

# Hadley Wood Primary School

## Science Curriculum Overview



### Our Vision

...that every child will leave our school **confident** in their own abilities and excited about the future, with the strategies and skills to tackle tasks and situations in a **capable** manner and **caring** about their planet and their fellow humans.

## **Curriculum Intent:**

It is our intent at Hadley Wood Primary School for pupils to be fully immersed in every aspect of Science and for them to recognise the importance of Science in daily life. We ensure the teaching and learning of Science has the importance and prominence it deserves by delivering a well-rounded, engaging curriculum. We use Snap Science as programme of study which enhances our quality first teaching.

As part of the Long Term Plan, year groups are allocated science topics to ensure that children cover all aspects of science as they progress through the school. Snap Science outlines ideas for planning which are adapted by class teachers to meet the needs of our pupils.

We aim for all children at Hadley Wood to:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics;
- develop understanding of nature, processes and methods of science through different types of science enquiries that help them to answer
- ask scientific questions about the world around them develop knowledge and understanding of important scientific ideas, processes and skills and relate these to everyday experiences;
- equip children with the scientific knowledge required to understand the uses and implications of science, today and for the future.
- develop attitudes of curiosity, originality, co-operation, perseverance, open mindedness, self-criticism, responsibility and independence in thinking;
- learn about ways of thinking and of finding out about and communicating ideas;
- retain and develop their natural sense of curiosity about the world around them;
- ask and answer scientific questions;
- develop the accurate use of scientific vocabulary through a range of enjoyable and interesting experiences;
- develop the skills to make systematic enquiries.

## **How we plan and teach science:**

Science is taught weekly by the class teacher. Scientific concepts are linked to practical experiences whenever appropriate to reinforce core understanding.

We ensure that the 'Working Scientifically' skills are built-on and developed throughout children's time at our school so that they can apply their knowledge of science when using equipment, carrying out practical investigations and explaining concepts confidently whilst continuing to ask questions and be curious about their surroundings. We achieve this through the 'Science Ninja approach to learning' whereby children are rewarded for demonstrating and improving their practical science skills during science activities and investigations.

Children to take control of their own learning and develop a love of learning through the use of a 'big question' approach. This is a carefully selected question which drives the topic and encourage deeper and broader thinking. Class teachers ensure that the question offers a high threshold question to challenge thinking and develop enquiry and **curiosity**. As children move through the school the skills and knowledge they acquire are revisited, consolidated and built upon, in order for the children to have the opportunity to achieve in all scientific concepts. For example, the topic of light is taught in Year 3 and the concepts are consolidated and built upon in Year 6.

### What you will see in our science lessons:

- 1 Working scientifically**, asking questions and testing ideas against evidence, is the most effective way for children to learn about science. Therefore each lesson **has a clear science enquiry focus**.
- Every lesson is carefully planned around **a question for children to answer**, either inside the classroom or outside. By ensuring that these questions spark children's enquiry and **curiosity** children are engaged in their learning and want to find out the answer. Lessons are purposeful and result in children gaining a new understanding of the world around them.
- In each lesson the **learning objective** is designed so that children have a powerful understanding of the skills and understanding they are developing in the lesson. **Success criteria** define the features of the learning intention in the context of the activity so that children can identify what they are aiming for and how well they are doing.
- Learning is effectively sequencing by sharing prior learning '**building blocks**' at the start of each lesson/topic/new concept. We recognise that children are more likely to retain new learning if it connected to prior understanding. Building blocks help pupils of all levels to connect learning and promote **independence**.
- Teachers start each lesson with a discursive statement to engage pupils and draw links between prior and new learning. Different levels of challenge and 'what if' challenges help to ensure our children have high aspirations of themselves and strive to be the best they can be.
- Teachers skilfully use the 'Deliberate Mistake' approach to learning to build pupil **resilience** to failure alongside their ability to work independently to problem solve. This embeds the concept that making mistakes is integral to the learning process.

## Science Long Term Overview: EYFS – Year 6

### Rationale for Sequencing

Development matters			Curriculum provision	Contribution on wider Science knowledge and what later content this prepares for
Three and Four Year Olds	Communication and Language	Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"	Provide regular opportunities to develop strength, control and co-ordination on the outdoor physical trail. Regularly discuss progress and achievements.	Planned opportunities during PE sessions to promote health awareness by talking about exercise, its effect on their bodies and the contribution exercise makes to health.  Provide opportunities to involve all children in being active e.g. large and small outdoor climbing equipment, lunchtime activities and in-school sports events.  Provide opportunities for children to learn about and discuss healthy eating choices e.g. snack time and cooking activities, and to begin to develop an understanding of their own well-being e.g. through PSHE and circle times.  Through 'People Who Help Us', learn about the role doctors, dentists, nurses play in keeping us healthy and participate in whole school events such as Road Safety Week and Safer Internet Day.
	Personal, Social and Emotional Development	Make healthy choices about food, drink, activity and toothbrushing.	During PE sessions have discussions about the effects exercise has on our bodies.  Provide opportunities for children to compare and describe different environments through stories, non-fiction texts and maps.	
	Understanding the World	Use all their senses in hands-on exploration of natural materials.  Explore collections of materials with similar and/or different properties.  Talk about what they see, using a wide vocabulary.  Begin to make sense of their own life-story and family's history.  Explore how things work.	Plant cress seeds and have discussions about the changes occurring and how we can influence them.  Make observations of our caterpillars through drawings and photographs to document their life cycles.  Regularly discuss how to look after our local area and in particular our school. Learning about recycling and collecting litter around the school.  Explore the similarities and differences in relation to food. Make porridge and	

