> <td>➤ Frogs</td> <td>➤ Lions</td> </tr> <tr> <td>➤ Toads</td> <td>➤ Cows</td> </tr> <tr> <td>➤ Crabs</td> <td>➤ Sheep</td> </tr> <tr> <td>➤ Moth</td> <td>➤ Pigs</td> </tr> <tr> <td>➤ Spiders</td> <td></td> </tr> </tbody> </table> <ul style="list-style-type: none"> Know that most snakes lay eggs but some produce live young. Know that some animals need milk and care from their mothers (including lambs, calves, piglets, goat kids) and some fend for themselves (including ducks and geese). Know the life cycle of a human using the following language: Baby, Toddler, Child, Teenager, Adult, Elderly. Know the life cycle of a frog - frogspawn, tadpole, frog. Know that the term metamorphosis describes the change from a tadpole to adult frog. 	dog, puppy cat, kitten horse, foal bear, cub	bird, chick cow, calf pig, piglet goat, kid	duck, duckling lion, cub sheep, lamb snake, hatchling	Hatch from an egg:	Live young :	➤ Crocodile	➤ Horses	➤ Swift	➤ Cats	➤ Mosquitos	➤ Dogs	➤ Frogs	➤ Lions	➤ Toads	➤ Cows	➤ Crabs	➤ Sheep	➤ Moth	➤ Pigs	➤ Spiders		<p>Scientific Enquiry: Pattern Seeking Do all animals start off small? <i>Children pair up pictures of a variety of animals with their very young and juvenile forms.</i></p> <p>Sorting animals into the correct classification</p> <p>Know that animals can be identified or sorted into groups based on their observable properties and their life cycles.</p> <p>Pupils will model the spread of germs using glitter.</p>
dog, puppy cat, kitten horse, foal bear, cub	bird, chick cow, calf pig, piglet goat, kid	duck, duckling lion, cub sheep, lamb snake, hatchling																					
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- Know that frogs have four legs - two front legs and two back legs. (address the misconception that frogs have arms)

Health

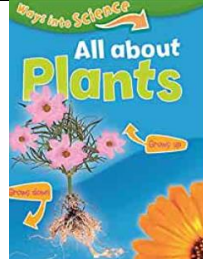

- Know that animals and humans need water, food and air to survive (relate to looking after pets) Know that humans need exercise to stay fit and healthy (exercise can include, running, swimming, playing sport etc.)
- Know that the heart pumps blood around the body through the veins and that lungs are used for breathing. The heart and lungs are called organs.
- Know that when we breathe in we take oxygen from the air.
- Know why we need a heart and why we need lungs.

Diet

- Know that a balanced diet consists of the five food groups below.
- Know examples from each and the health benefit of each food group
 - Carbohydrates give us energy (e.g. bread, pasta, rice)
 - Protein helps the body to grow and repair itself (e.g. meat, fish, eggs)
 - Dairy products keep bones and teeth healthy (e.g. milk, yoghurt, cheese)
 - Fruit and Vegetables keep your digestive system healthy. (e.g. apple, orange, pear, strawberry, melon)
 - Fats and Sugars give us energy but should not be eaten too often (e.g. butter, cooking oil, cream, chocolate, sweets, jam, cakes, biscuits)
- Know that we need to drink water to be hydrated and stay healthy.
- Know that water is good to drink as it does not contain calories and is not harmful to teeth.
- Know that calories are 'a measure of the amount of energy in food'.
- Know that sugary soft drinks can damage teeth and contain sugar which can be harmful to the body.

Hygiene

- Know that a germ is 'a very small living thing that causes disease'.
- Know that they are only visible through a microscope.
- Know the following basic hygiene rules to prevent the spread of germs
- Wash hands regularly especially before eating and after using the toilet
- Cover your mouth when sneezing or coughing
- Have a bath or shower regularly
- Brush teeth twice a day

Term:	Y2- Summer 1 & 2	Key Text(s):		
Scientist Study:	N/A			


Unit Title:	<p>Biology: Plants</p> <p>Context for study: This unit follows on from learning in Reception about the seasons and changes that happen to the plants during those seasons. They have also recognised some fruits and vegetables and named the basic parts of a plant. In year 1 the pupils learned about the names of common plants and trees and how to identify them by their leaves. They learn about the terms ‘evergreen’ and ‘deciduous’. In year 2 pupils will recap common plants and trees studied in year 1 before moving onto how plants grow (including germination and pollination), what they need to grow healthily and differences between bulbs and seeds. This unit includes an investigation about growing healthy plants. This is the precursor to work studied in Year looking more at what plants need to grow healthily. They will also study water transportation and the process of the life cycle of the plant including pollination, seed formation and seed dispersal. In Year 6, pupils continue to study plants by studying plant classification for flowering and not flowering plants.</p>			
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<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> Plants can grow. The names of some common garden plants (e.g. poppy, rose) and some common wild plants (e.g. daisy, dandelion, nettle). Deciduous trees lose their leaves in the autumn every year. Evergreen trees have green leaves all year round. The parts of a plant may include: petals, fruits, roots, bulbs, seeds, stem, trunk and branches. 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Plant: A living thing which uses energy from the Sun to make its own food (sugar). They grow from seeds and bulbs.</p> <p>Roots: The part of a plant found (mostly) underground. They hold (anchor) the plant in place and soak up (absorb) nutrients and water from the soil to help the plant grow.</p> <p>Bulb: These are underground masses of food storage from which plants grow.</p> <p>Seeds: Seeds are formed within the fruits of flowering plants. New plants grow (germinate) from these.</p> <p>Blossom: The mass of flowers created by a tree or plant. Blossom is usually found in Spring.</p> <p>Stem: The part of a plant which supports the leaves and flowers. Water and food are transported (moved around) inside the stem.</p> <p>Trunk: The trunk is the stem of a tree. It is thicker, woody and stronger, holding up the crown (branches) of the tree.</p> <p>Leaves: Mostly green parts of the plant used to capture sunlight to help the plant grow.</p>
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<p>Woodland: A woodland is a habitat where trees are the main (dominant) type of plant. Deciduous: These are trees which shed (drop) their leaves in the Autumn and grow new ones in Spring. Example: Oak. Evergreen: These trees and plants do not lose their leaves in Autumn, instead they keep them all year round. Example: Conifer.</p>		
<p>Composite – The Big Idea</p> <p>Plants are a type of life found throughout the world. They range in size from grass up to huge trees. They are usually green and have leaves, which capture sunlight to help them grow.</p> <p>Common Misconceptions</p> <p>Some children may think:</p> <ul style="list-style-type: none"> plants are not alive as they cannot be seen to move seeds are not alive all plants start out as seeds seeds and bulbs need sunlight to germinate 	<p>Components – Sequence of Learning</p> <ol style="list-style-type: none"> Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) Label the main parts of a plant and explain their function Sequence the different stages in a plant's life Explain how flowering plants reproduce Consider what plants need to grow well. Do plants grow the same amount every day? (Use a fast growing plant – e.g. cress) Information Text and LBQ Question Set 	
<p>Maths Links:</p>		
NC Objectives	Knowledge Content	Working Scientifically
<p><i>Observe and describe how seeds and bulbs grow into mature plants</i></p> <p><i>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</i></p> <p><i>Working scientifically:</i></p> <p><i>Performing simple tests</i></p>	<ul style="list-style-type: none"> Know the names of common trees and plants from Y1 curriculum Plants: daisy, white clover, poppy, nettle, ivy, bramble, dandelion and grass and introduce new species daffodils, roses, thistle and shamrock. Trees - oak, elm, maple, silver birch, sycamore, horse chestnut, crack willow. Know the parts of a plant as roots, stem, flower, leaves (revision from Y1) Know that roots support the plant in the ground and absorb water and nutrients needed for growth. Know that nutrients are substances that help plants and animals to grow. 	<p>Scientific Enquiry: Observing over Time Do plants grow the same amount every day?</p> <p><i>Children measure the height of a growing plant over a period of days and weeks</i></p> <p>Know that variables are the elements of an experiment that can be changed.</p>

<p><i>Observing closely, using simple equipment.</i></p> <p><i>Gathering and recording data to help in answering questions.</i></p>	<ul style="list-style-type: none"> • Know that the stem holds the flower and leaves up to the sunlight and carries water and nutrients to the leaves. • Know that leaves are made to catch sunlight and change the sun's energy into energy for the plant to use to grow. They are the only living things that can do this. • Know that the flower is where seeds are made. Know that bees and insects help this process by carrying pollen from one flower to another. This is called pollination. • Know that plants grow from seeds or bulbs. Identify pictures of seeds and bulbs. • Know that seeds are sown and bulbs are planted. • Know that when a seed germinates it starts to grow. This process is called germination. • As a plant grows it becomes a seedling before becoming an adult plant. • Know that a shoot is a new part of a plant that grows. • Know that seeds and bulbs have a store of food inside them. • Understand why a circle diagram is used to understand the life cycle of a plant. • Know that seeds need the following to germinate <ul style="list-style-type: none"> ○ Water ○ Oxygen ○ Warmth • Know that plants need the following to grow and be healthy: <ul style="list-style-type: none"> ○ Water ○ Air ○ Warmth ○ Light ○ Nutrients ('food' absorbed by the roots) • Know that healthy plants are green and strong unhealthy plants are often pale, yellowy and weak. 	<p>Know how to conduct an experiment to demonstrate the effects of water and light on plant growth.</p> <ol style="list-style-type: none"> 1. Seed A should have water and access to light (this is called the Control) 2. Seed B should have access to light but no water. 3. Seed C should have no water and access to light. 4. Seed D should have no water and no light. <p>Pupils use what they know about what plants need to grow to predict what will happen for each container.</p> <p>Know that the experiment must have other variables the same e.g. temperature.</p> <p>Know that they must check the size of the plants regularly and over a long period of time.</p> <p>Know how to use a ruler to measure height of a plant in cm. Know how to describe the health of the plant through careful observation of colouring and stem strength.</p>
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SCHEME OF WORK: YEAR 3

<p>Term:</p> <p>Scientist Study: BIOGRAPHY</p>	<p>Y3- Autumn 1</p> <p>Mary Anning (1799-1847) English fossil collector and palaeontologist who showed fossils to be impressions of extinct creatures (usually dinosaurs). She found the first complete ichthyosaur skeleton.</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Chemistry: Rocks</p> <p>Context for study: This unit is the third of five science units where pupils study materials as part of the discipline of chemistry - the identification of the properties a substance is made from. It is also the study of forces as part of the discipline of physics – the study of the processes that shape our world and how we use it. Pupils have a secure knowledge of the properties of materials and can identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses. Previous learning includes comparing how things move on different surfaces. Pupils know that squashing, bending, twisting and stretching can change the shapes of some solid objects. Pupils have studied the work of John Dunlop. This year 3 unit builds on pupils' knowledge of properties of materials as pupils learn about rocks and soils. New learning includes comparing and grouping together different kinds of rocks on the basis of their appearance and simple physical properties. Pupils describe how fossils are formed when things that have lived are trapped within rock and recognise that soils are made from rocks and organic matter. The knowledge acquired of rocks and soils during this unit will help pupils understand the significance of the life and works of palaeontologist Mary Anning. Later in the year, during a separate Year 3 forces unit, pupils further develop their knowledge as they 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. This unit is the precursor to work studied in Year 4 as pupils study materials in terms of solids, liquids and gases. Year 5 pupils learn about dissolving, mixing and changes of state, and reversible and irreversible changes. Pupils also build on previous knowledge of magnetic and non-magnetic metals.</p>		

<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • What materials some objects are made from • How to give simple descriptions of materials • Which materials are made/ natural • The properties of common materials • How the shape of solids can be changed by squashing, bending, twisting and stretching 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Rock/Stone: A hard material formed out of minerals in the Earth’s crust. There are three types of rocks: sedimentary, igneous and metamorphic.</p> <p>Layers: A thickness of material which sits upon other materials beneath it.</p> <p>Organic Matter: Organic matter is matter that has come from a recently living organism. It is capable of decaying.</p> <p>Permeable (Absorbs Water): Allows water to soak into it.</p> <p>Impermeable (Waterproof): Water cannot soak into the material, instead, it simple runs off of the surface.</p> <p>Soil: Soil consists of a mix of organic material (decayed plants and animals) and broken bits of rocks and minerals.</p> <p>Fossil: A fossil is the preserved remains or traces of a dead plant or animal.</p> <p>Sedimentary Rocks: Sedimentary rocks are made when sand, mud and pebbles get laid down in layers.</p> <p>Igneous Rocks: Igneous rock is formed when hot magma from the Earth’s mantle cools and solidifies. It may do this above or below the Earth's surface.</p> <p>Metamorphic Rocks: When a rock experiences heat and pressure, it becomes a metamorphic rock. All metamorphic rocks start as either sedimentary or igneous rock.</p> <p>Magma: Hot, liquid rock found within the Earth’s mantle. When magma comes to the surface of the crust, it is called lava.</p>
<p><u>Composite – The Big Idea</u></p> <p>Rocks are formed in the Earth’s crust and they have different properties. Soils are formed from the breakdown of rocks and decaying organic matter. Fossils are formed when dead animals are trapped within rocks.</p> <p><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • rocks are all hard in nature • rock-like, man-made substances such as concrete or brick are rocks 	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Observe and describe the properties of rocks 3. Are all rocks made in the same way? 4. Match rocks to their properties and suggest uses for them 5. Explain how fossils are formed 6. BIOGRAPHY: Mary Anning 7. Investigate what soils are made from. 8. Information Text and LBQ Question Set

<ul style="list-style-type: none"> materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' certain found artefacts, like old bits of pottery or coins, are fossils a fossil is an actual piece of the extinct animal or plant soil and compost are the same thing. 	
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<p>Maths Links:</p>	
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<p>NC Objectives</p>	<p>Knowledge Content</p>	<p>Working Scientifically</p>
<p><i>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</i></p> <p><i>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</i></p> <p><i>Recognise that soils are made from rocks and organic matter.</i></p> <p><i>Working scientifically:</i></p> <p><i>Asking relevant questions and using different types of scientific enquiries to answer them.</i></p> <p><i>Setting up simple practical enquiries, comparative and fair tests.</i></p> <p><i>Making systematic and careful observations and, where appropriate, taking accurate</i></p>	<p>Rocks</p> <ul style="list-style-type: none"> Know the three natural types of rocks: igneous, sedimentary and metamorphic. Know that the Earth has a solid crust made up of tectonic plates with molten rock beneath. Igneous rocks are formed from the heat of lava or magma. They have large crystals. e.g. Granite and basalt Sedimentary rocks are formed from sediment (small pieces of rock and earth that settle at the bottom of a liquid i.e. water) being compressed by the weight of the liquid above and cementing over time. They are made of small grains. e.g. Limestone (chalk), coal and sandstone. Metamorphic rocks are formerly igneous or sedimentary rocks that have been changed at a chemical level due to intense heat from magma. e.g. Marble and slate. <p>Fossils</p> <ul style="list-style-type: none"> Know that a fossil is the hard remains of a prehistoric animal or plant that are found inside a rock Know that fossils are comprised of body fossils (animal bones) and chemical fossils (that contain carbon and prove life once existed such as imprints in the ground and leave trace fossils behind) and understand how fossils are formed. Know that fossils are only found in sedimentary rock and go through the same process of compression and cementation in the ground over long periods of time. 	<p><u>Scientific Enquiry:</u> Identifying, classifying & grouping Are all rocks made in the same way? <i>Using criteria, children sort rock samples (and pictures) into the three types.</i></p> <p>Know how to use a magnifying glass to identify features of the rock types. Identify if the rocks have grains or crystals.</p> <p>Know how to test a range of rocks for: Density (use comparative weight of similar sized rocks) Permeability/ impermeability (waterproof - pour a small amount of</p>

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.

- Know that it is very rare for living things to become fossilised. Usually after most animals die their bodies just rot away and nothing is left behind. However, under certain special conditions, a fossil can form.
- Know the sequence of fossil formation as:
- Animal dies and is buried by sediment
- Soft parts of the animal decay or decompose
- More sediment builds up around the animal and is compressed to form rock
- Bones start to be dissolved by water underground
- Minerals in the water then turn to rock

Mary Anning

- Know that Mary Anning is famous for finding many important fossils.
- Know that she was born in 1799 in Lyme Regis, Dorset which is near the coast.
- Know that 200 million years ago Dorset was beneath the sea.
- Know that her fossils helped us to understand more about prehistoric animals.
- Know the term palaeontology means 'a person who studies fossils'
- Know the term dinosaur comes from the Greek word deinos (terrible) and sauros (lizard) which, put together, makes 'terrible lizard.'
- Know that dinosaurs are actually reptiles not lizards.
- Learn about the discovery of the ichthyosaur skull and a complete plesiosaur and how this changed the view of the prehistoric (pre-written history) natural world.
- Know that previously people did not believe in dinosaurs as real, as there was no evidence. It also helped people realise the world was much older than previously thought.
- Video clips:
- <https://www.bbc.com/ideas/videos/the-girl-who-helped-discover-dinosaurs/p06bfr1s>
- <https://www.bbc.co.uk/programmes/p015gn8>

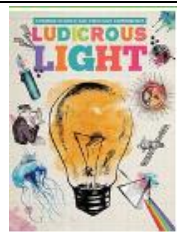
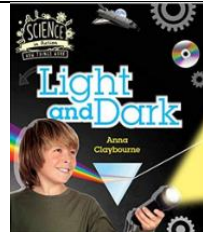
Soil

- Know that soil is a mixture of air, water, broken down rock matter and other organic material (dead or living animal tissue)

water and observe it is absorbed or runs off)
Strength (hard or soft - use a coin or similar object to scratch the rock and observe whether particles are easily dislodged).

To decide which rock group the rock belongs to based on the properties.

	<ul style="list-style-type: none"> • Know the names of common soil types: sand, clay and silt. • Know that sandy soil is dry and gritty, and does not hold onto water. • Silty soil is richer in nutrients and smoother to the touch. It has smaller particles (a tiny piece of matter) and it can retain water for longer but will eventually start to lose this. • Clay soil has the smallest particles and so absorbs more water. It is silky when wet but smooth and solid when dry. It contains the most nutrients as they cannot escape in water. Know that topsoil is dark in color and high in organic matter • Know that subsoil usually appears to be lighter in colour and has a sticky texture • Know that bedrock is the solid rock in the ground which supports all the soil above it. 	
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Term:	Y3- Autumn 2	Key Text(s):	 
Scientist Study:	N/A		
Unit Title:	<p>Physics: Light</p> <p><u>Context for study:</u> This unit is the first of two science units where pupils learn about light as part of the discipline of physics - the study of the processes that shape our world and how we use it. Pupils have a secure knowledge of the terms opaque, transparent and translucent. They know what plants need, including light, to grow well and how energy from light is the start of a food chain. This unit builds upon pupils' prior knowledge of materials as they recognise that shadows are formed when an opaque object blocks the light from a light source. Pupils find patterns in the way that the size of shadows changes. In Year 3, pupils learn we need light in order to see things and that dark is the absence of light. New learning includes that light is reflected from surfaces and it can be separated into a prism of colours. Pupils learn that light from the sun can be dangerous and that there are ways to protect their eyes. This is the precursor to work studied in Year 6 as pupils learn how shadows are formed. The knowledge acquired in this unit will help pupils to understand how light travels in straight lines and how the amount of light entering the eye is controlled by the pupil.</p>		

<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • Certain things produce light, usually by burning (e.g. the Sun) or electricity (e.g. street lights) • Shiny materials do not make light but do reflect it. • Shadows are caused when certain materials block light 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Light: Visible radiation which travels in waves, originating from primary light sources and reflecting off of secondary sources.</p> <p>Light Source: An object that gives off light. The main light source for the Earth is the Sun. Some other sources of light include torches, candles and lamps. Primary sources create light; Secondary sources reflect it.</p> <p>Dark / Darkness: An absence of light.</p> <p>Transparent: A property of a material where all lights passes through.</p> <p>Shiny Surface: Reflects light.</p> <p>Matt Surface: Does not reflect light. It is dull.</p> <p>Shadow: A shadow is formed when an object blocks out the light. The object must be opaque or translucent to make a shadow.</p> <p>Mirror: Highly polished, reflective surface (glass, metal or plastic) which allows a reflection to be clearly seen.</p> <p>Sunlight: Light created by the Sun (Our nearest star).</p> <p>Dangerous: Looking at direct sunlight can damage our eyes, possibly causing blindness.</p>
<p><u>Composite – The Big Idea</u></p> <p>Light allows us to see. It is created by primary sources of light such as the Sun. These primary sources can be natural or man-made. When light travels, it travels in straight lines. If it hits an object, light is reflected back, enabling us to see it. Opaque objects block light, causing shadows to form behind them. Shadow length changes depending on the distances between the source and object.</p> <p><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • we can still see even where there is an absence of any light • our eyes ‘get used to’ the dark 	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Identify light sources. 3. Identify whether an object is a light source or a reflector. 4. Explain light separation and prisms 5. Group objects according to whether they are transparent, translucent, or opaque. 6. Why do shadows change during the day? 7. Information Text and LBQ Question Set

<ul style="list-style-type: none"> the moon and reflective surfaces are light sources a transparent object is a light source shadows contain details of the object, such as facial features on their own shadow shadows result from objects giving off darkness. 	
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Maths Links:	
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NC Objectives	Knowledge Content	Working Scientifically
<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 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 find patterns in the way that the size of shadows change.</p> <p><i>Working scientifically:</i></p> <p><i>Asking relevant questions and using different types of scientific enquiries to answer them.</i></p>	<ul style="list-style-type: none"> Know that light is a form of energy Know that energy is needed to make things happen. Every movement or change, no matter how small, requires energy. Know that energy comes in different forms and can be neither created nor destroyed, only changed from one form to another. Know that we need light to see things and that darkness is the absence of light Know that light travels in straight lines Pupils should know that we require light to see and that darkness is the absence of light. Know that light is reflected from surfaces (smooth, shiny surfaces reflect light more efficiently), and is not the producer of the light source itself. Reflection of light is when we can see the light on another surface. Know that light reflects off objects and enters our eyes. This is how we see. Know that natural sources of light include - sun, stars, fire, lightning and bioluminescence in animals (such as fireflies) Know that there are man-made sources of light such as light bulbs, televisions, neon signs. Know that many light sources give off light and heat. Know that the Sun gives off light and heat Know that looking directly at the sun is dangerous, as the light is too strong. 	<p><u>Scientific Enquiry:</u></p> <p><u>Observing over Time</u></p> <p>Why do shadows change during the day?</p> <p><i>On a sunny day, using a metre stick, children note the changing length of a shadow thrown by a metre stick or other object.</i></p> <p>Take part in an experiment to see how the distance of the light source away from an opaque object changes the length of the shadow.</p> <p>Use a man-made light source to create the light for the shadow.</p> <p>Know that the further away the light source, the</p>

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.

- Understand that Ultraviolet (UV) light causes blindness or other long term vision problems and that eyes should be protected by covering with either a wide brimmed hat/cap or sunglasses.
- Know that a rainbow occurs when it is sunny and raining.
- Know that sometimes double rainbows can occur.
- Rainbows occur when the sun is low in the sky.
- Through teacher demonstration know that light can be separated with a prism into different colours.
- Know that white light consists of many different colours. These are - Red, Orange, Yellow, Green, Blue, Indigo, Violet. This is known as the spectrum of colours.
- This can be recalled with the mnemonic 'Richard of York Gave Battle In Vain'.
- Know that in a rainbow drops of rain act like a prism to create a rainbow.

Term	Definition	Example of material
Opaque	You cannot see through it	Wood, stone, metal
Translucent	Some light can pass through it but you cannot see clearly through it	some glass, some plastic, tissue paper
Transparent	You can see through it clearly	glass, plastic, cling film

- Understand that shadows are formed when an opaque object blocks light from passing through. This means it blocks out the light.
- Transparent and translucent objects let light through, creating no clear shadows.

smaller the shadow as less light is blocked.


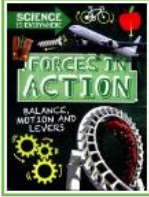
Know that the nearer the light source the larger the shadow as more light is blocked.

Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same.

Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc).

Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not

	yet been tested, but that can be tested through a scientific enquiry.
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Term:	Y3- Spring 1	Key Text(s):	 
Scientist Study:	N/A		
Unit Title:	Physics: Forces and Magnets		
	<p><u>Context for study:</u> This unit is the first of three science units where pupils study forces as part of the discipline of physics - the study of the processes that shape our world and how we use it. There are also many links to the discipline of Chemistry - the identification of the properties a substance is made from. Pupils have a secure knowledge of resistance and friction, are able to compare how things move on different surfaces and know that applying forces to objects can change their shape. This Year 3 unit builds on pupils' knowledge of how things move on different surfaces with a focus on the force friction. New learning is based on magnetism as pupils notice that some forces need contact between two objects, but magnetic forces can act at a distance. Pupils describe magnets as having two poles and observe how magnets attract or repel each other. Pupils further develop their knowledge of everyday materials as they compare and group according to whether they are attracted to a magnet, and identify some magnetic materials. The knowledge acquired in this unit will help pupils as they learn more about materials and their properties. This unit is the precursor to work in year 5 as pupils revise magnetism and learn about thermal and electrical conductivity.</p>		
<u>Prior Knowledge Requirements</u>	<u>Key Vocabulary for the Unit:</u>		
<ul style="list-style-type: none"> The shape of some materials can be changed when they are stretched, twisted, bent and squashed. Know how different toys move. Know what a force is and be able to explain that a push and pull are types of forces. 	<p>Forces: Power or energy used to move something, usually by pushing or pulling. Push: An object is moved away from something. Pull: An object is moved towards something. Contact Force: A push or pull which touches the object being moved. Non-Contact Force: A push or pull which does not touch the object being moved.</p>		

<ul style="list-style-type: none"> • That when forces are applied to an object, they allow them to move or stop moving. • The strength of the force determines how far and fast an object moves 	<p>Magnet: An object that has the power to pull items made of iron towards it. These can come in different shapes: bar, ring, button and horseshoe.</p> <p>Attract: Pulls objects together. Opposite poles attract (North and South).</p> <p>Repel: Repulsion is a force what pushes objects away from one another. Similar poles repel (North-North and South-South).</p> <p>Magnetic: Objects, which are attracted to a magnet, are magnetic. They usually contain the metals iron, nickel or cobalt.</p> <p>Magnetic Strength: The pull strength of a magnet.</p> <p>Pole: The North and South poles are opposite ends of a magnet. The magnetic field flows from North to South.</p> <p>Iron: A common type of metal, which is magnetic. The Earth’s magnetic field is due to the core and mantel being made out of iron.</p> <p>Surface: The top layer of something.</p> <p>Friction: A force acting between two surfaces moving, or trying to move, past each other.</p>
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<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>Forces are used to move things, usually by pushing or pulling an object. Magnets are objects which push or pull without physically touching the object, instead using magnetic fields, which attract or repel one another.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • the bigger the magnet the stronger it is • all metals are magnetic. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Explain the difference between push and pull forces 3. Explore how surface area affects friction (fair test – use adapted Lancashire Grid) 4. Investigate how magnets interact with one another. 5. Are all metals attracted to magnets? 6. Explain how magnets differ is size and strength. 7. LBQ Question Set
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<p style="text-align: center;"><u>Maths Links:</u></p>	
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NC Objectives	Knowledge Content	Working Scientifically
<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 predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> <p>Working scientifically: 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>Force</p> <ul style="list-style-type: none"> • Know that a force can be thought of as a push or a pull. • Know that there are three types of contact force: impact forces (when two surfaces collide), frictional forces (when two surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed). <p>Friction</p> <ul style="list-style-type: none"> • Know that the texture of a surface will affect how another object moves along that surface. • Know that smooth surfaces allow things to move quickly but rougher surfaces create a pull that keeps the object stuck there longer. • Know that the term motion means ‘moving from one place to another’ • Know that the force between two surfaces rubbing together is called friction. • Know that a balanced force is when two forces are equal and there is no motion. • Know that accelerate means to get faster. • Know that decelerate means to slow down. • Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force. <p>Magnetism</p> <ul style="list-style-type: none"> • Know that a magnet is a piece of iron or other material which attracts some metals towards it • Know that a magnet has two poles - North and South • Know that the word attract means one object pulling another object towards it • Know that repel means one object pushing another object away from it • Know that magnets have a magnetic field around them and that this is the area around a magnet where the magnetic forces work. • Understand that magnetic forces can work at a distance and do not need to have contact. Know that when materials are drawn to magnets this is called attraction. 	<p>Scientific Enquiry: Identifying, classifying & grouping Are all metals attracted to magnets?</p> <p>Children sort materials into magnetic and non-magnetic materials using a magnet and find other materials around the room that are magnetic.</p> <p>Plan an experiment comparing different materials, to see which are magnetic (they attract) and which are not (do not attract). Use wood, plastic, rubber, steel, iron, aluminium, glass and rock. Record results in a table.</p>

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.

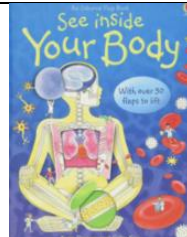
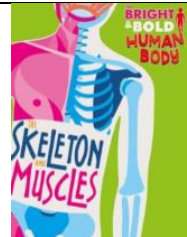
Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

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.

- Know that when materials are not drawn to magnets this is called repulsion.
- Know that magnets can come in different forms: horseshoe, ring, button, bar.
- Know the benefits of magnetic materials: sorting through different types of metals, keeping fridge doors sealed, attaching items to whiteboards without damaging them.

Term:	Y3- Spring 2	Key Text(s):	 
Scientist Study:	N/A		

Unit Title:	<p>Biology: Animals including Humans</p> <p>Context for study: This unit is the fourth of eight science units where pupils study animals, including humans, as part of the discipline of biology - the study of living organisms. Pupils have a secure knowledge of life cycles and what animals, including humans, need to survive and the importance of a healthy lifestyle. Pupils can identify and name a variety of animals. Pupils know the names of animals native to the sea, rivers and canals and the features that help them to live there. Pupils can use classification keys to help group, identify and name a variety of living things in their local and wider environment. In this Year 3 unit, pupils learn 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. Pupils further develop their knowledge of what humans need to thrive by learning about a balanced diet, including how sugar can cause tooth decay and obesity, the food groups and their role in human development. New learning includes how humans and some other animals have skeletons and muscles for support, protection and movement. This unit is the precursor to work in year 4 as pupils learn about the digestive system, teeth and food chains. The knowledge acquired in this unit will help pupils in Year 5 as they learn about puberty and gestation periods of animals before studying the circulatory system and dental structures in year 6.</p>
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<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> • What people need to be healthy (including food, water and sleep) • The names of the body parts (including head, arms, hands, legs etc) • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • Identify and name a variety of common animals that are carnivores, herbivores and omnivores • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) 	<p>Key Vocabulary for the Unit:</p> <p>Nutrition: Nutrition involves drinking enough water and eating the right amount of items from the five main food groups.</p> <p>Carbohydrates: Linked sugars which provide slow release of energy to the body.</p> <p>Sugars: The main source of energy used by all living things.</p> <p>Protein: Molecules which the body uses to create new tissues.</p> <p>Vitamins: Essential molecules needed by the body in order to stay healthy.</p> <p>Minerals: Naturally occurring chemicals which are needed to keep the body healthy and working.</p> <p>Fibre: Plant-based cellulose which helps aid human digestion.</p> <p>Fat: A major type of food store within bodies. Found in dairy products.</p> <p>Skeleton: The human skeleton is made of bone and grows as we grow. Our skull protects our brain and our ribs protect our heart and lungs.</p>
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<ul style="list-style-type: none"> Identify, name, draw and label the parts of the human body (including ear lobe, nostril, armpit etc) and say which part of the body is associated with each sense Identify how animals, including humans, have offspring which grow into adults The basic needs of animals, including humans, for survival (water, food and air) The importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	<p>Bones: Hard, rigid parts of the body used to support the body and work with muscles to provide movement and protection for vital organs.</p> <p>Muscles: Muscles are attached to bones by tendons and help them to move. When a muscle contracts it gets shorter and pulls on the bone it is attached to.</p> <p>Skulls: The main bone found in the heads of animals. The skulls contains and protects the brain.</p> <p>Ribs: Curved bones which form the rib cage. The rib cage is found in the chest area. It protects a person's internal organs from damage.</p> <p>Spine: Also known as your backbone, your spine is a strong, flexible column of ring-like bones that runs from your skull to your pelvis.</p>
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<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>All animals, including humans need the right types and amounts of nutrition (a balanced diet) in order to survive. Humans and other animals have skeletons and muscles for support, protection and movement.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> certain whole food groups like fats are 'bad' for you certain specific foods, like cheese are also 'bad' for you diet and fruit drinks are 'good' for you snakes are similar to worms, so they must also be invertebrates invertebrates have no form of skeleton. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (including LBQ vocabulary Question Sets where appropriate) Explore food groups and a balanced diet (links back to Y2). Explain how many portions of food from these different groups we should eat in a day. Create simple food chain and explain what it shows. Identify skeleton types within animals (endoskeleton, exoskeleton, hydro skeleton). Match a range of animals to their skeletons. Note similarities and differences between these. Identify the main functions of the human skeleton (movement, support and protection) alongside many of the key bones. 7. How does our body move and stand up? (Use skeleton model) Explain how muscles work (create model). Information Text and LBQ Question Set
<p style="text-align: center;"><u>Maths Links:</u></p>	

NC Objectives	Knowledge Content	Working Scientifically												
<p>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.</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p> <p>Working scientifically: 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, keys, bar charts, and tables.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or</p>	<ul style="list-style-type: none"> Animals, including humans, need food, water and air to survive. The arrows on a food chain show the direction that the energy travels. Know that all animals are consumers (they eat food but cannot create it themselves) and rely on a balanced diet to maintain their health. Consumers eat plants and some also eat other consumers. Know that plants are the only organisms that can make food for themselves using the sun's energy. <ul style="list-style-type: none"> The food that animals eat gives them nutrients for body health and maintenance. Know that nutrients are substances that help plants and animals to grow. Know that different food types provide different benefits for humans. Fruit and vegetables provide fibre, vitamins and minerals to keep body parts working properly and maintain health. Know that fibre consists of the parts of plants or seeds that your body cannot digest. Fibre is useful because it makes food pass quickly through your body. <ul style="list-style-type: none"> Know that vitamins are substances that you need in order to remain healthy which are found in foods. Know that vitamins are known by letters and know the following information about vitamins <table border="1" data-bbox="629 1091 1364 1281"> <thead> <tr> <th>Vitamin</th> <th>Food</th> <th>Main Role</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Milk, Cheese, butter</td> <td>Healthy vision and skin</td> </tr> <tr> <td>C</td> <td>Orange, Lemon, tomatoes</td> <td>Prevent infection</td> </tr> <tr> <td>D</td> <td>Milk, Cheese, Fish</td> <td>Helps bone development</td> </tr> </tbody> </table>	Vitamin	Food	Main Role	A	Milk, Cheese, butter	Healthy vision and skin	C	Orange, Lemon, tomatoes	Prevent infection	D	Milk, Cheese, Fish	Helps bone development	<p><u>Scientific Enquiry:</u> Research using secondary sources</p> <p>How does our body move and stand up? <i>Children use information from science encyclopaedias / textbooks to label a human skeleton and answer simple questions about it.</i></p> <p>Compare human skeletons with the skeletons of fish (tuna and shark), birds (owl and pigeon) and other mammals (blue whale, tiger, kangaroo).</p>
Vitamin	Food	Main Role												
A	Milk, Cheese, butter	Healthy vision and skin												
C	Orange, Lemon, tomatoes	Prevent infection												
D	Milk, Cheese, Fish	Helps bone development												


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.

- Meat, fish and eggs provide protein, which is needed for healthy muscle development and maintenance.
- Milk, cheese and yoghurt provide calcium, necessary for good bone and tooth development.
- Know that fibre/vitamin rich food should be 50% of each meal, protein around 30% and calcium around 20%.
- Know that high fat and sugary food does not provide any nutritional value, and can be harmful to health.
- Know that tooth decay is caused by an excess of sugar.
- Know that mammals have skeletons and that a human is a type of mammal.
- Know what a human skeleton looks like.
- Name key parts e.g. skull/cranium, rib cage, spine, pelvis, collar bone, spine, vertebra, patella/knee cap, cartilage.
- Know that birds, fish, amphibians and reptiles also have skeletons, and that skeletons are designed to keep bodies the correct shape and help movement, as well as offer protection of organs, such as the skull protects the brain and the rib cage protects the heart in humans.
- Bird bones are hollow, making them lighter, enabling birds to fly.
- Know that humans have muscles.
- Know the name and location of the following skeletal muscles in the body - abdominal, pectoral, bicep, tricep, hamstrings, calves.
- Know that the heart is a special type of muscle called cardiac muscle.
- Know that muscles are attached to the bones, and are responsible for movement.
- Know that when muscles contract and relaxing, that this is what causes movement.
- Know that joints occur where two bones meet and are able to move together e.g. knee, elbow.

<p>Term:</p> <p>Scientist Study:</p>	<p>Y3- Summer 1 & 2</p> <p>N/A</p>	<p>Key Text(s):</p>	
<p>Unit Title: Biology: Plants</p> <p>Context for study: This unit is the third of six science units where pupils learn about plants as part of the discipline of biology - the study of living organisms. Pupils are able to identify and name a variety of common wild and garden plants including deciduous and evergreen trees. Pupils are also able to identify and describe the basic structure of a variety of common flowering plants, including trees. During this unit, pupils revise a significant amount of knowledge from Year 2: the parts of a plant/tree; the function of each part of a plant; what seeds and plants need to grow and be healthy. This unit also reviews and builds upon pupils' knowledge of germination, pollination and life cycle diagrams. New learning includes seed formation and the four methods of seed dispersal. Pupils investigate the way in which water is transported within plants. The knowledge acquired in this unit will help pupils to group and classify living things in Year 4. This is the precursor to work studied in Year 5 when pupils construct food chains and in Year 6 when pupils study Linnaean classification, adaptations and sexual reproduction in plants.</p>			
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> • What Plants need to grow. • The names of some common garden plants (e.g. poppy, rose) and some common wild plants (e.g. daisy, dandelion, nettle). • The difference between Deciduous and Evergreen trees. • The parts of a plant may include: petals, fruits, roots, bulbs, seeds, stem, trunk and branches. 		<p>Key Vocabulary for the Unit:</p> <p>Leaves: Usually flat, green parts of a plant whose role is to capture sunlight in make sugar via photosynthesis.</p> <p>Photosynthesis: The process of making sugar using water, carbon dioxide and energy from sunlight.</p> <p>Deciduous: These are trees which shed (drop) their leaves in the Autumn and grow new ones in Spring. Example: Oak.</p> <p>Evergreen: These trees and plants do not lose their leaves in Autumn, instead they keep them all year round. Example: Conifer.</p> <p>Seed: Flowering plants produce seeds within fruits. The seed germinates, forming a root and shoot, growing into an adult plant.</p> <p>Seedling: A young, newly germinated plant from a seed, usually having a root, shoot and leaf.</p> <p>Seasonal Change: Changes to plant growth due to differences in the weather and temperature.</p>	

<ul style="list-style-type: none"> • The parts of plants we can eat (vegetables: leafy, root, stem, • flowering; fruit; grains, cereals, nuts and seeds) 	<p>Roots: The part of a plant which is found predominantly underground. Roots anchor the plant and absorb water and nutrients needed by the plant.</p> <p>Pollen: Fine grains from the male parts of flowers which fertilise eggs to create seeds.</p> <p>Pollination: The process where pollen from one plant is placed onto the female parts (stigma) of another plant.</p> <p>Seed Formation: The creation / growth of seeds from pollen and the eggs within flowers.</p> <p>Seed Dispersal: The ways in which seeds are scattered away from parent plants so that they are not in direct competition for resources.</p> <p>Germination: The growth of a root and shoot from a planted seed to form a seedling.</p> <p>Flowers: The bright, colourful parts of a plant consisting of petals and the male and female parts of a plant. They produce nectar (a sugary liquid) to attract insects to help in pollination.</p>
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<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>All plants start life as seeds, which must germinate (grow) underground to form adult plants. Many plants have flowers, whose role is to create off-spring in the form of seeds through a process called pollination.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • plants eat food • food comes from the soil via the roots • flowers are merely decorative rather than a vital part of the life cycle in reproduction • plants only need sunlight to keep them warm • roots suck in water which is then sucked up the stem. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Identify the main parts and functions of different flowering plants. 3. Describe the life cycle of a flowering plant. 4. Explain different methods of pollination in flowering plants. 5. Explain different methods of seed dispersal in flowering plants. 6. Do all plants need exactly the same things? 7. LBQ Question Set
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<p style="text-align: center;"><u>Maths Links:</u></p>	
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NC Objectives	Knowledge Content	Working Scientifically
<p><i>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</i></p> <p><i>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.</i></p> <p><i>Investigate the way in which water is transported within plants</i></p> <p><i>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</i></p> <p><i>Working scientifically: Asking relevant questions and using different types of scientific enquiries to answer them.</i></p> <p><i>Setting up simple practical enquiries, comparative and fair tests.</i></p> <p><i>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</i></p> <p><i>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</i></p>	<ul style="list-style-type: none"> • Know the following parts of a plant/tree (revision from Y2 unit) roots, stem, trunk, leaves and flower. • Know the function of each part of a plant (revision from Year 2). • Roots keep the plant secured within the ground and also collect water and nutrients from the soil. The stem keeps the plant upright and transports water to the leaves and flower head. The leaves collect energy from the sun to make into food. Plants are producers, as they make their food. • Know that flowering plants are any plant that produces a flower head or fruit. <p>• Know the life cycle of a plant as follows - Germination > Growth > Pollination > Seed Formation > Seed Dispersal > Germination</p> <p>Pollination, Seed formation and seed dispersal</p> <ul style="list-style-type: none"> • The flower is used to form seeds and attract animals for pollination. • Insects such as bees travel from flower-to-flower drinking nectar for energy. • Know that nectar is a sweet liquid produced by flowers, which bees and other insects collect. They collect pollen from one flower which sticks to their bodies. The grains of pollen from one plant stick to another plant and this begins the process of seed making. This is called pollination. • After pollination over a number of days, seeds begin to form in the flower head. When the seeds are developed, they are scattered away from the parent plant through a process called seed dispersal. • Know the importance of brightly coloured petals and flower heads as these colours can be seen by insects as ‘advertisements’ for food • Know the four methods of seed dispersal: 	<p><u>Scientific Enquiry:</u> Observing over Time Comparative & Fair Testing Do all plants need exactly the same things?</p> <p>Children give both a parsley plant and a small cactus minimal water over a two week period and observe the changes (perhaps drawing the result)</p> <p>Know that water travels through the stem of the plant.</p> <p>Use celery and coloured water to demonstrate the early stages of transpiration (water travelling through the plant.) Celery plants are mostly stems (as this is what we eat.)</p> <p>Set up the celery 72 hours prior to the session. Trim the root off the pieces, and place in dyed water. Red food colouring works better. Leave to allow the plant to soak up the dye.</p> <p>Cut open the celery and show a cross section of the</p>

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.

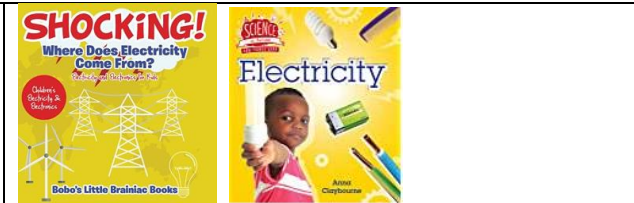
Method	Description	Examples of seeds
Wind Dispersal	seeds are blown to a new location	sycamore, dandelion
Water Dispersal	seeds float on water to a new location	coconut
Animal Dispersal	animals carry seeds either on their skin or in their stomachs after eating to a new location	blackberry, cherry, burdock
Explosion	dry seed pods crack open and the seeds fly out to a new location	poppy, laburnum

- Identify a cactus, tulip and Venus fly trap in photographs
- Know how a cactus plant is different from a tulip. Cactuses have thicker stems as they live in arid (dry) conditions whereas tulips grow in damp conditions where access to water is much easier. Cactus plants do not rely on insects for reproduction, whereas tulips have bright leaves to attract insects.

plant. Draw the cross section of the celery.

Know that a cross section is what you see if you cut through an object.

SCHEME OF WORK: YEAR 4

Term: Scientist Study:	Y4- Autumn 1 N/A	Key Text(s):	
Unit Title:	Physics: Electricity <u>Context for study:</u> This unit is the first of two science units where pupils learn about electricity as part of the discipline of physics - the study of the processes that shape our world and how we use it. Children will have limited prior knowledge before studying this unit. During this Year 4 unit, pupils identify common appliances that run on electricity and construct a simple series electrical circuit, identifying and naming its basic parts. Pupils investigate 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. Pupils recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. They recognise some common conductors and insulators, and associate metals with being good conductors. The knowledge acquired in this unit will help pupils to compare and group together everyday materials on the basis of their properties, in terms of conductivity, in Year 5. This is the precursor to work studied in Year 6 when pupils use recognised symbols when representing a simple circuit in a diagram. Pupils investigate the brightness of lamps or the volume of buzzers with the number and voltage of cells used in the circuit. Pupils compare and give reasons for variations in how components function.		
<u>Prior Knowledge Requirements</u> <ul style="list-style-type: none"> • Through play know which devices use electricity (battery and mains) and that the electricity provides the energy for the device to work. • Know some everyday devices which use electricity • Sources of light and sound may need electricity to work 	<u>Key Vocabulary for the Unit:</u> Electricity: The flow of electrons through conducting materials such as metal. Electrical Appliance: A machine which is powered by electricity. Mains: The electricity source from sockets within homes. This supply is more powerful than batteries and is generated by power stations. Electrical Circuit: A complete loop with no gaps or breaks of electrical components, linked by wires and containing a power source (cell / battery). Cell / Battery: A container that chemically stores electricity. They are used to power portable electrical appliances. Positive / Negative: The two, oppositely charged ends of a cell (battery).		

	<p>Short Circuit: A circuit with a cell / battery with no appliances to power. The wires dangerously overheat and the battery is quickly drained.</p> <p>Crocodile Clip: A metal, toothed clip used to join wires to electrical components.</p> <p>Bulb: An electrical device designed to create light.</p> <p>Switch: A device which allows the controlled breaking and completion of circuits in order to turn things on/off.</p> <p>Buzzer: An electrical device which makes a buzzing sound.</p> <p>Electrical Conductor: Some materials let electricity pass through them easily. These materials (mostly metals) are known as electrical conductors.</p> <p>Electrical Insulator: Some materials stop electricity passing through them.</p> <p>Electrical Symbol: Standardised ways of drawing electrical components.</p>
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>Electricity is the flow of electrons within materials. As they move, they generate electrical power which can be used to make things work. Electricity flows through closed / complete circuits, using wires to connect a power source to electrical components such as bulbs.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • electricity flows to bulbs, not through them • electricity flows out of both ends of a battery • electricity works by simply coming out of one end of a battery into the component. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Explore methods of powering electrical appliances 3. Identify situations when electricity can be dangerous. 4. Create a simple circuit 5. Does Electricity flow easily through all objects? 6. Explain how an electrical switch works. 7. Information Text and LBQ Question Set
<p style="text-align: center;"><u>Maths Links:</u></p>	

NC Objectives	Knowledge Content	Working Scientifically
<p><i>Identify common appliances that run on electricity.</i></p> <p><i>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</i></p> <p><i>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.</i></p> <p><i>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors</i></p> <p><i>Working scientifically: Asking relevant questions and using different types of scientific enquiries to answer them.</i></p> <p><i>Setting up simple practical enquiries, comparative and fair tests.</i></p> <p><i>Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</i></p>	<ul style="list-style-type: none"> • Know appliances that run on electricity in school and at home and those that do not. • Know the difference between mains electricity and battery powered electricity. • Know that electricity is dangerous, and know how to be safe using it. • Identify the hazards that might be faced in the home. <ol style="list-style-type: none"> 1. Overloaded plug extension sockets, 2. Exposed wires, 3. Damaged sockets, 4. Wires left along the carpet for people to trip over, 5. Electrical appliances and wires near water, 6. Placing metal into electrical appliances or open sockets • Know how to prevent these hazards and know not to touch anything they feel is unsafe. • Know how electricity travels through a circuit, and the various components that create a circuit (Battery, cell, open and closed switches, buzzer, lamp, motor, wire and voltmeter.) Note: all batteries are cells, but not all cells are batteries. • A cell is a power source, a battery is a power source that uses chemical reactions to generate power. • Know how to create simple circuits using a battery, a bulb and a switch. • Know that an open switch will not complete the circuit and that a closed switch will complete the circuit. • Know that electricity must be able to flow around the circuit for components to work. • Know that the word current describes the flow of electricity in a circuit. 	<p><u>Scientific Enquiry:</u> Identifying, classifying & grouping Comparative & Fair Testing Does Electricity flow easily through all objects? <i>Children to create a small circuit to test whether objects are conductors or insulators (e.g. circuit with bulb which lights when a gap in the circuit is bridged.)</i></p> <p>Know that conductors allow electricity to pass through them and that insulators prevent the passage of electricity.</p> <p>Know that metals such as copper, iron and steel make good conductors. Know that wood, plastic, paper and rubber are insulators.</p> <p>Identify materials that are conductors and insulators. (Children should know which materials are insulators and conductors prior to the investigation.</p> <p>Plan an investigation to check the conductive</p>

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.

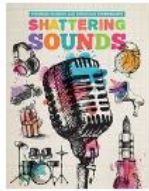

Identifying differences, similarities or changes related to simple scientific ideas and processes.

Using straightforward scientific evidence to answer questions or to support their findings.

- Know if the following circuits work or not.
- A complete circuit without switches.
- A circuit with wires not connected to the cell on one side.
- A complete circuit with an open switch.
- 4. A complete circuit with a closed switch.

properties of materials, with pupils predicting that metals will allow a circuit to be complete, but that other materials will not.

Test the predictions and record in a table.

Term:	Y4- Autumn 2	Key Text(s):	 
Scientist Study:	N/A		

Unit Title:	<p>Physics: Sound</p> <p>Context for study: This is a stand-alone unit where pupils learn about sound as part of the discipline of physics - the study of the processes that shape our world and how we use it. It is important to assume that all pupils have very little prior knowledge in this unit. During teaching, extra attention must be given to explicitly teaching the precise meaning of subject specific vocabulary as pupils may be unfamiliar with this. This unit does not link directly with any future science teaching so it is important that knowledge is secured during the unit. In Year 4, pupils identify how sounds are made and recognise that vibrations from sounds travel through a medium to the ear. Learning includes the anatomy of the human ear. The knowledge of sound acquired in this unit will help pupils find patterns between the pitch of a sound and features of the object that produced it. It also helps pupils find patterns between the volume of a sound and the strength of the vibrations that produced it. Pupils will know that sounds get fainter as the distance from the sound source increases.</p>
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<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> Hearing is one of our five senses. We use our ears to hear. Sounds vary – loud, quiet, high pitch, low pitch. Sounds can be combined using musical instruments. From Music, pupils will be aware of pitch, tempo and pulse. 	<p>Key Vocabulary for the Unit:</p> <p>Sound: Noise created from the vibrations of mediums such as air and water.</p> <p>Source: The place where the sound wave is first created.</p> <p>Vibrate / Vibration: Vibrations backwards and forwards movements caused when a medium such as air wobbles in the form of sound waves.</p> <p>Pitch (High / Low): A high sound has a high pitch and a low sound has a low pitch. A tight drum skin gives a higher pitched sound than a loose drum skin.</p> <p>Volume: How loud or quiet something is.</p> <p>Faint: Very low volume sounds that are difficult to detect.</p> <p>Loud: Very noisy sounds that are easy to detect.</p> <p>Insulation: Protecting something by surrounding it with material that reduces or prevents the transmission of sound.</p> <p>Ear: An organ of the body designed to detect sound waves.</p> <p>Sound Wave: The continuous vibrations of a medium moving away from the source.</p> <p>Frequency: Frequency is measured as the number of wave cycles that occur in one second. More waves means a higher frequency. This is linked to pitch.</p>
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<p><u>Composite – The Big Idea</u> Sound is created from a source and travels outwards in the form of a sound wave in all directions. Sound waves are caused by vibrating molecules in either solids, liquids or gases. Bigger sound waves create louder sounds and longer wave lengths create lower frequencies (pitches). Sounds are detected by the ears of animals.</p> <p><u>Common Misconceptions</u> Some children may think:</p> <ul style="list-style-type: none"> • sound is only heard by the listener • sound only travels in one direction from the source • sound can't travel through solids and liquids • high sounds are loud and low sounds are quiet. 	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc. LBQ vocab QS where appropriate) 2. Explain how sounds are made and how they travel. 3. Describe how sounds waves are detected by the ear 4. Explore how the pitch of sound changes 5. Explain the volume of a sound can change 6. How do instruments make different sounds? 7. Investigate the relationship between distance and volume (Graphing: Line graph). 8. Information Text and LBQ Question Set
<u>Maths Links:</u>	

NC Objectives	Knowledge Content	Working Scientifically
<p><i>Identify how sounds are made, associating some of them with something vibrating.</i></p> <p><i>Recognise that vibrations from sounds travel through a medium to the ear.</i></p> <p><i>Find patterns between the pitch of a sound and features of the object that produced it.</i></p>	<p>Sound</p> <ul style="list-style-type: none"> • Know sounds are made when something vibrates. • Know that vibrate means to shake with repeated small quick movements. • Metal vibrates when it is struck, vocal chords inside our throat vibrate when we speak. This causes the air around the source of the sound to vibrate. The vibration travels through the air to our ear in a wave. Sound waves can travel through solids (such as metal, stone and wood), liquids (such as water) and gases (such as air). • Know that sound travels in longitudinal waves as each particle pushes the particles next to it. 	<p><u>Scientific Enquiry:</u> <u>Pattern Seeking</u> How do instruments make different sounds? <i>Children to play a guitar or flute with different notes to show how different vibrations make notes of different pitch.</i></p>

Find patterns between the volume of a sound and the strength of the vibrations that produced it.

Recognise that sounds get fainter as the distance from the sound source increases.

- Know that where there is no gas, there is no sound. Sound cannot travel through space as there is no air. This is called a vacuum.

Anatomy of the ear

- Know the structure/ anatomy of the human ear.
- Know that the ear consists of the outer ear and inner ear.
- Know that the eardrum is a thin piece of stretched skin inside the ear, which vibrates. These vibrations then travel through a sequence of small bones (the smallest bones in the human body).
- These bones connect to the cochlea.
- The cochlea looks like a snail shell (the word 'cochlea' means snail in Ancient Greek).
- Small hairs in the cochlea convert the vibrations into nerve impulses, which send information to the brain for processing.

Pitch

- Know that pitch is how high or low a sound is.
- Know that the following words would be used to describe low and high pitch sound.

Low Pitch	squeak, squeal,
High Pitch	rumble, grunt, boom

- Know that pitch and volume are different - volume is how loud or quiet a sound is.
- Know that there are high pitches and low pitches.
- A short string gives a higher-pitched sound than a long string when they are plucked.
- A tight drum skin gives a higher-pitched sound than a loose drum skin.

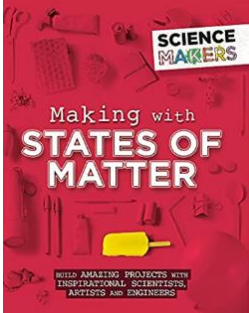
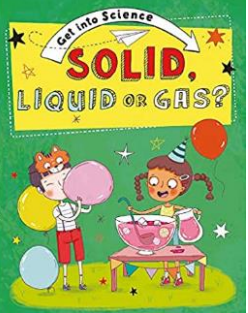
Demonstrate that sound can travel through gas and liquid.

Scratch a desk and listen to the sound through the air and then place your ear on the desk and listen again.

Know that the sound is louder when it travels through the desk.

Volume

- Know that the volume of a sound is how loud or quiet a sound is.
- Know that the stronger the vibrations the louder the sound.
- The weaker the vibrations the quieter the sound. Know that as sounds travel the vibrations become weaker, because they run out of energy.
- This means that the volume of the sound will decrease the further away a sound is from an ear to hear it (investigation – requires a loud, continuous, single-pitch sound: [Use YouTube: Vacuum Cleaner – White Noise Sound / Sleep Trick – Best for Babies \(8 Hours\)](#))

<p>Term:</p> <p>Scientist Study:</p>	<p>Y4- Spring 1</p> <p>N/A</p>	<p>Key Text(s):</p>		
<p>Unit Title:</p>	<p>Chemistry: States of Matter</p> <p>Context for study:</p> <p>This unit is the fourth of five science units where pupils study materials as part of the discipline of chemistry - the identification of the properties a substance is made from. It is also the study of forces as part of the discipline of physics – the study of the processes that shape our world and how we use it. Pupils have a secure knowledge of the properties of materials and can identify and compare the suitability of a variety of everyday materials. Previous learning includes comparing how things move on different surfaces and pupils know that squashing, bending, twisting and stretching can change the shapes of some solid objects. Pupils have studied the work of John Dunlop and Mary Anning. Pupils can compare and group different kinds of rocks on the basis of their appearance and simple physical properties. Pupils know how fossils are formed and recognise that soils are made from rocks and organic matter. This year 4 unit builds on pupils’ knowledge of properties of materials as pupils learn about states of matter. Pupils compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>New learning includes that some materials change state depending on their temperature (heated or cooled). Pupils will take measurements or use research to determine the temperature at which this happens in degrees Celsius (°C). The knowledge acquired during this unit will help pupils understand the water cycle in Geography: the parts played by evaporation and condensation, including associating the rate of evaporation with temperature. This unit is the precursor to work studied in Year 5 pupils learn about dissolving, mixing and changes of state, and reversible and irreversible changes. Pupils also build on previous knowledge of magnetic and non-magnetic metals.</p>			

<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • Some materials are heavier than others even though they are the same size e.g. medicine ball in PE. • Materials change when heated or cooled – observations of cooking / freezing e.g. ice-cream / puddles disappearing. • Some changes can be reversed – observations of snow melting / ice. 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Solid: A substance that stays the same shape. Its particles do not move</p> <p>Liquid: Liquids will flow, it is made up of loosely packed particles.</p> <p>Gas: Gaseous matter is made up of matter that is so loose that it is always moving.</p> <p>State Change: Materials changing between solids, liquids and gases through freezing, melting, evaporation and condensation.</p> <p>Melting: Change in state from solid to liquid. The temperature at which this occurs is a material's 'melting point'.</p> <p>Freezing: Change in state from liquid to solid.</p> <p>Boiling Point: The temperature where a liquid begins to turn into a gas (vapour).</p> <p>Evaporation: Change in state from liquid into gas.</p> <p>Condensation: When water vapour that is around us changes from a gas back to water.</p> <p>Temperature: The amount of heat in a substance or object.</p> <p>Water Cycle: The continuous cycle of evaporation, condensation and precipitation of water around the world.</p> <p>Water Vapour: Water that is in the form of gas.</p> <p>Precipitation: Any watery substance such as rain, snow, hail or sleet that falls to Earth.</p> <p>Surface Run-Off: Surface water which travels across the land, flowing into streams and rivers.</p>
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>Matter can exist in different forms – solids, liquids and gases. As temperature changes, these forms (states of matter) can change through processes such as freezing and melting and evaporation and condensation. All water on Earth is part of the hydrological (water) cycle, a process responsible for clouds, rain (precipitation) and rivers.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • 'solid' is another word for hard or opaque • solids are hard and cannot break or change shape easily and are often in one piece 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Group substances according to whether they are solid, liquids or gases. 3. Explain how materials change state. 4. Research the melting and boiling points of different materials. 5. Explain the water cycle 6. Does water always evaporate at the same speed? 7. Information Texts and LBQ Question Set

- substances made of very small particles like sugar or sand cannot be solids
- particles in liquids are further apart than in solids and they take up more space
- when air is pumped into balloons, they become lighter
- water in different forms – steam, water, ice – are all different substances

Maths Links:

NC Objectives	Knowledge Content	Working Scientifically						
<p><i>Compare and group materials together, according to whether they are solids, liquids or gases.</i></p> <p><i>Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</i></p> <p><i>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</i></p> <p><i>Working scientifically:</i></p> <p><i>Asking relevant questions and using different types of scientific enquiries to answer them.</i></p> <p><i>Setting up simple practical enquiries, comparative and fair tests.</i></p>	<ul style="list-style-type: none"> • Know that everything is made up of tiny particles. • The properties of a substance depend on what its particles are like, how they move, and how they are arranged. • Most substances can exist in three states: solid, liquid and gas. • In a solid state the vibrating particles form a regular pattern. This explains the fixed shape of a solid and why it can't be compressed or poured. • In a liquid the particles still touch their neighbours but they move around, sliding over each other. This is why you can pour, but not compress (squash), a liquid. • In the gas state, widely-spaced particles move around randomly. This explains why you can compress gases and why they flow. <ul style="list-style-type: none"> • Identify the following solids, liquids and gases at room temperature. Know that room temperature means neither heated nor cooled. Watch video clip at: http://www.bbc.co.uk/guides/zqpv7p3#zh4fy4j <table border="1" data-bbox="584 1193 1039 1393"> <thead> <tr> <th>Solid (at room temperature)</th> <th>Liquid (at room temperature)</th> <th>Gas (at room temperature)</th> </tr> </thead> <tbody> <tr> <td>Wood Iron Copper Plastic</td> <td>water milk blood oil</td> <td>oxygen carbon dioxide nitrogen steam</td> </tr> </tbody> </table>	Solid (at room temperature)	Liquid (at room temperature)	Gas (at room temperature)	Wood Iron Copper Plastic	water milk blood oil	oxygen carbon dioxide nitrogen steam	<p>Scientific Enquiry:</p> <p>Observing over Time</p> <p>Comparative & Fair Testing</p> <p>Does water always evaporate at the same speed?</p> <p><i>Children to observe and record as ice melts in different conditions (e.g. outside vs radiator, wrapped in insulation vs not)</i></p> <p>Measure the temperatures as the solids are heated using a thermometer.</p>
Solid (at room temperature)	Liquid (at room temperature)	Gas (at room temperature)						
Wood Iron Copper Plastic	water milk blood oil	oxygen carbon dioxide nitrogen steam						

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.

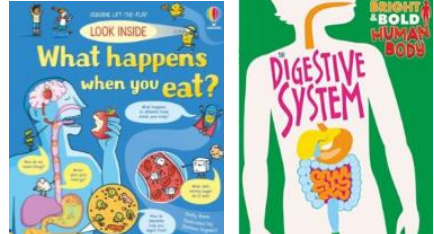
Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

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.

- Know that air is a collection of gases (not a single gas) and it contains - 78% nitrogen, 21% oxygen and a small amount of other gases including carbon dioxide.
- Know that steam and smoke are not the same thing.
- Know that steam is water in gas form and that smoke comes from burning solid material.
- Know that when atoms are heated, the bonds between them break, allowing for solids to become liquids, and liquids to become gases.
- Know that when materials are cooled, bonds are created in air to form liquids, and bonds are strengthened and become rigid, creating solids from liquids.
- Know that we measure temperature using degrees Celsius (°C)
- Know that in many countries they use a Fahrenheit scale.
- Compare the two scales.
- Know that condensation is the name of the process when water vapour changes into liquid through cooling.
- Know that condensation also refers to the liquid as it appears on windows on a cold day. Know that as water condenses clouds form in the sky.
- When it is cool enough, and a vast amount of water has formed, it falls in the form of rain and is called precipitation.
- Know that water can exist in all three states. (Use the word water vapour alongside steam).
- Understand that water will change from a liquid to a solid when cooled to 0°C and that this is the freezing process. When ice melts, it becomes liquid which becomes part of the water cycle again.

<p>Term:</p> <p>Scientist Study:</p>	<p>Y4- Spring 2</p> <p>N/A</p>	<p>Key Text(s):</p>	
<p>Unit Title: Biology: Animals including Humans</p> <p>Context for study: This unit is the sixth of eight science units where pupils study animals, including humans, as part of the discipline of biology - the study of living organisms. Pupils have a secure knowledge of life cycles and what animals, including humans, need to survive. Pupils know the importance of a healthy lifestyle, including a balanced diet and the effects of sugar, the food groups and their role in human development. Pupils can identify and name a variety of animals, including the names of animals native to the sea, rivers and canals and the features that help them to live there. Pupils can use classification keys to help group, identify and name a variety of living things in their local and wider environment. Pupils know that humans and some other animals have skeletons and muscles for support, protection and movement. In this Year 4 unit, pupils learn about the simple functions of the basic parts of the digestive system in humans. New learning includes identifying the different types of teeth in humans and their simple functions. Pupils construct and interpret a variety of food chains, identifying producers, predators and prey. This unit is the precursor to work in year 5 as pupils learn about puberty and gestation periods of animals. The knowledge acquired in this unit will help pupils in Year 6 to learn about the circulatory system and dental structures.</p>			
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> • How to be healthy by eating well and staying clean. • Know the names for the main parts of the body. • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. 		<p>Key Vocabulary for the Unit:</p> <p>Digestive System: A series of linked organs which work together to break down food and drink.</p> <p>Digestion: The process of breaking down food to acquire energy and nutrients.</p> <p>Mouth: The part of the body where food and drink enters.</p> <p>Teeth: Hard, enamel covered parts of the mouth, used for biting, ripping and chewing food.</p> <p>Saliva: A liquid containing starch dissolving enzymes produced in the salivary glands in the mouth.</p> <p>Oesophagus: The oesophagus is like a stretchy tube that moves food from the back of the throat to the stomach.</p> <p>Stomach: An organ containing acid and amylase, where food proteins are digested.</p> <p>Small Intestine: The main function of the small intestine is absorption of nutrients and minerals from food.</p> <p>Pancreas: The pancreas produces juices called enzymes which helps the body digest food.</p> <p>Nutrients: Vitamins and minerals needed to keep people healthy.</p>	

<ul style="list-style-type: none"> 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. Animals, including humans, have offspring which grow into adults. Know the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 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. Humans and some other animals have skeletons and muscles for support, protection and movement. 	<p>Large Intestine: The major function of the large intestine is to absorb water from the remaining indigestible food.</p> <p>Rectum: The part of the intestines where faeces is stored and compacted.</p> <p>Anus: The part of the digestive system where solid food waste leaves the body.</p> <p>Prey: The term prey refers to an animal that is sought, captured, and eaten by a predator.</p> <p>Teeth: Hard, calcified objects in the mouth used for biting, cutting and tearing food.</p> <p>Incisor: Narrow teeth at the front of the mouth for cutting.</p> <p>Canine: Pointy teeth that tear your food.</p> <p>Molar: Molars are the teeth that are used for chewing and grinding our food.</p> <p>Premolars: Wide back teeth for grinding food.</p> <p>Herbivore: An animal that only eats plants.</p> <p>Carnivore: An animal that only eats meat.</p> <p>Omnivore: An animal that eats both plants and meat.</p> <p>Producer: Something that creates its own food (usually plants).</p> <p>Predator: Predators are wild animals that hunt, or prey on, other animals. Predator animals need the flesh of the animals that they kill to survive.</p> <p>Food Chain: A food chain is a diagram that shows us how animals are linked by what they eat, starting with a producer.</p> <p>Organ: The skin is the biggest organ of your body. Other organs include your brain, lungs, heart, liver, stomach, intestines, pancreas, and kidneys, and they're called internal organs.</p> <p>Consumer: Something that eats another living thing.</p>
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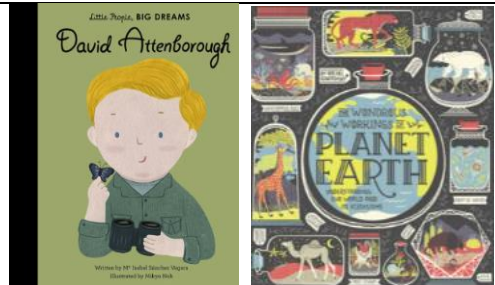
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>All living things need food and water. Some, such as plants produce their own food (sugar), whilst others eat other living things to acquire this energy, forming food chains. Animals, including humans have digestive systems, which are linked organs responsible for breaking down food into sugars, proteins and nutrients, alongside removing waste from the body.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> arrows in a food chain mean 'eats' 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc. LBQ vocab QS where appropriate) Locate the main organs of the human digestive system and explain their functions. Model the process of digestion from mouth to anus in humans. Identify the different types of human teeth and explain their functions. Explain how we can look after our teeth (links to PSHCE). Working scientifically investigation: How do different liquids affect our teeth? (Eggshell teeth modelling) Create food chains and food webs. Information Texts and LBQ Question Set
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<ul style="list-style-type: none"> • the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain • there is always plenty of food for wild animals • your stomach is where your belly button is • food is digested only in the stomach • when you have a meal, your food goes down one tube and your drink down another • the food you eat becomes “poo” and the drink becomes “wee”. 	
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Maths Links:

NC Objectives	Knowledge Content	Working Scientifically
<p><i>Describe the simple functions of the basic parts of the digestive system in humans</i></p> <p><i>Identify the different types of teeth in humans and their simple functions</i></p> <p><i>Construct and interpret a variety of food chains, identifying producers, predators and prey.</i></p> <p><i>Working scientifically:</i></p> <p><i>Asking relevant questions and using different types of scientific enquiries to answer them.</i></p> <p><i>Setting up simple practical enquiries, comparative and fair tests.</i></p> <p><i>Making systematic and careful observations and, where appropriate, taking accurate</i></p>	<ul style="list-style-type: none"> • Know that digestion is the breaking down of food mechanically in the mouth before chemically in the stomach. • Know that the mouth, tongue, teeth, oesophagus (sometimes spelled oesophagus), stomach, small and large intestine make up the human digestive system. • Know where each part is within the human body. • Know the function of each part – <ul style="list-style-type: none"> ○ Mouth: food enters the digestive system and is mixed with saliva to make it softer ○ Tongue: moves food around to be broken down. ○ Teeth: break down the food so it can travel through the oesophagus. ○ Oesophagus: moves food from the mouth to the stomach. ○ Stomach: uses chemicals to break down the food into small parts before passing on to the small intestine. ○ Small intestine: digested food here is passed into the bloodstream where it can be taken to the body parts that require it. ○ Large intestine: any food leftover is unwanted, and is passed along the large intestine to the rectum. • Know that, without digestion, we could not absorb nutrients from food into our bodies and use them. 	<p><u>Scientific Enquiry:</u> Comparative & Fair Testing Research using secondary sources</p> <p>Compare the teeth of humans with carnivores and herbivores. Know that carnivores eat only meat. Their teeth have more canines as they will rip and tear food more. e.g. Lion’s teeth. Know that herbivores eat only plant life. Their teeth have more molars as they grind and break down vegetation more. e.g Zebra’s teeth. Know that humans are omnivores and have a more</p>

<p><i>measurements using standard units, using a range of equipment, including thermometers and data loggers.</i></p> <p><i>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</i></p> <p><i>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</i></p> <p><i>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</i></p> <p><i>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</i></p> <p><i>Identifying differences, similarities or changes related to simple scientific ideas and processes.</i></p> <p><i>Using straightforward scientific evidence to answer questions or to support their findings.</i></p>	<p>Teeth</p> <ul style="list-style-type: none"> • Know that there are different teeth for different purposes. • Incisors: the front teeth help bite off chunks of food to be broken down. • Canines: pointed teeth designed to rip and tear meat and fish. (Premolars and) • Molars: flatter, thicker teeth at the back of the mouth designed to crush and grind food. Know that you get two sets of teeth during your lifetime - the first set is often called the milk or baby teeth. • Know that a child has 20 teeth and an adult has 32. • Know that adults have wisdom teeth which grow at the end of each row of teeth. These are often removed in adults because they can affect the growth of the teeth nearby and can be painful. • Know that it is important to look after teeth by brushing at least twice a day for two minutes at a time. It is important to use toothpaste which contains fluoride as this protects teeth from tooth decay. • Know that you can also use mouthwash and dental floss to help look after your teeth. <p>Food Chains</p> <ul style="list-style-type: none"> • Know that a food chain is a series of living things which are linked to each other because each thing feeds on the one next to it in the series. • Know that plants are producers, and create their own food through a process called photosynthesis • Know that all animals are consumers, they eat food (either plants or other animals) rather than produce their own (as plants are able to) • Know that prey are animals that are consumed by other animals and predators are animals that consume other animals. • Understand that some animals can be both predator and prey (e.g. a baboon eats grasshoppers but is eaten by a leopard) • Know the following food chains: • Plant Roots (producer) -> Zebra (prey) -> Lion (predator) Green shoots (producer) -> antelope (prey) -> crocodile (predator) • Grass (producer) -> grasshopper (prey) -> Baboon (predator + prey) -> Leopard (predator). Grass (producer) -> cow (prey) -> human (predator). 	<p>balanced diet of plants and animals.</p> <p>Know that acidic foods and liquids damage tooth enamel.</p>
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<p>Term:</p> <p>Scientist Study: BIOGRAPHY</p>	<p>Y4- Summer 1 & 2</p> <p>Sir David Attenborough (1926-Present) English broadcaster and natural historian, known for his work within the BBC's Natural History Unit, fronting productions such as Planet Earth II and Blue Planet II.</p>	<p>Key Text(s):</p>	
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<p>Unit Title:</p>	<p>Biology: Living Things and their Habitats</p> <p>Context for study: This unit is the fourth of six science units where pupils learn about plants and animals as part of the discipline of biology- the study of living organisms. Pupils have a secure knowledge of the functions of the different parts of flowering plants and the requirements of plants for life and growth. They know how water is transported within plants and the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. This Year 4 unit builds upon pupils' prior knowledge of plants as they identify and name a variety of living things in their local and wider environment. Pupils group living things and begin to use classification keys for flowers (flowering and nonflowering). Animals are classified into warm blooded and cold-blooded, vertebrates and invertebrates. New learning includes knowing the names of common woodland species, which builds on knowledge from the Blue Planet topic in Year 3. Pupils learn that environments can change and that this can sometimes pose dangers to living things. The knowledge of plants acquired in this unit will help pupils at the end of Year 4 to construct and interpret a variety of food chains, identifying producers, predators and prey. This is the precursor to work studied in Year 5 as pupils identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. They will also describe the life process of reproduction in some plants and animals. This links to work studied in Year 6 when pupils study Linnaean classification, adaptations and sexual reproduction in plants.</p>
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<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> Animals can be grouped into vertebrates (and then further into fish, reptiles, amphibians, birds and mammals) and invertebrates. Animals can be grouped into carnivores, herbivores and omnivores 	<p>Key Vocabulary for the Unit:</p> <p>Classification Key: Living organisms can be sorted and identified using 'Yes/No' questions to identify them.</p> <p>Environment: An area containing many different habitats, including both living things and non-living features. Examples: Desert, Forest.</p> <p>Habitat: The specific area or place in which a living things both live, breed and obtain food and drink from.</p> <p>Human Impact: Changed caused to environments by human activities.</p> <p>Species: A specific type of living thing. Example: A rat is a species of rodent (type of mammal).</p> <p>Life Process: Seven essential features needed for living (See: MRS GREN).</p>
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- The names of some common wild and garden plants and deciduous and evergreen trees.
- Examples of habitats (including microhabitats) and the animals and plants that can be found there.
- Living things depend on each other to survive.
- How food chains and food webs work.

Seasonal Change: Changes to plant growth due to differences in the weather and temperature.

Hibernate: Animals enter a deep, extended sleep during winter months in order to avoid the cold and starvation due to a lack of food.

Migration: Animals and birds, who travel to other places, sometimes thousands of miles away, to avoid winter cold and food shortages.

Vertebrate: Animals that have a backbone (examples: fish, mammals, birds, reptiles, amphibians).

Invertebrate: Animals that do not have a backbone (examples: molluscs, insects, arachnids, worms).

Warm-Blooded: Animals who generate their own body heat to keep a constant body temperature.

Cold-Blooded: Animals whose bodies are the same temperature as their surroundings.

Flowering Plant: Plants, which produce flowers and fruits.

Non-Flowering Plant: Plants, which do not produce flowers (ferns, mosses).

(Additional linked to plant identification)

Leaf Arrangement: The positioning of individual leaves on stalks. They can be whorled in circular patterns, opposite or alternating.

Leaf Edge: The outer edge of a leaf. These are usually smooth or jagged (serrated).

Simple Leaves: Leaves formed from a single leaf structure.

Compound Leaves: Leaves formed from many leaflets.

Leaf Veins: Small tubes criss-crossing leaves which carry water and sugar.

Composite – The Big Idea

All living things (organisms) change and are affected by the environments in which they live. They can also be grouped in different ways – for example: Animals, Plants, Fungi etc., which in turn can be split into smaller groups, creating a ‘tree like’ diagram. Living things can also be identified through their features using identification / classification keys.

Common Misconceptions

Some children may think:

- the death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain

Components – Sequence of Learning

1. Retrieval of previous learning – see above
Introduce and explore knowledge organiser
Teach new Vocabulary (inc LBQ vocab QS where appropriate)
2. Identify whether an animal is a vertebrate or an invertebrate.
3. **Are some animals more alike than others? (Explore methods of sorting animals, including Venn Diagrams)**
4. Group and identify animals according to whether they are fish, amphibians, reptiles, birds or mammals.
5. Explore and create classification keys for animals.
6. Undertake a local wildlife survey within the school grounds / local environment, using identification keys and linking this to the environments in which they live (include pond where feasible).
7. Classify and group plants (flowering and non-flowering).

<ul style="list-style-type: none"> • there is always plenty of food for wild animals • animals are only land-living creatures • animals and plants can adapt to their habitats, however they change • all changes to habitats are negative. 	<p>8. Explain the reasons for environmental change, both natural (including hibernation and migration) and human impact. Focussed study on the reasons for deforestation and its negative effects upon the habitats and the wider environment.</p> <p>9. BIOGRAPHY: Sir David Attenborough</p> <p>10. Information Text and LBQ Question Set</p>
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<p>Maths Links:</p>	
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<p>NC Objectives</p>	<p>Knowledge Content</p>	<p>Working Scientifically</p>									
<p><i>Recognise that living things can be grouped in a variety of ways</i></p> <p><i>Explore and use classification keys to help group</i></p> <p><i>Identify and name a variety of living things in their local and wider environment</i></p> <p><i>Recognise that environments can change and that this can sometimes pose dangers to living things.</i></p> <p><i>Working scientifically:</i></p> <p><i>Asking relevant questions and using different types of scientific enquiries to answer them.</i></p> <p><i>Setting up simple practical enquiries, comparative and fair tests.</i></p> <p><i>Making systematic and careful observations and, where appropriate, taking accurate</i></p>	<p>Grouping plants and animals</p> <ul style="list-style-type: none"> • Know that animals and plants can be put into different groups this is called classification. • Warm Blooded vs Cold Blooded • Know that animals can be divided into warm and cold blooded <table border="1" data-bbox="584 826 1415 1078"> <thead> <tr> <th>Type</th> <th>Definition</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>Warm Blooded</td> <td>Animals that can make their own body heat even when it is cold outside</td> <td>Humans, mammals, birds</td> </tr> <tr> <td>Cold Blooded</td> <td>Animals that cannot make their own heat. They need the sun's warmth to heat their bodies.</td> <td>reptiles, amphibians, fish</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Know that animals can be classified into vertebrates and invertebrates. • Know that vertebrates are animals with a backbone and that invertebrates have no backbone and can be hard bodied or soft bodied. • Know that vertebrates will include fish, amphibians, reptiles, birds and mammals. Invertebrates into molluscs, worms, arachnids and insects. • Mammals are warm blooded, have fur or hair, usually give birth to live young and typically feed their young milk. 	Type	Definition	Example	Warm Blooded	Animals that can make their own body heat even when it is cold outside	Humans, mammals, birds	Cold Blooded	Animals that cannot make their own heat. They need the sun's warmth to heat their bodies.	reptiles, amphibians, fish	<p>Scientific Enquiry: Identifying, classifying & grouping</p> <p>Are some animals more alike than others?</p> <p><i>Children to use descriptions to put animals into groups in different ways (e.g. where they live, what they eat, how they move, how many legs, etc) moving on to using keys to differentiate between closely related animals.</i></p> <p>Know how to use a classification key to sort animals into groups</p> <p>Know how to create a classification key to sort the UK woodland animals studied above focusing on</p>
Type	Definition	Example									
Warm Blooded	Animals that can make their own body heat even when it is cold outside	Humans, mammals, birds									
Cold Blooded	Animals that cannot make their own heat. They need the sun's warmth to heat their bodies.	reptiles, amphibians, fish									

<p><i>measurements using standard units, using a range of equipment, including thermometers and data loggers.</i></p> <p><i>Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</i></p> <p><i>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</i></p> <p><i>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</i></p> <p><i>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</i></p> <p><i>Identifying differences, similarities or changes related to simple scientific ideas and processes.</i></p> <p><i>Using straightforward scientific evidence to answer questions or to support their findings.</i></p>	<ul style="list-style-type: none"> • Fish are cold blooded, breathe using gills, lay eggs and have fins. • Reptiles are cold blooded, have dry scaly skin and lay their eggs on land. Birds are warm blooded, have feathers and lay eggs. • Amphibians are cold blooded, breathe air but lay eggs underwater as their young use gills to breathe. • Molluscs have soft, unsegmented bodies but use shells for protection. They live in damp, wet habitats. • Worms are long, slender unsegmented animals that burrow underground and have no additional limbs. (Know that limb is a word used to mean arms and legs) • Arachnids usually have segmented body parts and eight legs. • Insects have six legs, 3 segmented body parts and generally have one or two sets of wings. Know that insects have 3 parts to their body structure head, thorax and abdomen • Know how to identify these in a range of different insects (real and from pictures) Know the names of these common UK Woodland animals, the classification groups they are members of and identify pictures of them – • Mammals: Weasel, badger, rabbit, bat, deer, fox, mole • Fish: Salmon, brown trout • Birds: Barn owls, blackbird, kestrel, cuckoo, great spotted woodpecker, kingfisher • Reptiles: Adder, Grass Snake, Common lizard Amphibians: Common frog, Common toad, Smooth newt • Molluscs: Slug, Garden Snail • Arachnids: Harvestman, Garden Spider • Worms: Common earthworm • Insect: Peacock Butterfly, wood ant, wasp. bee, cricket, centipede, millipede, woodlouse, grasshopper 	<p>mammals, birds, amphibians and reptiles.</p>
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Classifying Plants

- Know that plants can be classified into flowering and non-flowering plants. Flowering plants such as grasses and non-flowering plants such as ferns, mosses.
- Discuss the key features of each plant group.
- Know how to identify grass and moss in the local environment
- Flowering plants will have a flower head or fruit. Non-flowering plants do not produce flowers or fruit.
- Flowering plants: dandelion, buttercup, daisy, bluebell
- Non-flowering plants include ferns and mosses

Changing Environments

- Know that humans can impact positively and negatively on the environment. Know that negative impacts include cutting down trees (deforestation), building roads/houses, growing population, littering, and plastic in oceans.
- Know that positive impacts include building nature reserves, protecting land, introducing different species
- Examples of re-wilding: reintroduction of Beavers. Conservation groups such as the Royal Society for the Protection of Birds (RSPB), Tiggywinkles (hedgehogs) and Bumblebee Conservation Trust.

SCHEME OF WORK: YEAR 5

<p>Term:</p> <p>Scientist Study:</p>	<p>Y5- Autumn 1</p> <p>Isaac Newton (1642-1726)</p> <p>An English scientist and Mathematician who developed the concept of gravity, laws of motion and discovered that white light was made of many colours (spectrum).</p> <p>Note: Galileo Galilei is covered in part, but main biographical study is in Space Unit.</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Physics: Forces</p> <p>Context for study:</p> <p>This unit is the first of three science units where pupils study forces as part of the discipline of physics - the study of the processes that shape our world and how we use it. Pupils have a secure knowledge of resistance and friction, are able to compare how things move on different surfaces and know that applying forces to objects can change their shape. In Year 5, pupils revise and build upon previous learning on magnetism. They know some forces need contact between two objects, but magnetic forces can act at a distance. Pupils know magnets have two poles and that they attract or repel each other. Pupils further develop their knowledge of magnetic and non-magnetic materials with thermal and electrical conductivity. New learning in this unit includes knowing that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Pupils study the effects of air resistance, water resistance and friction that act between moving surfaces. By the end of the unit, pupils will know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. The knowledge acquired in this unit will help pupils as they learn more about materials and their properties.</p>		
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> Forces are pushes and pulls These forces change the motion of an object. They will make it start to move or speed up, slow it down or even make it stop. Friction is a force that holds back the motion of an object 		<p>Key Vocabulary for the Unit:</p> <p>Force: The strength of a physical action or movement measured in Newtons (N).</p> <p>Gravity: Gravity is a force which tries to pull two objects toward each other.</p> <p>Air Resistance: Air resistance is a type of friction between air and another material. For example, when an aeroplane flies through the air or a parachute falls to Earth.</p> <p>Water Resistance: If you go swimming, there is friction between your skin and the water particles, making it harder to move.</p> <p>Simple Machines: Devices that change the direction or magnitude of forces. These include gears, levers and pulleys. When combined, they form mechanisms.</p>	

<ul style="list-style-type: none"> • Some surfaces create more friction than others which means that objects move across them slower • On a ramp, the force that causes the object to move downwards is gravity 	<p>Friction: Friction is a force between two surfaces that are sliding, or trying to slide, across each other.</p> <p>Levers: A lever can be described as a long rigid body with a fulcrum along its length.</p> <p>Pulleys: Pulley is a simple machine and comprises of a wheel on a fixed axle, with a groove along the edges to guide a rope or cable. They are used to lift heavy objects more easily.</p> <p>Gears: Gears are wheels with teeth that slot together. When one gear is turned the other one turns as well, but in the opposite direction. Smaller gears turn more quickly than larger gears.</p>
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Composite – The Big Idea	Components – Sequence of Learning
<p>Forces can move objects, change their direction of travel and their shape. Forces are pushes and pulls and can be contact forces such as friction or non-contact forces such as gravity. Friction, air and water resistance can slow the movement of objects. Simple machines such as gears, levers and pulleys can transform the direction and strength of forces. Forces are measured in Newtons (N).</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • the heavier the object the faster it falls, because it has more gravity acting on it • forces always act in pairs which are equal and opposite • smooth surfaces have no friction • objects always travel better on smooth surfaces • a moving object has a force which is pushing it forwards and it stops when the pushing force wears out • a non-moving object has no forces acting on it • heavy objects sink and light objects float. 	<ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc. LBQ vocab QS where appropriate) 2. Explain why objects fall to Earth (Gravity). (Link to Galileo Galilei’s Pisa experiment). 3. BIOGRAPHY: Isaac Newton (link to writing) 4. Explain and describe the effects of friction on different materials. 5. How does the size of a parachute affect the time it takes to fall? 6. Explain how a lever works and provide real world examples. 7. Explain how gears and pulleys work. 8. Information texts and LBQ Question Set

Maths Links:		
NC Objectives	Knowledge Content	Working Scientifically
<p><i>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</i></p> <p><i>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</i></p> <p><i>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</i></p> <p><i>Working scientifically:</i></p> <p><i>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</i></p> <p><i>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</i></p> <p><i>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graph.</i></p> <p><i>Using test results to make predictions to set up further comparative and fair tests.</i></p>	<p>Gravity</p> <ul style="list-style-type: none"> • Know that the force that pulls things to the ground on Earth (and other planets) is called gravity. • Know that gravity acts as a pull force making unsupported objects fall towards Earth. • Know that gravity pulls towards earth wherever you are on Earth. • Know that gravity holds Earth and the other planets in their orbits around the Sun. <p>Friction & Air Resistance</p> <ul style="list-style-type: none"> • Know that friction occurs when objects move through water or air. Air resistance is a type of friction between air and another material (this is sometimes called drag). • Know that as an object moves, air resistance slows it down. The faster the object's motion, the greater the air resistance exerted against it. Air resistance affects all moving objects. For example, when an aeroplane flies through the air, air particles hit the aeroplane making it more difficult for it to move through the air. • Galileo Galilei (Main biographical study in Space Unit) He discovered that when you drop two objects of similar shape and size but of different masses fall at the same rate. This went against the common sense idea at the time from Aristotle who believed that heavier objects fell faster. He is said to have dropped objects from the Leaning Tower of Pisa to demonstrate this. Most scientists and historians believe this was a 'thought experiment' and did not actually happen. A 'thought experiment' is when you imagine the outcome of an experiment rather than carry it out directly. <p>Isaac Newton (Biography)</p> <ul style="list-style-type: none"> • To know that Sir Isaac Newton (1642 - 1726) was an English mathematician and scientist. He is known as one of the most influential scientists of all time. He developed Newton's law of universal gravitation. • Know that he is said to have 'discovered' the concept of gravity when sitting under a tree and an apple fell to the ground near him. There is a common myth that the 	<p>Scientific Enquiry: Comparative & Fair Testing How do parachutes work?</p> <p><i>Children to create parachutes, changing a variable to try to isolate what is needed for an effective parachute (e.g. changing parachute material, size, shape, etc)</i></p> <p>Conduct an experiment to test parachutes and measure air resistance with designs that are different sizes. Use graphs to map the results. (MS Excel: Scatter graph – area v drop time)</p> <p>Observe the fall of sycamore seeds. Demonstrate how a paper helicopter can act as a model of a sycamore seed. Know how air pushes the blades of the paper helicopter as it falls and causes it to rotate.</p>

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a 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.

apple landed on his head which is generally considered to be untrue. Newton also discovered that white light was made from a range of colours (review previous work on rainbows and the colour spectrum).

- Know that he is buried in Westminster Abbey with other famous people Charles Dickens, Charles Darwin, Queen Elizabeth I and most recently Professor Stephen Hawking.

Water Resistance

- Know that water resistance acts in the same way that air resistance does. If you go swimming, there is friction between your skin and the water particles. This is known as water resistance. When something is in water, there are two forces acting on it. Its weight and the force of the water pushing up, the upthrust. If the weight is equal to or less than the upthrust, it floats. Things that float are 'buoyant'.
- Know that 'buoyancy' is the ability of an object to float in liquid or the air.
- Know that a buoy is a floating object that is used to show ships and boats where they can go and to warn them of danger.
- Know that if the weight of an object is greater than the upthrust, it sinks.
- Know how to use arrows on diagrams to show the forces at work in given situations e.g. submarine in water, parachute falling, car moving on the road.

Levers, Pulleys and Gears

- Know that levers, pulleys and gears are mechanisms that allow a small force to have a greater effect.
- Know that a lever is a simple mechanism used to move or lift objects.
- Know how to label a diagram showing a lever, load, effort and a fulcrum or pivot.
- Know that the nearer the fulcrum/pivot to the load then the less effort is needed.
- Know that a seesaw works because the fulcrum is in the middle.
- Consider what would happen if a seesaw had the fulcrum closer to one end.

Gears

- Know that gears are toothed wheels that lock together and turn each other.
- Know that gears are often different sizes.

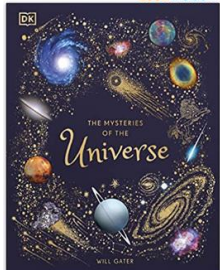

- A number of gears connected together are called a gear train. Small gears rotate faster than large ones and need less effort to move.
- Know that gears on a bike enable us to go faster than we could normally move without using up a lot of energy.

For further information - <https://www.dkfindout.com/uk/science/simple-machines/gears/>

Watch examples of gears - https://www.youtube.com/watch?v=D_i3PJIYtuY

Pulleys

- Know that a pulley is a device consisting of a wheel over which a rope or chain is pulled in order to lift heavy objects. Know that when someone raises a flag up a flagpole a pulley system is used.

Term: Scientist Study: BIOGRAPHY	Y5- Autumn 2 Galileo Galilei (1564-1642) A scientist from Italy who discovered that when you drop two objects of similar shape and size but of different mass fall at the same rate.	Key Text(s):		
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Unit Title:	Physics: Earth and Space Context for study: This unit is the last of three science units where pupils study forces as part of the discipline of physics - the study of the processes that shape our world and how we use it. Pupils have a secure knowledge of the effects of air resistance, water resistance and friction that act between moving surfaces. Pupils know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Previous learning includes how some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. Pupils know about magnetic and non-magnetic materials, and thermal and electrical conductivity. They know some forces need contact between two objects, but magnetic forces can act at a distance. Pupils know magnets have two poles and that they attract or repel each other. In this Year 5 unit, pupils describe the Sun, Earth and Moon as approximately spherical bodies. New learning includes knowing about the movement of the Earth, and other planets, relative to the Sun in the solar system. Pupils learn the movement of the Moon relative to the Earth. By the end of the unit, pupils use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. This unit is the precursor to work studied in KS3 when pupils continue to study forces as part of the discipline of physics. The knowledge acquired in this unit will help pupils as they learn more about forces and movement, including measuring forces
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Prior Knowledge Requirements <ul style="list-style-type: none"> We have four seasons (autumn, winter, spring and summer). Know that a shadow is caused when an object blocks light from passing through it. Know that a shadow is caused when an object blocks light from passing through it. The properties of a sphere That the moon is not a source of light 	Key Vocabulary for the Unit: Phases: The changing appearance of the Moon when viewed from Earth due to its position in relation to the Earth and Sun. Rotation: The act of turning on or around an axis. Orbit: An orbit is a repeating elliptical path that one celestial body takes around another. Planets: There are eight planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Seasons: One of the four parts of the year; spring, summer, fall, and winter. Star: A giant ball of super-heated gases (hydrogen and helium), around which planets orbit. Our Sun is a star.
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	<p>Hemisphere: Either of two halves of the earth.</p> <p>Moon: The earth's natural satellite.</p> <p>Poles: Either end of a planet's, moon's, or star's axis.</p> <p>Space: A vast vacuum which contains the entire material universe and its events.</p> <p>Reflect: to throw back from a surface.</p> <p>Solar System: The solar system is made of the eight planets that orbit our sun. It is also made of asteroids, moons, comets and dwarf planets.</p>
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>The Earth is a rocky planet in space, which forms part of the Solar System. Being one of eight planets that orbit the Sun (a star), it has a Moon, whose appearance from Earth changes on a 28 day cycle. Human knowledge of the Solar System has developed through the discoveries of famous astronomers, including Copernicus and Galileo Galilei.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • the Earth is flat • the Sun is a planet • the Sun rotates around the Earth • the Sun moves across the sky during the day • the Sun rises in the morning and sets in the evening • the Moon appears only at night • night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Explain how the Earth and the other planets in the solar system move (Model using string for orbit periods). 3. Research and compare the different planets in the solar system. 4. Explain how the Moon moves. 5. Explain how day and night are caused. 6. What shape is the moon and does it change? 7. BIOGRAPHY: Galileo Galilei 8. Information Text and LBQ Question Set
<p style="text-align: center;"><u>Maths Links:</u></p>	

NC Objectives	Knowledge Content	Working Scientifically
<p><i>Describe the movement of the Earth and other planets relative to the sun in the solar system.</i></p> <p><i>Describe the movement of the moon relative to the Earth.</i></p> <p><i>Describe the sun, Earth and moon as approximately spherical bodies use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</i></p> <p><i>Working scientifically:</i></p> <p><i>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</i></p> <p><i>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</i></p> <p><i>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graph.</i></p> <p><i>Using test results to make predictions to set up further comparative and fair tests.</i></p>	<p>Solar System</p> <ul style="list-style-type: none"> • Know the names of the planets in our solar system in order from the sun - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, (Pluto – now re-classified as one of the Solar System's dwarf planets). • Know that recently Pluto has been designated as a dwarf planet and is no longer included as a major planet in the solar system. • Know the mnemonic - My Very Easy Method Just Speeds Up Naming Planets • Know that there is an asteroid belt between Mars and Jupiter • Know the approximate relative size of planets from this diagram. • Know that planets have their own moons • Know that only Earth is habitable. • The gas giants are: Jupiter, Saturn • The ice giants are: Uranus and Neptune. • The others are terrestrial planets: 'terra', the Latin meaning for land. <p>Solar System Models</p> <ul style="list-style-type: none"> • Know the way that ideas about the solar system have developed, • Know how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus (heliocentric (sun-centred) model). <p>Planets</p> <ul style="list-style-type: none"> • Know that the planet names are derived from Roman and Greek mythology, except for the Earth, which is Germanic and Old English in origin. • Mercury: named after the Roman messenger god who was known for his ability to travel quickly with wings on his feet. • Venus: named after the goddess of love and beauty. The planet Venus is the brightest object in our sky after the sun and the moon. 	<p><u>Scientific Enquiry:</u></p> <p>Observing over Time</p> <p>What shape is the moon and does it change?</p> <p><i>Children keep a moon diary over the period of a month (focusing on moon shape) and a moon diary for one clear evening (focusing on position in the sky) and analyse their results.</i></p>

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a 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.

- Earth: the name comes from the German word 'erde' which means ground. This is the odd one out as it is not based on Roman or Greek Mythology.
- Mars: the Roman god of war. Red is the colour of blood and war and Mars is the Red Planet. The colour is due to a type of rust in the soil.
- Jupiter: the supreme god of the ancient Romans. The planet Jupiter, the largest planet in our solar system, is named after the king of the gods,
- Saturn: the king of the Titans who ruled the world before Jupiter. Saturn has over 30 moons in orbit
- Uranus: the Roman sky god.
- Neptune: named after the Roman god of the sea. For many years, Neptune was thought to lie on the edge of the Solar System, watching over the vast oceans of space.
- Pluto: Pluto was the brother of Jupiter and Neptune and the god of the underworld. The underworld was supposed to be dark and cold just like the planet Pluto.

Sun, Moon, Earth

- Know that the Earth, sun and moon are approximately spherical bodies in space.
- Know that the sun is a star and the moon is a satellite, not planets.
- Know that the Earth rotates once every 24 hours.
- Know that this creates day and night as the Earth takes 24 hours to complete one spin on its axis.
- Know that the Earth orbits around the sun once every 365 and a quarter days (one year). Know that the sun is the ball of gas in the sky that the Earth goes round, and that gives us heat and light.
- Know that it is not safe to look directly at the Sun, even when wearing dark glasses
- Know that the orbit is the curved path in space that is followed by an object going round and round a planet, moon, or star
- Know that every 4 years the Earth year is 366 days long due to the 4 quarter days equalling an extra day. We refer to this as a leap year. Know that the extra day occurs on Feb 29th.
- Know that the Earth spins on an imagined axis, tilted at approximately 23° Explain how this also alters how we see the sun in different positions in the sky throughout the day, and this makes the sun look as if it is moving when it is in fact Earth.

- Know that the sun appears to rise in the east and sets in the west.

Time Zones


- Know that there are different time zones across the world because of the rotation of the earth.
- Know that as you move eastwards from the UK you add time on. E.g. Sydney, Australia you add 11 hours.
- Know that as you move westwards you subtract time. E.g. Los Angeles, USA you subtract 8 hours.

Moon

- Know that the moon is not a light source it reflects the light from the sun.
- Know that the moon orbits our Earth every 28 days, and this is called the lunar cycle.
- Know that Earth has one moon; Jupiter has four large moons and numerous smaller ones.
- (no requirement to teach the names of the phases of the moon)
- Know that over 28 days the moon goes from a full moon to a sequence of shrinking crescent moons to a new moon (not visible) a sequence of increasing crescent moons to a full moon over 28 days.
- Know that the force of gravity also exists on the Moon but it is not as strong as it is on Earth. This is because the Moon is much smaller than our planet.

Galileo Galilei (1564-1642)

- (Re-visit and link to previous learning in **Forces Unit** – Pisa object dropping experiment).
- To know that Galileo Galilei (1564 - 1642) was a scientist and engineer from Italy.
- Proved the heliocentric model of the solar system, building upon the work of Nicolaus Copernicus.
- He mapped the Moon and discovered the four largest (Galilean) moons of Jupiter. He also observed Saturn's rings after perfecting the modern telescope.

<p>Term:</p> <p>Scientist Study:</p>	<p>Y5- Spring 1</p> <p>N/A</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Biology: Living Things and their Habitats</p> <p><u>Context for study:</u> This unit is the fifth of six science units where pupils learn about plants and animals as part of the discipline of biology- the study of living organisms. Pupils have a secure knowledge of the functions of the different parts of flowering plants and the requirements of plants for life and growth. They know how water is transported within plants and the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Pupils can identify and name a variety of living things in their local and wider environment and use classification keys to help group plants and animals. In Year 5, pupils revise their prior knowledge of food chains, identifying producers, predators and prey. This unit builds on pupils' understanding of how environments can change and that this can sometimes pose dangers to living things. Pupils identify how animals and plants of the Amazon rainforest are adapted to suit their environment in different ways and that adaptation may lead to evolution. New learning includes knowing particular species of animals and plants of the Amazon rainforest and describing the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Pupils further develop their knowledge of the seven life processes. The knowledge acquired in this unit will help pupils understand the life process of reproduction in some plants and animals. This is the precursor to work studied in Year 6 when pupils study Linnaean classification, adaptations and sexual reproduction in plants and animals.</p>		
<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • Animals can be grouped into vertebrates (and then further into fish, reptiles, amphibians, birds and mammals) and invertebrates • Some examples of life cycles (including those of plants) • The processes of dispersal, fertilisation and germination 		<p><u>Key Vocabulary for the Unit:</u></p> <p>Life Cycle: The series of changes in the life of an organism including reproduction</p> <p>Reproduce: To have off-spring.</p> <p>Sexual Reproduction: Offspring get genes from both mum and dad, inheriting a mix of features from both.</p> <p>Sperm/Egg: The male and female cells used in reproduction. They carry DNA.</p> <p>Fertilises: The fusion (joining) of pollen or sperm (make reproduction cells) to the egg (female reproduction cells) to create a new cell with DNA from both parents. This grows into the new organism.</p> <p>Live Young: Born without the need for eggs (most mammals).</p>	

- Reproduction is one of the seven life processes.
- Parts of a plant, their features and what their functions are.
- The work of David Attenborough (Y4 study).

Metamorphosis: The process of complete change in body type and shape during a life-cycle.

Plantlets: New plants growing asexually from the end of runners.

Runners: Horizontal stems, which grow across the ground. Part of asexual reproduction. Plantlets grow from these.

Asexual Reproduction: Offspring get genes from one parent so are clones of their parents

Bulbs: An underground storage structure, from which new shoots and roots grow, forming new plants.

Cuttings: Stems of plants cut and regrown into full plants. Cuttings can be combined to create new plants.

Pollination: The process of pollen (male) making contact with the style (female part) of a flower. A pollen tube is grown, down which the pollen grain travels to fertilise the egg in the ovule.

Composite – The Big Idea

All living things have life-cycles, where they are born, live and ultimately die. In order for different species to pass on their genetic code (DNA), they must reproduce, with males and females forming offspring. Some plants can reproduce on their own. Different organisms have different life-cycles, including those who undergo partial or complete metamorphosis – a change in body morphology (looks).

Common Misconceptions

Some children may think:

- all plants start out as seeds
- all plants have flowers
- plants that grow from bulbs do not have seeds
- only birds lay eggs.

Components – Sequence of Learning

1. Retrieval of previous learning – see above
Introduce and explore knowledge organiser
Teach new Vocabulary (inc LBQ vocab QS where appropriate)
2. Explain and describe the importance of ecosystems
3. Construct and interpret food chains
4. Compare the life cycles of different mammals.
5. Compare the life cycles of different insects.
6. Compare the differences between animal life cycles.
7. Describe how flowering plants reproduce.
- 8. Investigate whether a new plant will grow from cuttings.**
9. Information Text and LBQ Question Set

<u>Maths Links:</u>		
NC Objectives	Knowledge Content	Working Scientifically
<p><i>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</i></p> <p><i>Describe the life process of reproduction in some plants and animals.</i></p> <p><i>Construct and interpret a variety of food chains, identifying producers, predators and prey</i></p> <p><i>Working scientifically:</i></p> <p><i>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</i></p> <p><i>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</i></p> <p><i>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graph.</i></p> <p><i>Using test results to make predictions to set up further comparative and fair tests.</i></p>	<ul style="list-style-type: none"> • Know that an ecosystem is ‘all the plants and animals that live in a particular area together and the relationship between them and the environment’. • Know that a tropical rainforest is an ecosystem consisting of ‘wet, warm forest all year round’. • Understand the term biodiversity as ‘the variety of animals and plant life in a particular ecosystem’. • Know that rainforests are home to approximately 50% of all living things on earth. • Know the names of the following species of animals which live in the Amazon rainforest and whether they are herbivores, carnivores or omnivores: <ul style="list-style-type: none"> • giant anteater, green iguana, tapir, anaconda, poison dart frog, sloth, macaw, jaguar, armadillo, howler monkey, piranha, hummingbird, leaf cutter ants, porcupine, tarantula and toucan. • Know the names of the following species of plants which live in the Amazon rainforest and identify images of these: rubber tree, orchid, cacao, giant water lilies and banana tree. • Know the following food chain - orchid (producer), butterfly (consumer), toucan (consumer), jaguar (consumer). • Use the terms predator and prey to describe the relationships in the food chain. • Know that all food chains begin with Solar Energy. • Know that a number of different species each year become extinct as a result of deforestation. Know that extinct means ‘no longer in existence’. e.g. dodo <p style="background-color: yellow; margin-top: 10px;">Discussion Point: In preparation for Year 6</p> <ul style="list-style-type: none"> • Adaptation: adaptation is defined as ‘the process of change by which an organism or species becomes better suited to its environment.’ 	<p><u>Scientific Enquiry:</u> Comparative and Fair Testing Investigate whether a new plant will grow from cuttings. <i>Children cut up a plant such as a potato or tomato plant, to investigate which parts will grow into a new individual.</i></p>

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a 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.


- Know that piranhas have adapted to live and hunt in schools, they have sharp teeth, they have interlocking jaws, and they have an acute sense of hearing to detect prey.
- Understand the term evolution as ‘the process by which different kinds of living organisms are believed to have developed from earlier forms during the history of the earth’.
- Know that adaptations can lead to evolution of species. (Explain that they will learn more about this in Year 6)
- Life processes and life cycles
- Revise the seven life processes (from Y2) are:
- Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion and Nutrition.

- Use the acronym MRS GREN to recall these:

M	Movement	All living things move, even plants.
R	Respiration	Getting energy from food.
S	Sensitivity	Detecting changes in the surroundings.
G	Growth	All living things grow.
R	Reproduction	Making more living things
E	Excretion	Getting rid of waste.
N	Nutrition	Taking in and using food.

Life Cycles:

- Jaguar (mammal)
Live young > kitten > adult
- Females have between one and four kittens in each litter. She will give birth in a cave den or a thicket. The kittens are born with their eyes closed. At birth they have fuzzy spotted fur. The kittens begin to hunt when they are six months old. They will stay with their mother for about two years. The jaguar has a lifespan of 15-20 years.
- Poison dart frog (amphibian): frog spawn > tadpole > froglet > adult frog
<https://nationalaquarium.wordpress.com/2013/07/16/the-life-cycle-of-poison-dart-frogexplained/>
- Leaf cutter ant (insect)
- Know that the life cycle of the ant consists of four stages: egg, larva, pupa, and adult. Fertilized eggs produce female ants (queens, workers, or soldiers); unfertilized eggs produce male ants.
- Egg: Ant eggs are oval shaped and tiny (they are about 1 mm long)
- Larva: The worm-like larvae have no eyes and no legs. The larvae molt (shed their skin) many times as they increase in size.
- Pupa: After reaching a certain size, the larva spins a silk-like cocoon around itself (against a solid object) and pupates. During this time the body metamorphoses (changes) into its adult form.
- Adult: The pupa emerges as an adult. The entire life cycle usually lasts from 6 to 10 weeks. <http://www.enchantedlearning.com/subjects/insects/ant/leafcutter.shtml>
- Hummingbird (bird).
- Egg > Young > Adult (<https://sciencing.com/life-cycle-hummingbird-5417886.html>)

<p>Term:</p> <p>Scientist Study:</p>	<p>Y5- Spring 2</p> <p>N/A</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Chemistry: Properties and changes of materials</p> <p><u>Context for study:</u></p> <p>This unit is the fifth of five science units where pupils study materials as part of the discipline of chemistry - the identification of the properties a substance is made from. It is also the study of forces as part of the discipline of physics – the study of the processes that shape our world and how we use it. Pupils have a secure knowledge of the properties of materials and can identify and compare the suitability of a variety of everyday materials. Pupils know how things move on different surfaces and pupils know that squashing, bending, twisting and stretching can change the shapes of some solid objects. Pupils have studied the work of John Dunlop, John MacAdam and Mary Anning. Previous learning includes knowing different kinds of rocks on the basis of their appearance and simple physical properties. Pupils know how fossils are formed and recognise that soils are made from rocks and organic matter. In this year 5 unit, pupils further develop their knowledge as they compare and group together everyday materials on the basis of their properties, including hardness (using Moh’s Hardness Scale) solubility, transparency, electrical and thermal conductivity. Pupils revise their prior knowledge of magnetic and non-magnetic metals from Year 3. New learning includes knowing that some materials will dissolve in liquid to form a solution, and knowing how to recover a substance from a solution. This unit also builds on pupils’ previous knowledge of states of matter. Pupils know that some materials change state when they are heated or cooled (e.g. evaporation and condensation in the water cycle) and associate the rate of evaporation with temperature. Pupils use their knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. The knowledge acquired during this unit will help pupils understand that dissolving, mixing and changes of state are reversible changes. By the end of the unit, pupils will be able to 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. This unit is the precursor to work studied in KS3 as pupils continue to learn about states of matter.</p>		

<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • That matter is made of atoms and can exist in solid, liquid or gas state • Changes to materials can be reversible or irreversible 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Thermal Conductor: A material through which heat can easily travel.</p> <p>Thermal Insulator: A material preventing heat travel.</p> <p>Electrical Conductor: A material allowing the flow of electricity through it.</p> <p>Electrical Insulator: A material blocking the flow of electricity.</p> <p>Object: Anything created for a purpose using different materials. Example: a stapler, a table.</p> <p>Material: The matter from which other things are made. Examples: metal, plastic, glass.</p> <p>Property: The way in which a material behaves. Example: impermeable (waterproof).</p> <p>Mixture: Two or more materials put together.</p> <p>Dissolve: A solid's particles become mixed within a liquid (usually water), forming a solution. It looks as if the solid has disappeared – it has not. The particles are simply too small to be seen.</p> <p>Solution: Liquids (solvents) containing dissolved solids (solute).</p> <p>Filter: The removal of solids from liquids using microscopic holes, allowing only the water to pass through.</p> <p>Sieve: Using holes to separate solids of different sizes.</p> <p>Reversible Change: A mixture of materials that can be undone. New materials are created.</p> <p>Irreversible Change: A mixture of materials, which undergo a chemical reaction or change, creating new substances. You cannot get your original materials back.</p> <p>Solubility: Is a chemical property referring to the ability for a given substance, the solute, to dissolve in a solvent.</p>
<p><u>Composite – The Big Idea</u></p> <p>Different materials have properties, which make them suitable or unsuitable for making things (objects). Some materials, when mixed together react to create new materials (irreversible changes), whilst others can be separated again (reversible changes).</p> <p><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • thermal insulators keep cold in or out • thermal insulators warm things up • solids dissolved in liquids have vanished and so you cannot get them back • lit candles only melt, which is a reversible change. 	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser 2. Teach new Vocabulary (including LbQ vocabulary Question Set where appropriate) 3. Investigate the hardness of materials. 4. Investigate which materials are soluble in water. 5. Investigate the effects of water temperature and number of stirs on dissolving (separate tests within same lesson). 6. Group materials according to their properties and explain why materials are used for different purposes – magnetism. 7. Group materials according to their properties and explain why materials are used for different purposes – thermal conductivity (measure temperature of objects conducting heat within hot water).

	<p>8. Group materials according to their properties and explain why materials are used for different purposes – electrical conductivity.</p> <p>9. Reversible changes: identify how to reverse observed changes (links to Y4 Changing States of Matter) (Short pre-cursor to main investigation): Is it possible to separate materials? (Use techniques including: picking, magnetism, sieving, filtration, dissolving/evaporation).</p> <p>10. Investigate irreversible changes (Vinegar-Bicarbonate balloons; milk-vinegar casein)</p> <p>11. Information Text and LBQ Question Set</p>
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Maths Links:

NC Objectives	Knowledge Content	Working Scientifically
<p><i>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</i></p> <p><i>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</i></p> <p><i>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</i></p> <p><i>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</i></p>	<ul style="list-style-type: none"> Know how to compare materials based on the properties of hardness, solubility (how easily dissolvable it is), transparency, magnetism, conductivity of thermal (heat) and electricity. Know that different materials will have different purposes, based on their properties. <p>Hardness</p> <ul style="list-style-type: none"> Know that hardness can be measured by observing if one material can scratch another. Know that a common scale for doing this is Moh’s Hardness Scale developed in 1812 Know how to conduct a scratch test (Investigate using rocks – link back to Y3 Rocks and Fossils learning). <ol style="list-style-type: none"> If ‘Specimen A’ can scratch ‘Specimen B’, then ‘Specimen A’ is harder than ‘Specimen B’. If ‘Specimen A’ does not scratch ‘Specimen B’, then ‘Specimen B’ is harder than ‘Specimen A’. If the two specimens are equal in hardness then they will be relatively ineffective at scratching one another. Small scratches might be produced, or it might be difficult to determine if a scratch was produced. If ‘Specimen A’ can be scratched by ‘Specimen B’, but it cannot be scratched by ‘Specimen C’, then the hardness of ‘Specimen A’ is between the hardness of ‘Specimen B’ and ‘Specimen C’. 	<p><u>Scientific Enquiry:</u> Pattern Seeking Is it possible to separate materials? <i>Children use filtering and evaporation to separate a mixture of sand, salt and stones.</i> Know how to conduct a simple scratch test on familiar items.</p> <p>Know that to get the salt or sugar back (the substance), the solution can be heated to evaporate the water from the substance. (Using a cold surface above the heat will catch the vapour and return it to liquid water)</p>

Demonstrate that dissolving, mixing and changes of state are reversible changes

Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Working scientifically:

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 graph.

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 a degree of trust in results, in oral and written forms such as displays and other presentations.

Solubility

- Know that solubility is the ability of a substance to dissolve
- Know that dissolving is when a solid material mixes with a liquid and is no longer visible. Know that materials dissolved into liquid will create a solution: salt water, sugar water. Know that there is a limit to how much material can be dissolved in a given liquid. This is called saturation point. After this no more material will be dissolved it will be visible. (**Investigate – which solids dissolve in water**)
- Know that the hotter the solution the faster the dissolving process occurs (**Investigate – number of sugar cubes dissolving in water at different temperatures**).
- Know that stirring a solution can speed up the dissolving process (**Investigate – number of stirs required to dissolve sugar at a given temperature**).
- Know that solutions are often transparent, but the solid is still present. Revise prior vocabulary - transparent, translucent, opaque

Magnetism

- Revise vocab from Y3 unit - North and South poles, magnetic field, attract, repel.

Magnetic Materials	Non-Magnetic Material
1. Iron	1. Aluminium
2. Steel	2. Copper
3. Nickel	3. Gold
	4. Silver

Thermal Conductivity

- Know that the term thermal refers to heat
- Know that a thermal conductor is a material that allows heat to be transferred easily
- Know that a thermal insulator does not conduct heat well.
- Know that a metal spoon heats up more quickly than a plastic one in a hot drink.
- Know that metal (such as aluminium and steel) conducts heat well so it is used to make saucepans so is known as a good thermal conductor.

Observe the process and record findings.

Identifying scientific evidence that has been used to support or refute ideas or arguments.

- Know that wood does not conduct heat well so is often used for handles of saucepans. Know that plastic does not conduct heat well so is a thermal insulator.

Electrical Conductivity

- (Links to Y4 Electricity) Know that an electrical conductor allows electricity to flow through it, whilst an electrical insulator does not.
- Know that rubber is used for coating copper wires, as it is a poor conductor of electricity. Know that iron is used in circuits as it will conduct electricity.
- Know that silver, copper, gold and aluminium are the most effective electrical conductors.

Separating Solids and Liquids

- Know that solids, liquids and gases can be separated using filtering, sieving and evaporation.
- Know the following terms
 - Filtering: separates an insoluble solid from a liquid.
 - Sieving: separates solids of different sizes.
 - Evaporation: separating dissolved substances from liquids.

Reversible and Irreversible Changes

- Know that reversible changes are changes that are not permanent.
- Dissolving, mixing and altering states are reversible changes.
- Water can be altered from solid to liquid, to gas and back.
- Butter can be melted then will solidify. Know that solidify means 'to become a solid'
- Know that some changes result in the making of a new material, and that this is irreversible. Bread, wood, paper that is burnt cannot be returned to its original state.
- Know that cooking an egg is an example of an irreversible change.
- Know that adding acid to bicarbonate of soda results in the bicarbonate breaking down into salt, water and gas (carbon dioxide). The resulting product cannot be transformed back into its original form.

Term:	Y5- Summer 1 & 2	Key Text(s):	
Scientist Study:	N/A		
Unit Title:	<p>Biology: Animals including Humans</p> <p><u>Context for study:</u> This unit is the seventh of eight science units where pupils study animals, including humans, as part of the discipline of biology - the study of living organisms. Pupils have a secure knowledge of life cycles and what animals, including humans, need to survive. Pupils can use classification keys and interpret food chains: identifying producers, predators and prey. Pupils know that humans and some other animals have skeletons and muscles for support, protection and movement. Previous learning includes the importance of a healthy lifestyle, including a balanced diet and the effects of sugar, the food groups and their role in human development. Pupils know the functions of the basic parts of the digestive system and the functions of different types of teeth in humans. In this Year 5 unit, pupils learn about the changes a human goes through as they develop across their lifetime. Pupils describe the changes as humans mature to old age and draw a timeline to indicate stages in the growth and development. Pupils learn what older people need to stay healthy and the difficulties they may face, including memory loss and a weakened immune system, as a result of old age. In SRE sessions, pupils learn how babies grow and develop, and about puberty. New learning includes the gestation period and life expectancy of different species of animals. This unit is the precursor to work in Year 6 as pupils learn about the circulatory system and dental structures.</p>		
<p><u>Prior Knowledge Requirements</u></p> <ul style="list-style-type: none"> • Know the names for the main parts of the body. • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) 	<p><u>Key Vocabulary for the Unit:</u></p> <p>Life Cycle: The series of changes in the life of an organism including reproduction</p> <p>Reproduce: To have off-spring (children in humans).</p> <p>Sexual Reproduction: Offspring get genes from both mum and dad, inheriting a mix of features from both.</p> <p>Sperm/Egg: The male and female cells used in reproduction. They carry DNA.</p> <p>Live Young: Born without the need for eggs.</p> <p>Puberty: Is the name for the time when your body begins to develop and change as you move from childhood to adult.</p> <p>Adolescence: The transition phase between childhood and becoming an adult. These are usually teenage years.</p> <p>Foetus: A human child still developing within the mother's uterus (womb).</p> <p>Infant: A human baby.</p>		

<ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Animals, including humans, have offspring which grow into adults. Know the basic needs of animals, including humans, for survival (water, food and air). Humans and some other animals have skeletons and muscles for support, protection and movement. 	<p>Toddler: Babies who develop the ability to sit up independently, manipulate objects, follow verbal instructions and begin to walk unaided.</p> <p>Child: A human who has not yet reached puberty / adolescence.</p> <p>Adult: A fully grown human capable of reproduction.</p>
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<p><u>Composite – The Big Idea</u></p> <p>As mammals, humans are born live. As babies, humans are totally reliant upon their parents’ care, feeding on milk whilst they develop and grow. Eventually, the child will learn to walk, developing into a child where significant brain development occurs. Children undergo a process called puberty, which transitions their change into adults capable of reproduction. As humans age, they become less agile and strong.</p> <p><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> a baby grows in a mother’s tummy a baby is “made”. 	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) Create a timeline of a human life. Explain how a human foetus develops. Compare the gestation periods of different mammals. Explain and describe the development of a child. Describe the changes involved with puberty. Explain some of the difficulties involved with old age and how they can be treated. Information Text and LBQ Question Set
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<p><u>Maths Links:</u></p>	
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NC Objectives	Knowledge Content	Working Scientifically
<p><i>Describe the changes as humans develop to old age.</i></p>	<ul style="list-style-type: none"> The study of animals, including humans regarding the changes a human goes through as they develop across their lifetime is part of the discipline of biology - the study of living organisms. 	<p><u>Scientific Enquiry:</u></p>

Working scientifically:

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 graph.

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 a 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.

- To know that all humans grow and develop from the time they are born until old age.
- To know the terms baby, toddler, child, teenager, adolescent, adult and pensioner and the periods with which they roughly refer:
- Baby: 0 - 1 year Toddler: 1 - 3 years Child: 3 - 12 years Teenager/ adolescent: 12 - 18 years Adult: 18+ years Pensioner (old age): 65+ years
- Draw a timeline to indicate stages in the growth and development of humans.

Gestation Periods

- Know that nearly all mammals are viviparous - they give birth to live young rather than laying eggs.
- Know that the gestation is the development of an embryo up to the point of birth.
- Know that an embryo is an unborn animal at the very early stages of development.
- Know that an embryo develops into a foetus in the mother's womb and that over time the foetus develops typical human features including arms and legs.
- Know that the gestation period refers to the time an embryo spends in development in the womb.
- Know that an embryo develops into a foetus (in humans this is after 8 weeks) Know the following gestation periods:

Animal	Average Gestation Period in days	Average Gestation Period in Months
Rat	21 days	Less than a month
Rabbit	31 day	1 month
Cat/Dog	63 days	2 months
Human	275 days	9 months
Horse	336 days	11 months
Killer Whale	465 days	15 months
Elephant	624 days	20 months

- Know that the general rule is 'the bigger the animal, the longer the gestation period'

Compare the gestation periods of different mammals.

Pattern Seeking

Children complete a table showing the gestation periods of 10 different mammals. They round each gestation period to the nearest 10 days and use this to create a bar chart. They look for patterns and identify which mammal has the longest gestation period.

- Know that these gestation periods are averages and that sometimes this period is longer and shorter.

Puberty (Recaps prior learning from RSE in Y4)

- To know that puberty is when changes occur in the body during adolescence. It is the end of the development of the body.

Old Age

- Know that there are a number of changes as adults move into old age.
- Know that older people need a different diet to stay healthy, they may keep their teeth throughout old age, they need to exercise, they can learn new information.
- Know that some older people suffer from severe memory loss (become senile) Know that some older people have difficulty in moving around and may use a walking stick or frame. Know that the immune system becomes weaker in old age and it is more difficult for the body to fight off illness.
- Know that the immune system defends people against germs and microorganisms every day. In most cases, the immune system does a great job of keeping people healthy and preventing infections. However, sometimes problems with the immune system can lead to illness and infection.

SCHEME OF WORK: YEAR 6

Term:	Y6- Autumn 1	Key Text(s):	
Scientist Study:	N/A		
Unit Title:	<p>Biology: Animals including Humans</p> <p>Context for study: This is the final unit of eight science units where pupils study animals, including humans, as part of the discipline of biology - the study of living organisms. Pupils have a secure knowledge of life cycles and what animals, including humans, need to survive. Pupils know that humans and some other animals have skeletons and muscles for support, protection and movement. Pupils know the functions of the basic parts of the digestive system and the functions of different types of teeth in humans. Previous learning includes the changes a human goes through as they develop across their lifetime. In SRE sessions, pupils learned how babies grow and develop, and about puberty. Pupils know what older people need to stay healthy and the difficulties they may face as a result of old age. This Year 6 unit builds on pupils' knowledge of the importance of a healthy lifestyle, including a balanced diet and the effects of sugar, the different food groups and their role in human development. New learning includes recognising the impact of diet, exercise, drugs and lifestyle on the way their bodies function. In Year 6, pupils identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Pupils also describe the ways in which nutrients and water are transported within animals, including humans. This is the precursor to work studied in KS3 when pupils continue to study the human body as part of the discipline of biology.</p>		
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> Know the names for the main parts of the body. Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. 		<p>Key Vocabulary for the Unit:</p> <p>Heart: Organ, which pumps blood at high pressure around the body by regular contracting (squeezing) and relating.</p> <p>Pulse (rate): Your heart has to push so much blood through your body that you can feel a little thump in your arteries each time the heart beats</p> <p>Blood: A body fluid which contains platelets, red and while blood cells within plasma. Red blood cells carry oxygen. White blood cells are art of the body's immune system.</p> <p>Blood Vessels: Blood vessels are a series of tubes inside your body called veins, arteries and capillaries. They move oxygenated and deoxygenated blood to and from your heart via all tissues of the body.</p> <p>Lungs: Organs designed to take oxygen from the air and deliver it into the blood stream. They also remove carbon dioxide from the blood and back into the air.</p>	

<ul style="list-style-type: none"> 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. Animals, including humans, have offspring which grow into adults. Know the basic needs of animals, including humans, for survival (water, food and air). Humans and some other animals have skeletons and muscles for support, protection and movement. Describe the changes as humans develop to old age. The changes that happen as humans develop to old age The gestation period of different animals 	<p>Oxygen: A gas required by living things.</p> <p>Drugs: A drug is a chemical that is not food and that affects your body. Some drugs are given to people by doctors to make them healthy.</p> <p>Carbon Dioxide: A waste gas created through breathing (respiration).</p> <p>Nutrients: Vitamins and minerals needed to keep people healthy.</p> <p>Muscles: Tissues which are connected to other parts of the body (usually bones) which contract and relax, allowing us to move.</p> <p>Circulatory System: Also called the cardiovascular system, delivers nutrients and oxygen to all cells in the body.</p>
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<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>The body is made up of tissues and organs, which are linked together to do particular functions. The heart and lungs are such organs, which work together as part of the circulatory (cardiovascular) system, transporting oxygen, sugar and nutrients around our bodies.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> your heart is on the left side of your chest the heart makes blood 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) Identify the main parts of the human circulatory system and explain their functions. Explain how the human heart works. Describe the functions of blood and blood vessels. Is our heart rate always the same? Explain how diet and exercise affect health. LBQ Question Set and information text.
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<ul style="list-style-type: none"> • the blood travels in one loop from the heart to the lungs and around the body • when we exercise, our heart beats faster to work the muscles more • some blood in our bodies is blue and some blood is red • we just eat food for energy • all fat is bad for you 	
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<u>Maths Links;</u>	
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NC Objectives	Knowledge Content	Working Scientifically
<p><i>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</i></p> <p><i>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</i></p> <p><i>Describe the ways in which nutrients and water are transported within animals, including humans.</i></p> <p><i>Working scientifically:</i></p> <p><i>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</i></p> <p><i>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision,</i></p>	<p>Circulatory System</p> <ul style="list-style-type: none"> • Know the circulatory system is the system that circulates blood through the body. • Know that this consists of the heart, blood vessels, blood, veins, arteries, capillaries, oxygen, lungs and ribcage. • Know the location of the lungs and heart <p>Heart</p> <ul style="list-style-type: none"> • Know that the heart is a hollow muscular organ that pumps the blood through the circulatory system by regular contractions. There are four chambers with two atria and two ventricles. • Know the following sequence that explains the function of the heart: • Deoxygenated blood flows into the heart from the body through the veins • This blood is pumped out to the lungs through the pulmonary artery • Blood is then oxygenated in the lungs • Blood returns to the heart through the pulmonary vein • The oxygenated blood is then pumped out of the heart through the aorta • The blood travels around the body delivering oxygen and nutrients to the organs. 	<p>Scientific Enquiry: Pattern Seeking Is our heart rate always the same?</p> <p><i>Children to investigate the effect of exercise on heart rate and how long it takes for their pulse to return to the resting rate after exercising for a minute.</i></p> <p>Take measurements of pulse rate before and after a range of exercises. Make predictions as to what will happen if measurements are taken at regular intervals. Repeat over time and record results in a line graph.</p>

taking repeat readings when appropriate.

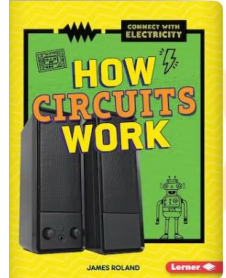
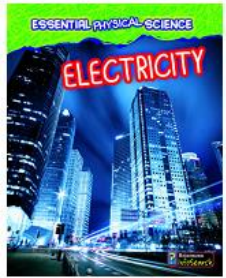
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graph.

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 a 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.

- Know that oxygenated means 'to be enriched with oxygen'
 - Know that deoxygenated means 'to be depleted of oxygen'
 - Know that blood is red when oxygenated and deep purple or blue looking through skin when not.
- Blood
- Describe the functions of red blood cells, white blood cells, platelets and plasma
 - Show the percentage of each component by volume in a typical sample of blood.
- Diet, exercise, drugs and lifestyle
- Know that diet can impact on lifestyle as fatty rich foods can clog arteries and veins, preventing blood from delivering what is needed.
 - Know that exercise can improve the health of a person by removing fatty deposits from the body.
 - Know that some exercises are called cardiovascular, and are designed to improve the fitness of the overall circulatory system by strengthening the organs and pulse rate.
 - Know the impact of having little exercise and poor diet will have
 - Know that taking certain drugs can cause permanent damage to the circulatory system (link to PSHE curriculum).

Term:	Y6- Autumn 2	Key Text(s):		
Scientist Study:	N/A			

Unit Title:	<p>Physics: Electricity</p> <p>Context for study: This unit is the second of only two science units where pupils learn about electricity as part of the discipline of physics - the study of the processes that shape our world and how we use it. Pupils are able to identify common appliances that run on electricity. Pupils have a secure knowledge of simple series electrical circuits including that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. They know some common conductors and insulators, and associate metals with being good conductors. In Year 6, pupils learn about the scientists Benjamin Franklin and Thomas Edison and the key role they each played in the discovery of electricity. During this unit, pupils revise and build upon their previous knowledge of electrical circuits as they use recognised symbols when representing a simple circuit in a diagram. New learning includes associating the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Pupils 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>
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<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a • complete loop with a battery 	<p>Key Vocabulary for the Unit:</p> <p>Electricity: The flow of electrons through conducting materials such as metal.</p> <p>Series Circuit: A circuit with a single pathway through which electricity can flow.</p> <p>Complete Circuit:</p> <p>Cell / Battery: An electrical cell is a device that is used to generate electricity, or one that is used to make chemical reactions possible by applying electricity.</p> <p>Circuit Diagram: Diagram showing circuit components as standardised symbols.</p> <p>Volts / Voltage: Voltage a measure of how powerful the electrical 'push' is in a circuit.</p> <p>Bulb: A glass bulb which provides light by passing an electrical current through a filament.</p> <p>Switch: A device for making and breaking the connection in an electric circuit.</p> <p>Buzzer: An electrical device that makes a buzzing noise and is used for signalling.</p> <p>Motor: A machine powered by electricity that supplies power for a vehicle or other moveable device.</p>
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- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors

Electrical Symbols: Standardised drawings which represent electrical components such as bulbs, motors and wires.

Electrical Conductor: Some materials let electricity pass through them easily. These materials are known as electrical conductors.

Electrical Insulator: Plastic, wood, glass and rubber are good electrical insulators.

Socket: A socket is a safe device to plug your electrical items into at home. Almost every room at home will have at least one socket.

Plug: A device at the end of a power cord (wire) that connects to the socket.

Fuses: These are safety devices. A fuse is a strip of wire that melts and breaks an electric circuit if it goes over a safe level.

Component: Part of a circuit, such as bulb, battery, switch, wire, buzzer etc.

Composite – The Big Idea

Electricity is the flow of electrons through conducting materials. It can be used in circuits to power components such as buzzers, motors and bulbs. The loudness, speed and brightness of these can be changed by varying the voltage of cells. All electrical components have standardised images, so that they are clearly recognised anywhere.

Common Misconceptions

Some children may think:

- larger-sized batteries make bulbs brighter
- a complete circuit uses up electricity
- components in a circuit that are closer to the battery get more electricity.


Components – Sequence of Learning

1. Retrieval of previous learning – see above
Introduce and explore knowledge organiser
Teach new Vocabulary (inc LBQ vocab QS where appropriate)
2. Explain and describe how electricity is produced
3. Describe the function of electrical components and match them to their symbols.
4. Use symbols to create circuit diagrams to represent electrical circuits.
5. **Is it possible to change how bright a bulb is?**
6. Predict whether an electrical circuit will function and suggest ways of improving it.
Incorporate switches, including pressure switches.
7. LBQ Question Set

Maths Links:

NC Objectives	Knowledge Content	Working Scientifically
<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> <p>Working scientifically:</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 graph.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p>	<ul style="list-style-type: none"> • Know that electricity is created by generators which can be powered by gas, coal, oil, wind or solar. • Know that the electrical energy can be converted into other types of energy such as light, heat, movement or sound. Electricity is dangerous, so be careful when using electrical appliances. • Know that metal is used in plugs to allow electricity to transfer from the wall socket, through the plug, and into a device such as a radio or TV. • Know that some materials do not allow electricity to pass through them. These materials are known as electrical insulators. • Know that plastic, wood, glass and rubber are good electrical insulators. That is why they are used to cover materials that carry electricity. • Know that the plastic covering that surrounds wires is an electrical insulator. It stops you from getting an electrical shock. <p>Circuits</p> <ul style="list-style-type: none"> • Know that electricity can flow through the components in a complete electrical circuit. Know that a circuit always needs a power source, such as a battery, with wires connected to both the positive (+) and negative (-) ends. • A battery is made from a collection of cells connected together. • Know that when drawing circuit diagrams, rather than drawing detailed components; we use simple symbols to represent the different components. • Know which symbols to use when drawing a circuit <ul style="list-style-type: none"> • Know that a circuit can also contain other electrical components, such as bulbs, buzzers or motors, which allow electricity to pass through. • Know that electricity will only travel around a circuit that is complete. That means it has no gaps. You can use a switch in a circuit to create a gap in a circuit. This can be used to switch it on and off. 	<p>Scientific Enquiry: Pattern Seeking Is it possible to change how bright a bulb is? <i>Children create circuits to investigate the effect of different voltages on different components.</i></p> <p>(Note - ensure children are confident with their understanding of how circuits work before designing circuits. Practical work then supports what they already know and is not used to teach knowledge) Draw and design circuits using the correct symbols then build them. Systematically identify the effect of changing one component at a time. Predict and test outcomes.</p>

<p><i>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.</i></p> <p><i>Identifying scientific evidence that has been used to support or refute ideas or arguments.</i></p>	<ul style="list-style-type: none"> • Know that when a switch is open (off), there is a gap in the circuit. Electricity cannot travel around the circuit. When a switch is closed (on), it makes the circuit complete. Electricity can travel around the circuit. • Know that a circuit always has a battery (cell) but it can also contain other electrical components, such as bulbs, buzzers and motors. • Know that electricity flows through a circuit, with the volt being the push that moves electrons along the wires. • Know that the more volts there are in a circuit, the more power there is travelling through it. • Understand that the higher the volts, the brighter a lamp and the louder a buzzer 	
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<p>Term:</p> <p>Scientist Study: BIOGRAPHY</p>	<p>Y6- Spring 1 & 2</p> <p>Charles Darwin (1809-1882) English naturalist, geologist and scientist, who sailed to the Galapagos Islands on HMS Beagle. Whilst there, he developed his theories of natural selection and evolution.</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Biology: Evolution and Inheritance</p> <p>Context for study: This unit is the final of six science units where pupils learn about plants and animals as part of the discipline of biology- the study of living organisms. This unit comes after pupils have studied a variety of living things in their local and wider environment. Pupils know species of animals and plants from the Amazon rainforest, how they are adapted to suit their environment and that adaptation may lead to evolution. Pupils can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Pupils have secure knowledge of the seven life processes, the requirements of plants for life and growth and food chains. In this unit, pupils revise and further develop their knowledge of the functions of the different parts of flowering plants related to reproduction. In Year 6, pupils learn that sexual reproduction in plants happens in a cycle-like pattern: germination, pollination, fertilization and seed dispersal</p>		

(Year 3 revision). This unit builds on pupils' previous knowledge of the classification of living things. In Year 6, pupils 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. Pupils learn about plant taxonomy- the science that finds, identifies, describes, classifies, and names plants. Pupils learn about the modern classification system created by Carl Linnaeus and that each species is given a name using Latin words which links to the Year 5/6 Latin curriculum. Pupils are introduced to the taxonomic hierarchy in relation to the red fox which is the precursor to work pupils will study in KS3. During this unit, pupils also learn about the important role bees play in pollination in our ecosystem, understand why the global bee population is in decline and the need for conservation to maintain bee populations for the future.

Prior Knowledge Requirements

- describe in simple terms how fossils are formed when things that have lived are trapped within rock (year 3)
- describe the life process of reproduction in some plants and animals (year 5)

Key Vocabulary for the Unit:

Evolution: Adaptation and change of living things over time.
Offspring: The young plant or animal that is produced by reproduction of the species. Example: children.
Sexual Reproduction: The process of reproduction using genetic material from both the male and female of the species.
Variation: The differences between individuals of the same species.
Suited: A change which enables a species to live well within its environment.
Adaptation: A genetic trait or characteristic which changes over time, increasing a species reproduction and survival chances.
Inheritance: A mixture of parental characteristics and traits that are passed on to their offspring.
Environment: An area containing many different habitats, where both living and non-living things exist.
Characteristics: The distinguishing features that all members of a species have.
Species: A type of living thing. Examples: oak trees, humans.
Habitat: The natural environment in which a living thing lives.
Fossils: The remains or imprint of a prehistoric plant or animal embedded within rock.
Natural Selection: The best adapted and fittest members of a species survive to breed, resulting in stronger, better adapted offspring.
DNA: The 'recipe' for how living things are made.
Organism: Living things. These can be plants, animals or microbes (bacteria etc.).
Climate: The weather conditions and temperature of a place.

Composite – The Big Idea

All living things inherit their features from their parents. This mixing of DNA (the genetic

Components – Sequence of Learning

1. Retrieval of previous learning – see above

<p>building blocks of life) causes variation (differences) within members of the same species. Those individuals with better characteristics and adaptations to their environments survive to reproduce. This is called 'survival of the fittest', which leads to a species changing over time. We call this process 'evolution'.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life • offspring most resemble their parents of the same sex, so that sons look like fathers • all characteristics, including those that are due to actions during the parent's life such as dyed hair or • footballing skills, can be inherited • cavemen and dinosaurs were alive at the same time. 	<p>Introduce and explore knowledge organiser</p> <p>Teach new Vocabulary (inc. LBQ vocab QS where appropriate)</p> <ol style="list-style-type: none"> 2. Identify features that individuals have inherited from their parents. 3. Explain how some animals are adapted to their environment. 4. Why do individuals within species of animals look different? 5. BIOGRAPHY: Charles Darwin 6. Explain how Darwin developed the theory of natural selection. 7. Explain the process of evolution by natural selection. 8. Explain what the fossil record tells us about the past. 9. Information Texts and LBQ Question Set 		
<u>Maths Links:</u>			
NC Objectives	Knowledge Content		Working Scientifically
<p><i>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</i></p>	<ul style="list-style-type: none"> • Know that characteristics are passed from parents to their offspring. • Use the example of different breeds of dog (including what happens when Labradors are crossed with poodles). • Know the term inheritance as 'the passing on of characteristics from parent to offspring' http://www.bbc.co.uk/timelines/zq8gcdm 		<p><u>Scientific Enquiry:</u> Identifying, classifying & grouping Why do species of animals look different?</p>

Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.

Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Working scientifically:

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 graph.

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 a degree of trust in results, in oral and written forms such as displays and other presentations.

- Know that variation in offspring over time can make animals more or less able to survive in particular environments e.g. the development of insulating fur on the arctic fox.

Charles Darwin

- Know that Darwin lived from 1809 - 1882 and is known for his theory of evolution Know that Darwin studied animals and plants (a biologist) and developed the idea of natural selection to explain how different species had evolved over time. Know that he explained his theory in his most famous book 'On The Origin of Species' Know that his theory was formulated whilst studying animals on the HMS Beagle voyage between 1831 and 1836 including the Galapagos islands.
- Know that in biology, an adaptation is defined as 'the process of change by which an organism or species becomes better suited to its environment.
- Know the case study of the peppered moths as described in Moth: An Evolution Story.
- Know that the theory of evolution states that evolution happens by natural selection through the following process:

The Process of Evolution

- More organisms are born than can survive.
- These individuals all have slight variations between them.
- Some of these variations are helpful and improve an organism's chance of survival. Those that survive pass their characteristics onto their offspring.
- Over time, these helpful variations are passed on to the next generation.
- This process takes thousands of years and can't be seen from one generation to the next.

Fossilisation [\(Links to Y3 Rocks and Fossils\)](#)

- Know that fossilisation is the process that forms fossils.
- Know that a fossil is 'the remains or impression of a prehistoric plant or animal embedded in rock and preserved in petrified form'
- Know that prehistoric means 'before written history'.
- Know that preserved means 'to keep something as it is'.

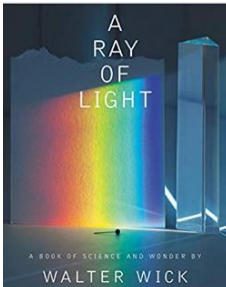
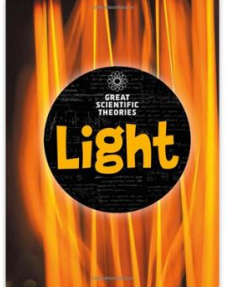
Children sort various species of animals into the environments in which they are adapted based on their physical attributes and listed behaviours

Know the story of Darwin's finches and how the shape of their beaks helped Darwin to develop his theories.

Peppered Moths Case Study

1. Light-coloured moths were common
2. During the Industrial Revolution (1760 – 1840) coal burning covered the moth's habitats in black soot
3. This gave the dark coloured moths a greater chance of survival because they had better camouflage than the light moths
4. Many light-coloured moths died as they were easily spotted by their prey
5. Dark coloured moths became more common
6. As pollution has reduced over time the light-coloured moths have now become more common again

<p><i>Identifying scientific evidence that has been used to support or refute ideas or arguments.</i></p>	<ul style="list-style-type: none">• Know that petrified means ‘change into stone’• Know how palaeontologists build up a picture of the past using incomplete evidence, most organisms die without leaving a fossil trace.• Learn about stratigraphy, and that organisms found in lower layers of rock tend to have died earlier.• Use diagrams showing a simplified cross-section of rock to date 3 different organisms, working out when they appeared, when they died out, and how long they lived for. Compare the organisms to each other and discuss which lived most recently.• Use fossil evidence to guess how the animal may have looked when alive, showing this in a diagram.	
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Term:	Y6- Summer 1	Key Text(s):		
Scientist Study:	N/A			

Unit Title:	<p>Physics: Light</p> <p>Context for study: This unit is the second of two science units where pupils learn about light as part of the discipline of physics - the study of the processes that shape our world and how we use it. Pupils have a secure knowledge of the terms opaque, transparent and translucent; what plants need, including light, to grow well and how energy from light is the start of a food chain. Previous learning includes knowing that light from the sun can be dangerous and that there are ways to protect their eyes. Pupils also know we need light in order to see things and that dark is the absence of light. This unit builds upon pupils' prior knowledge that shadows form when the light from a light source is blocked by an opaque object. Pupils already know that light is reflected from surfaces and it can be separated into a prism of colours. New learning includes knowing how light appears to travel in straight lines. Pupils learn that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. This new knowledge acquired in Year 6 is used to explain why shadows have the same shape as the objects that cast them and that those objects are seen because they give out or reflect light into the eye. This is the precursor to work studied in KS3 as pupils continue to learn about how light can be reflected, refracted and dispersed as part of the discipline of physics.</p>
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<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> • What a light source is • Shiny materials do not make light but do reflect it. • Why we need light • Shadows are caused when certain materials block light 	<p>Key Vocabulary for the Unit:</p> <p>Visible Light Rays: One of the characteristics of light is that it behaves like a wave. Light can be defined by its wavelength and frequency. The frequency is how fast the wave vibrates up and down.</p> <p>Primary Light Source: Light, or illumination, is a form of energy that travels in waves, like sound from a source. Primary sources of light create the light itself, such as a candle or the Sun.</p> <p>Secondary Light Source: These sources of light do not create light, instead they reflect light from primary light sources. Examples: The Moon and mirrors.</p> <p>Dark / Darkness: An absence of light.</p> <p>Transparent: The property of materials which lets light pass through. The image is clear.</p> <p>Translucent: The property of materials which lets some light pass through. The image is blurry.</p>
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<p>Opaque: The property of materials which does not light pass through. Shiny Surface: Surfaces which reflect light. Matt Surface: Surfaces which do not reflect light. Shadow: An area of darkness formed when light cannot pass through opaque objects. Reflect: Light waves bounce off of surfaces in straight lines. Straight Lines: Light always travels in straight lines. It does not bend. Sunlight: The light produced by our nearest star, the Sun. Dangerous: Direct sunlight is very bright and can damage the retina of the eye, potentially causing blindness. Filters: A filter is a transparent material that absorbs some colours and allows others to pass through.</p>		
<p style="text-align: center;"><u>Composite – The Big Idea</u></p> <p>Light travels in waves from primary and secondary sources in straight lines. It can be reflected off of surfaces or refracted to change direction. The visible spectrum is the light which can be seen when it travels into the human eye. Shadows are formed when light is blocked by opaque objects.</p> <p style="text-align: center;"><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> we see objects because light travels from our eyes to the object. 	<p style="text-align: center;"><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) Explain how we see light sources and non-light sources. Explain how reflection causes light to change direction. Why can I hear round corners but not see round corners? Label the main parts of the human eye and explain their functions. Explain how the shape and size of a shadow are determined Explain how white light is made up of a spectrum of different colours LBQ Question Set 	
<u>Maths Links:</u>		
<u>NC Objectives</u>	<u>Knowledge Content</u>	<u>Working Scientifically</u>
<p><i>Recognise that light appears to travel in straight lines</i></p> <p><i>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.</i></p>	<ul style="list-style-type: none"> Know that light travels in straight lines from its source. Know that some light sources are natural (stars, sun, fire, lightning, bioluminescence) and some are man-made (torch, light bulb, digital screen, laser pointer) Know that light either travels in a straight line directly from the source or by reflecting off a surface into our eye. Know how to draw arrows to show light entering the eye from a light source or reflection. 	<p><u>Scientific Enquiry:</u> Pattern Seeking Why can I hear round corners but not see round corners?</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 use the idea that light travels in straight lines.

Explain why shadows have the same shape as the objects that cast them.

Working scientifically:

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 graph.

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 a 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.

- Know that reflection is when light bounces off a surface, changing the direction of a ray of light.
- Know that all objects reflect light; smooth and shiny surfaces reflect all the rays of light at the same angle, rather than scattering the rays of light like rough or dull surfaces.
- Know that when rays of light reflect, they obey the law of reflection: The angle of incidence always equals the angle of reflection.
- Demonstrate with a laser pointer and mirror.
- Predict where the laser will point given a change in angle.

The Eye

- Know that the amount of light entering the eye is controlled by the pupil, which is surrounded by the iris – the coloured part of the eye.
- Know that the pupil dilates when it is darker to let more light into the eye.
- The pupil constricts when it is bright to reduce the amount light entering the eye


Shadows

- Know that a shadow is formed when light is blocked by an opaque object.
- Know that opaque means light cannot pass through, translucent means some light can pass through but it is difficult to see through and that transparent means light can pass easily through and it is easy to see through.
- Understand that as light travels in straight lines shadows have the same shape as the objects that cast them.
- Understand that if something casts a light or shadow somewhere, it causes it to appear there.
- Know that the further the light source from the opaque object the bigger the shadow. Know that the nearer the light source from the opaque object the smaller the shadow. Know that the shadow of an object can be moved by moving the light source.
- Know that a silhouette is different from a shadow because a silhouette is the solid dark shape that you see when someone or something has a bright light or pale background behind them.

Children to use mirrors and torches to investigate how light travels in straight lines and reflects off mirrors.

Use sticks and mirrors to create simple periscopes that allow people to see what is happening behind or above them.

Create labelled diagrams that show the path that the light took to reach the eye.

<p>Term:</p> <p>Scientist Study:</p>	<p>Y6- Summer 2</p> <p>Carl Linnaeus (1707-1778) Swedish biologist who created the binomial naming system for living things. His work began to link together the 'tree of life', showing how species are related to one another.</p>	<p>Key Text(s):</p>	
<p>Unit Title:</p>	<p>Biology: Living Things and their Habitats</p> <p>Context for study: This unit is the final of six science units where pupils learn about plants and animals as part of the discipline of biology- the study of living organisms. This unit comes after pupils have studied a variety of living things in their local and wider environment. Pupils know species of animals and plants from the Amazon rainforest, how they are adapted to suit their environment and that adaptation may lead to evolution. Pupils can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Pupils have secure knowledge of the seven life processes, the requirements of plants for life and growth and food chains. In this unit, pupils revise and further develop their knowledge of the functions of the different parts of flowering plants related to reproduction. In Year 6, pupils learn that sexual reproduction in plants happens in a cycle-like pattern: germination, pollination, fertilization and seed dispersal (Year 3 revision). This unit builds on pupils' previous knowledge of the classification of living things. In Year 6, pupils 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. Pupils learn about plant taxonomy- the science that finds, identifies, describes, classifies, and names plants. Pupils learn about the modern classification system created by Carl Linnaeus and that each species is given a name using Latin words which links to the Year 5/6 Latin curriculum. Pupils are introduced to the taxonomic hierarchy in relation to the red fox which is the precursor to work pupils will study in KS3. During this unit, pupils also learn about the important role bees play in pollination in our ecosystem, understand why the global bee population is in decline and the need for conservation to maintain bee populations for the future.</p>		
<p>Prior Knowledge Requirements</p> <ul style="list-style-type: none"> the differences in the life cycles of a mammal, an amphibian, an insect and a bird the life process of reproduction in some plants and animals. 		<p>Key Vocabulary for the Unit:</p> <p>Vertebrates: Animals which have backbones (mammals, fish, birds, reptiles and amphibians). Fish: Aquatic scaly animals whose limbs are fins and breathe using gills. Examples: sharks, goldfish. Amphibians: Vertebrates who lay eggs and spend at least some part of their life cycle living in water. They usually undergo metamorphosis. Examples: frogs, toads, newts. Reptiles: Egg-laying, scaled animals who shed their skins. Examples: snakes, tortoises, lizards.</p>	

	<p>Birds: Egg-laying, warm-blooded, feathered animals with beaks. Most, but not all species can fly. Example: blackbird, robin, penguin.</p> <p>Mammals: Fur-covered, warm-blooded animals who (mainly give birth to live young and lactate (produce milk). Examples: humans, dogs, whales, dolphins.</p> <p>Invertebrates: Animals without backbones. These include insects, spiders (arachnids), worms and crustaceans such as crabs.</p> <p>Spiders: (Arachnids) Eight-legged animals with exoskeletons and two body sections (head and abdomen). They cannot fly and often spin silk webs.</p> <p>Insects: Six-legged, three body segmented creatures with exoskeletons.</p> <p>Snails: Molluscs with shells. They move via a mucus (slime) covered muscular foot. They have hydrostatic skeletons.</p> <p>Worms: Segmented, limbless animals with hydrostatic (water pressure) skeletons.</p> <p>Flowering Plants: Plants which reproduce using pollination via flowers.</p> <p>Non-Flowering Plants: Plants which reproduce using other means such as runners. They do not have flowers.</p> <p>Environment: The place and its surroundings where living things live.</p> <p>Animals: Multi-cellular living things which cannot create their own food and can move.</p> <p>Classify / Classification Key: The process of using 'Yes' / 'No' answered questions to sort living things.</p> <p>Micro-organism: Micro-organisms are tiny. They are so small they can only be seen with a microscope.</p> <p>Species: This is the grouping together of similar species of plant, animal and other organisms.</p> <p>Fungi: Fungi are a group of living organisms which are classified in their own kingdom. This means they are not animals, plants, or bacteria.</p> <p>Monera: The whole organism is made up of just one cell. The cell is more basic than cells of other organisms.</p> <p>Bacteria: Bacteria are tiny, single-celled organisms that are everywhere around us.</p> <p>Protista: Protists are not animals, plants, fungi, or bacteria. Many protists are so small that people can see them only through a microscope.</p> <p>Plant: Living things which are producers, using photosynthesis to create sugars</p>
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<p><u>Composite – The Big Idea</u></p> <p>All living things can be grouped according to their characteristics. This means they share some features with other living things and therefore can be grouped together. Once they</p>	<p><u>Components – Sequence of Learning</u></p> <ol style="list-style-type: none"> 1. Retrieval of previous learning – see above Introduce and explore knowledge organiser Teach new Vocabulary (inc LBQ vocab QS where appropriate) 2. Use taxonomy to explain how organisms are related
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<p>are grouped, they have been classified – this means they have joined a group.</p> <p><u>Common Misconceptions</u></p> <p>Some children may think:</p> <ul style="list-style-type: none"> • all micro-organisms are harmful • mushrooms are plants. 	<ol style="list-style-type: none"> 3. Explain how Carl Linnaeus developed a classification system. 4. Classify animals as vertebrates and invertebrates. 5. Create a classification key to classify organisms 6. Identify invertebrates in the local environment. 7. Can I identify trees by their leaves? 8. Information Texts and LBQ Question Set
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<p><u>Maths Links:</u></p>	
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<p>NC Objectives</p>	<p>Knowledge Content</p>	<p>Working Scientifically</p>
<p><i>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</i></p> <p><i>Give reasons for classifying plants and animals based on specific characteristics.</i></p> <p><i>Working scientifically:</i></p> <p><i>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</i></p> <p><i>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</i></p> <p><i>Recording data and results of increasing complexity using</i></p>	<ul style="list-style-type: none"> • Know that plant taxonomy is the science that finds, identifies, describes, classifies, and names plants. <p>Classifying organisms</p> <ul style="list-style-type: none"> • Know that there are millions of species of living things on our planet. • Know that it would be difficult to describe and name each one individually. • Know that while species can be very different from each other, many of them have similar features that allow us to put them into groups. • Know that grouping things helps scientists identify gaps in their research and they get an idea of what to investigate next. <p>Modern classification system</p> <ul style="list-style-type: none"> • Know that, in 1735 (in the eighteenth century), Carl Linnaeus started the modern system of organising species of organisms into certain groups and giving them scientific names. <p>Carl Linnaeus (1707 - 1778)</p> <ul style="list-style-type: none"> • Each species is given a name using Latin words, so that the same name can be used all over the world. 	<p><u>Scientific Enquiry:</u></p> <p>Identifying, classifying & grouping</p> <p>Can I identify trees by their leaves?</p> <p>Children look at the leaves of 5 different trees common to the British isles and identify them using a dichotomous key. They discuss which of these trees they have seen in the local area.</p>

scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graph.

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 a 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.

- Know that Latin is the language which the ancient Romans used to speak and is used frequently in science for classifying animals
- Know that the scientific name for modern human beings is 'homo sapiens'.
- Know that homo means 'man' and sapiens means 'wise'.
- Know that homo is the genus name and sapiens is the species name. Putting different species into different groups according to their features is called classification.
- Know that a genus is a class of similar things, especially a group of animals or plants that includes several closely related species.
- Know that a species is a class of plants or animals whose members have the same main characteristics and are able to breed with each other.
- Know that plants can be classified into two groups - flowering and non-flowering.
- Know that non-flowering plants can be divided into two groups:
 - those that reproduce with dust-like particles called spores.
 - those that use seeds to reproduce
- Know the following plants by their appearance:

Flowering Plants	Non-flowering Plants
bluebell poppy rose dandelion daisy honeysuckle ivy snowdrop	ferns pine moss

- Know that mushrooms and fungi are not plants - they belong to a separate classification of living things called fungi.
- Revise the parts of a plant and their function: roots, stem, leaves, flower etc. (see Y2)

Life cycle of a plant

- Know that sexual reproduction in plants happens in a cycle-like pattern. Flowers come from seeds, and they create seeds too. All flowering plants go through the following life cycle:
 - Germination is the process by which a plant begins to grow from a seed. Roots form under the soil. The stem, leaves and flower emerge above the soil.
 - Pollen produced by a flower is carried by insects or blown by the wind to another flower. This process is called pollination.
 - When the pollen reaches another flower, it travels to the ovary where it fertilises the ovules (egg cells) to make seeds. This process is called fertilisation.
 - These seeds are scattered by animals or the wind. This process is called dispersal.
 - Some of the seeds will grow into new plants.
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- Know the parts of a flower related to reproduction - stamen (male) consists of the anther and filament.
 - The carpel (female) consists of the stigma, style, ovule and ovary.
 - Know how to label these on a diagram of a flower.

WORKING SCIENTIFICALLY

Scientific Enquiry

Investigation Ideas

(Years 1-6)

Investigative questions outlined in documentation from the Ogden Trust



Fair Tests:

Year 3

BIOLOGY: PLANTS

How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh?

CHEMISTRY: ROCKS

How does adding different amounts of sand to soil affect how quickly water drains through it?

PHYSICS: LIGHT

How does the number of layers of transparent plastic affect how much light can pass through?

PHYSICS: FORCES & MAGNETS

How does the mass of an object affect how much force is needed to make it move?

PHYSICS: LIGHT

How does the distance between the shadow puppet and the screen affect the size of the shadow?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

Does the amount of light affect how many woodlice move around?

CHEMISTRY: CHANGING STATES OF MATTER

How does the mass of a block of ice affect how long it takes to melt?

CHEMISTRY: CHANGING STATES OF MATTER

How does the surface area of a container of water affect how long it takes to evaporate?

PHYSICS: SOUND

How does the volume of a drum change as you move further away from it?

PHYSICS: ELECTRICITY

How does the thickness of a conducting material affect how bright the lamp is?

PHYSICS: SOUND

How does the length of a guitar string/tuning fork affect the pitch of the sound?

Year 5

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does the level of salt affect how quickly brine shrimp hatch?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does age affect a human's reaction time?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does the temperature of tea affect how long it takes for a sugar cube to dissolve?

PHYSICS: FORCES

How does the angle of launch affect how far a paper rocket will go?

PHYSICS: FORCES

How does the surface area of a container affect the time it takes to sink?

PHYSICS: FORCES

How does the surface area of a parachute affect the time it takes to fall to the ground?

Year 6

BIOLOGY: CLASSIFICATION

How does the temperature affect how much gas is produced by yeast?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does the length of time we exercise for affect our heart rate?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Can exercising regularly affect your lung capacity?

PHYSICS: LIGHT

How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface?

PHYSICS: ELECTRICITY

How does the voltage of the batteries in a circuit affect the brightness of the lamp?

PHYSICS: ELECTRICITY

How does the voltage of the batteries in a circuit affect the volume of the buzzer?



Comparative Tests:

Year 1

BIOLOGY: PLANTS

Which type of compost grows the tallest sunflower?

BIOLOGY: PLANTS

Which tree has the biggest leaves?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Is our sense of smell better when we can't see?

PHYSICS: SEASONAL CHANGES

In which season does it rain the most?

CHEMISTRY: EVERYDAY MATERIALS

Which materials are the most flexible?

CHEMISTRY: EVERYDAY MATERIALS

Which materials are the most absorbent?

Year 2

BIOLOGY: PLANTS

Do cress seeds grow quicker inside or outside?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do amphibians have more in common with reptiles or fish?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do bananas make us run faster?

BIOLOGY: LIVING THINGS & THEIR HABITATS

Is there the same level of light in the evergreen wood compared with the deciduous wood?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Which shapes make the strongest paper bridge?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Which material would be best for the roof of the little pig's house?

Year 3

BIOLOGY: PLANTS

Which conditions help seeds germinate faster?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does the skull circumference of a girl compare with that of a boy?

CHEMISTRY: ROCKS

Which soil absorbs the most water?

PHYSICS: LIGHT

Which pair of sunglasses will be best at protecting our eyes?

PHYSICS: FORCES & MAGNETS

Which magnet is strongest?

PHYSICS: FORCES & MAGNETS

Which surface is best to stop you slipping?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does the average temperature of the pond water change in each season?

BIOLOGY: ANIMALS, INCLUDING HUMANS

In our class, are omnivores taller than vegetarians?

CHEMISTRY: CHANGING STATES OF MATTER

Does seawater evaporate quicker than fresh water?

PHYSICS: SOUND

Which material is best to use for muffling sound in ear defenders?

PHYSICS: SOUND

Are two ears better than one?

PHYSICS: ELECTRICITY

Which metal is the best conductor of electricity?

Year 5

PHYSICS: FORCES

Which seed shape takes the longest time to fall?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Who grows the fastest, girls or boys?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

Which type of sugar dissolves the fastest?

PHYSICS: EARTH & SPACE

How does the length of daylight hours change in each season?

PHYSICS: FORCES

Which shoe is the most slippy?

PHYSICS: FORCES

Which shape parachute takes the longest to fall?

Year 6

BIOLOGY: CLASSIFICATION

Which is the most common invertebrate on our school playing field?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Which type of exercise has the greatest effect on our heart rate?

BIOLOGY: EVOLUTION & INHERITANCE

What is the most common eye colour in our class?

PHYSICS: LIGHT

Which material is most reflective?

PHYSICS: ELECTRICITY

Which make of battery lasts the longest?

PHYSICS: ELECTRICITY

Which type of fruit makes the best fruity battery?



Observations Over Time:

Year 1

BIOLOGY: PLANTS

How does a daffodil bulb change over the year?

BIOLOGY: PLANTS

How does my sunflower change each week?

PHYSICS: SEASONAL CHANGE

How does the oak tree change over the year?

BIOLOGY: AMIALS, INCLUDING HUMANS

How does my height change over the year?

CHEMISTRY: EVERYDAY MATERIALS

What happens to materials over time if we bury them in the ground?

CHEMISTRY: EVERYDAY MATERIALS

What happens to shaving foam over time?

PHYSICS: SEASONAL CHANGE

How does the colour of a UV bead change over the day?

Year 2

BIOLOGY: PLANTS

What happens to my bean after I have planted it?

BIOLOGY: AMIALS, INCLUDING HUMANS

How does a tadpole change over time?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does the school pond change over the year?

BIOLOGY: AMIALS, INCLUDING HUMANS

How much food and drink do I have over a week?

CHEMISTRY: USES OF EVERYDAY MATERIALS

How long do bubble bath bubbles last for?

CHEMISTRY: USES OF EVERYDAY MATERIALS

What will happen to our snowman?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Would a paper boat float forever?

Year 3

BIOLOGY: PLANTS

What happens to celery when it is left in a glass of coloured water?

BIOLOGY: PLANTS

How do flowers in a vase change over time?

CHEMISTRY: ROCKS

How does tumbling change a rock over time?

CHEMISTRY: ROCKS

What happens when water keeps dripping on a sandcastle?

PHYSICS: FORCES & MAGNETS

If we magnetise a pin, how long does it stay magnetised for?

PHYSICS: LIGHT

When is our classroom darkest?

PHYSICS: LIGHT

Is the Sun the same brightness all day?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does the variety of invertebrates on the school field change over the year?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does an egg shell change when it is left in cola?

CHEMISTRY: CHANGING STATES OF MATTER

Which material is best for keeping our hot chocolate warm?

CHEMISTRY: CHANGING STATES OF MATTER

How does the level of water in a glass change when left on the windowsill?

CHEMISTRY: CHANGING STATES OF MATTER

How does the mass of an ice cube change over time?

PHYSICS: ELECTRICITY

How long does a battery light a torch for?

PHYSICS: SOUND

When is our classroom the quietest?

Year 5

BIOLOGY: LIVING THINGS & THEIR HABITATS

How do brine shrimp change over their lifetime?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does a bean change as it germinates?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does our compost heap change over time?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does a container of salt water change over time?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does a sugar cube change as it is put in a glass of water?

CHEMISTRY: PROPERTIES & CHANGES OF MATERIALS

How does a nail in salt water change over time?

PHYSICS: FORCES

How long does a pendulum swing for before it stops?

Year 6

BIOLOGY: CLASSIFICATION

What happens to a piece of bread if you leave it on the windowsill for two weeks?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How does my heart rate change over the day?

BIOLOGY: EVOLUTION & INHERITANCE

How do different animal embryos change?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How much exercise do I do in a week?

PHYSICS: ELECTRICITY

Does the temperature of a light bulb go up the longer it is on?

PHYSICS: ELECTRICITY

How would you group electrical components and appliances based on what electricity makes them do?

PHYSICS: LIGHT

How does my shadow change over the day?



Pattern Seeking:

Year 1

PHYSICS: SEASONAL CHANGES

Do trees with bigger leaves lose their leaves first in autumn?

BIOLOGY: PLANTS

Is there a pattern in where we find moss growing in the school grounds?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do you get better at smelling as you get older?

PHYSICS: SEASONAL CHANGES

Does the wind always blow the same way?

CHEMISTRY: EVERYDAY MATERIALS

Is there a pattern in the types of materials that are used to make objects in a school?

Year 2

BIOLOGY: PLANTS

Do bigger seeds grow into bigger plants?

BIOLOGY: LIVING THINGS & THEIR HABITATS

What conditions do woodlice prefer to live in?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Which age group of children wash their hands the most in a day?

BIOLOGY: LIVING THINGS & THEIR HABITATS

Which habitat do worms prefer – where can we find the most worms?

PHYSICS: FORCES & MAGNETS

Do magnetic materials always conduct electricity?

Year 3

BIOLOGY: PLANTS

What colour flowers do pollinating insects prefer?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do male humans have larger skulls than female humans?

CHEMISTRY: ROCKS

Is there a pattern in where we find volcanoes on planet Earth?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Are you more likely to have bad eye sight and to wear glasses if you are older?

PHYSICS: FORCES & MAGNETS

Does the size and shape of a magnet affect how strong it is?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

How has the use of insecticides affected bee population?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Are foods that are high in energy always high in sugar?

CHEMISTRY: CHANGES IN STATES OF MATTER

Is there a pattern in how long it takes different sized ice lollies to melt?

PHYSICS: SOUND

Is there a link between how loud it is in school and the time of day? If there is a pattern, is it the same in every area of the school?

PHYSICS: ELECTRICITY

Which room has the most electrical sockets in a house?

Year 5

BIOLOGY: LIVING THINGS & THEIR HABITATS

Is there a relationship between a mammal's size and its gestation period?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Are the oldest children in our school the tallest?

PHYSICS: FORCES

Do all stretchy materials stretch in the same way?

PHYSICS: EARTH & SPACE

Is there a pattern between the size of a planet and the time it takes to travel around the Sun?

PHYSICS: FORCES

Do all objects fall through water in the same way?

Year 6

BIOLOGY: CLASSIFICATION

Do all flowers have the same number of petals?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Is there a pattern between what we eat for breakfast and how fast we can run?

BIOLOGY: EVOLUTION & INHERITANCE

Is there a pattern between the size and shape of a bird's beak and the food it will eat?

PHYSICS: LIGHT

Is there a pattern to how bright it is in school over the day? And, if there is a pattern, is it the same in every classroom?

PHYSICS: ELECTRICITY

Does the temperature of a light bulb go up the longer it is on?



Research:

Year 1

BIOLOGY: PLANTS

What are the most common British plants and where can we find them?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How are the animals in Australia different to the ones that we find in Britain?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Do all animals have the same senses as humans?

PHYSICS: SEASONAL CHANGES

Are there plants that are in flower in every season? What are they?

CHEMISTRY: EVERYDAY MATERIALS

How are bricks made?

CHEMISTRY: EVERYDAY MATERIALS HUMANS

Which materials can be recycled?

Year 2

BIOLOGY: PLANTS

How does a cactus survive in a desert with no water?

BIOLOGY: ANIMALS, INCLUDING HUMANS

What do you need to do to look after a pet dog/cat/lizard and keep it healthy?

BIOLOGY: ANIMALS, INCLUDING HUMANS

What food do you need in a healthy diet and why?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How does the habitat of the Arctic compare with the habitat of the rainforest?

CHEMISTRY: USES OF EVERYDAY MATERIALS

How have the materials we use changed over time?

CHEMISTRY: USES OF EVERYDAY MATERIALS

How are plastics made?

Year 3

BIOLOGY: PLANTS

What are all the different ways that seeds disperse?

CHEMISTRY: ANIMALS, INCLUDING HUMANS

Why do different types of vitamins keep us healthy and which foods can we find them in?

CHEMISTRY: ROCKS

Who was Mary Anning and what did she discover?

PHYSICS: LIGHT

How does the Sun make light?

PHYSICS: FORCES & MAGNETS

How have our ideas about forces changed over time?

PHYSICS: FORCES & MAGNETS

How does a compass work?

Year 4

BIOLOGY: LIVING THINGS & THEIR HABITATS

Why are people cutting down the rainforests and what effect does that have?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How do dentists fix broken teeth?

BIOLOGY: LIVING THINGS & THEIR HABITATS

What are hurricanes, and why do they happen?

PHYSICS: ELECTRICITY

How has electricity changed the way we live?

PHYSICS: ELECTRICITY

How does a light bulb work?

PHYSICS: SOUND

Do all animals have the same hearing range?

Year 5

BIOLOGY: LIVING THINGS & THEIR HABITATS

What are the differences between the life cycle of an insect and a mammal?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Why do people get grey/white hair when they get older?

BIOLOGY: LIVING THINGS & THEIR HABITATS

What are microplastics and why are they harming the planet?

PHYSICS: EARTH & SPACE

How have our ideas about the solar system changed over time?

PHYSICS: EARTH & SPACE

What unusual objects did Jocelyn Bell Burnell discover?

PHYSICS: FORCES

How do submarines sink if they are full of air?

Year 6

BIOLOGY: CLASSIFICATION

What do different types of microorganisms do? Are they always harmful?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How have our ideas about disease and medicine changed over time?

BIOLOGY: EVOLUTION & INHERITANCE

What happened when Charles Darwin visited the Galapagos islands?

BIOLOGY: EVOLUTION & INHERITANCE

Why do some people need to wear glasses to see clearly?

PHYSICS: ELECTRICITY

How has our understanding of electricity changed over time?

PHYSICS: LIGHT

How do astronomers know what stars are made of?



Identifying and Classifying:

Year 1

BIOLOGY: PLANTS

How can we sort the leaves that we collected on our walk?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How can we organise all the zoo animals?

BIOLOGY: ANIMALS, INCLUDING HUMANS

What are the names for all the parts of our bodies?

PHYSICS: SEASONAL CHANGES

How would you group these things based on which season you are most likely to see them in?

CHEMISTRY: EVERYDAY MATERIALS

We need to choose a material to make an umbrella. Which materials are waterproof?

CHEMISTRY: EVERYDAY MATERIALS

Which materials will float and which will sink?

Year 2

BIOLOGY: PLANTS

How can we identify the trees that we observed on our tree hunt?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Which offspring belongs to which animal?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How would you group these plants and animals based on what habitat you would find them in?

BIOLOGY: LIVING THINGS & THEIR HABITATS

How would you group things to show which are living, dead, or have never been alive?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Which materials are shiny and which are dull?

CHEMISTRY: USES OF EVERYDAY MATERIALS

Which materials will let electricity go through them, and which will not?

Year 3

BIOLOGY: PLANTS

How many different ways can you group our seed collection?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How do the skeletons of different animals compare?

CHEMISTRY: ROCKS

Can you use the identification key to find out the name of each of the rocks in your collection?

PHYSICS: LIGHT

How would you organise these light sources into natural and artificial sources?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How can we group the food that we eat?

PHYSICS: FORCES & MAGNETS

Which materials are magnetic?

Year 4

BIOLOGY: ANIMALS, INCLUDING HUMANS

What are the names for all the organs involved in the digestive system?

BIOLOGY: ANIMALS, INCLUDING HUMANS

How can we organise teeth into groups?

CHEMISTRY: CHANGING STATES OF MATTER

Can you group these materials and objects into solids, liquids, and gases?

BIOLOGY: LIVING THINGS & THEIR HABITATS

Can we use the classification keys to identify all the animals that we caught pond dipping?

PHYSICS: ELECTRICITY

How would you group these electrical devices based on where the electricity comes from?

CHEMISTRY: CHANGING STATES OF MATTER

How would you sort these objects/materials based on their temperature?

Year 5

BIOLOGY: ANIMALS, INCLUDING HUMANS

Can you identify all the stages in the human life cycle?

BIOLOGY: LIVING THINGS & THEIR HABITATS

Compare this collection of animals based on similarities and differences in their lifecycle.

CHEMISTRY: PROPERTIES AND CHANGES OF MATERIALS

Can you group these materials based on whether they are transparent or not?

PHYSICS: EARTH & SPACE

How could you organise all the objects in the solar system into groups?

PHYSICS: FORCES

Can you label and name all the forces acting on the objects in each of these situations?

PHYSICS: EARTH & SPACE

Can you observe and identify all the phases in the cycle of the Moon?

Year 6

BIOLOGY: CLASSIFICATION

How would you make a classification key for vertebrates/invertebrates or microorganisms?

BIOLOGY: ANIMALS, INCLUDING HUMANS

Which organs of the body make up the circulation system, and where are they found?

BIOLOGY: EVOLUTION & INHERITANCE

Compare the skeletons of apes, humans, and Neanderthals – how are they similar, and how are they different?

BIOLOGY: EVOLUTION & INHERITANCE

Can you classify these observations into evidence for the idea of evolution, and evidence against?

PHYSICS: LIGHT

Can you identify all the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together?

PHYSICS: ELECTRICITY

How would you group electrical components and appliances based on what electricity makes them do?