		<p>Plant seeds and care for growing plants.</p> <p>Understand the key features of the life cycle of a plant and an animal.</p> <p>Begin to understand the need to respect and care for the natural environment and all living things.</p> <p>Explore and talk about different forces they can feel.</p> <p>Talk about the differences between materials and changes they notice.</p>	<p>melt chocolate, discussing textures and changes.</p> <p>When decorating biscuits discuss managing own basic hygiene and the importance if this beforehand.</p> <p>Provide opportunities for children to look at icicles and discuss how they are formed.</p> <p>Regularly share stories and videos in regards to the importance of good hygiene.</p> <p>Children are encouraged to change independently for PE.</p>	<p>Provide opportunities for children to observe things closely e.g. plants and mini beasts using magnifying glasses, life cycle of a butterfly, changing weather and seasons.</p> <p>Enable children to record observations by creating diagrams, drawings and diaries as well as digitally using photos and video e.g. measuring the height of a plant at different times, comparing photos of different leaves.</p> <p>Introduce and use vocabulary that enables children to talk about their observations and experiences e.g. smooth, soft, shiny, hard.</p> <p>Planned activities enable children to show care and concern for living things e.g. egg hatching and raising chicks, planting and watering bean plants, and also for the environment e.g. Trash Mob.</p> <p>Introduce concepts such as floating and sinking, melting and freezing through activities and dedicated workshops.</p> <p>Link stories to real-life contexts e.g. Humpty Dumpty and encourage children to devise simple fair tests, record observations and draw conclusions.</p>
Reception	Communication and Language	<p>Learn new vocabulary.</p> <p>Ask questions to find out more and to check what has been said to them.</p> <p>Articulate their ideas and thoughts in well-formed sentences.</p> <p>Describe events in some detail.</p> <p>Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.</p> <p>Use new vocabulary in different contexts</p>	<p>Provide opportunities for children to taste healthy foods and discuss the importance of healthy food choices.</p> <p>Provide opportunities for children to compare and describe different environments through stories, non-fiction texts and maps.</p> <p>Apply our knowledge of floating and sinking to create ice models, dropping different items into water.</p> <p>Make observations of <b>changes</b> in the world around us. Take photos and observational drawings during our Autumn walk. This will be continued throughout the year as seasons change.</p>	
	Personal, Social and Emotional Development	<p>Know and talk about the different factors that support their overall</p>		

			<p>health and wellbeing:</p> <ul style="list-style-type: none"> <li>&gt;regular physical activity</li> <li>&gt;healthy eating</li> <li>&gt;toothbrushing</li> <li>&gt;sensible amounts of 'screen time'</li> <li>&gt;having a good sleep routine</li> <li>&gt;being a safe pedestrian</li> </ul>		<p>Use stories as the starting point for investigations e.g. The Three Little Pigs to begin to understand the properties of materials.</p>
	Understanding the World		<p>Explore the natural world around them.</p> <p>Describe what they see, hear and feel while they are outside.</p> <p>Recognise some environments that are different to the one in which they live.</p> <p>Understand the effect of changing seasons on the natural world around them.</p>		
ELG	Communication and Language	Attention and Understanding	<p>Make comments about what they have heard and ask questions to clarify their understanding</p>		
	Personal, Social and Emotional Development	Managing Self	<p>Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.</p>		

	Understanding the World	The Natural World	<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>		
--	-------------------------	-------------------	---	--	--

Year 1	Substantive Knowledge Content based around a Big Question	Recurring themes, ideas and language	Contribution on wider Science knowledge and what later content this prepares for
Autumn 1	<p><b>Which body parts are linked to our 5 senses?</b></p> <p>Identify, name and compare parts of our bodies</p> <p>Describe, compare and group different edible materials by using the sense of taste</p> <p>Identify, compare and group the sounds collected during a sound walk</p> <p>Describe how our sense of touch helps us to learn about the world around us.</p> <p>Describe and compare a variety of different smells, identifying which are the most and least liked by the class</p> <p>Describe how our senses help us to find out about the world</p>	<p>Pupils build on their knowledge of themselves (All about Me topic - EYFS), with plenty of opportunities to learn and recall the main parts of the human body by using their own bodies as a reference. They use their <b>senses: smell, touch, taste, sound and sight</b> to <b>compare</b> different textures, sounds and smells.</p> <p>When <b>working scientifically</b>, pupils will carry out a variety of <b>comparative tests and identifying and classifying enquiries</b>.</p> <p><i>NC Objectives:</i>  <i>Working scientifically:</i>  <i>&gt;asking simple questions and recognising they can be answered in different ways</i>  <i>&gt;performing simple tests</i>  <i>&gt;observing closely using simple equipment</i></p>	<p>Pupils have the opportunity to build on this knowledge in <b>year 2</b> where they learn how to keep the body healthy, including the parts of the body learned about in this unit.</p> <p>Pupils build on this basic knowledge of the human body throughout their primary school science careers with:  <b>Year 3: Musculoskeletal</b>  <b>Year 4: Digestion</b>  <b>Year 6: Circulatory system</b></p> <p>Pupils continue to learn about hearing and sound in <b>year 4</b></p>

		<p>&gt; <i>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with which sense</i></p>	
Autumn 2 & Spring 1	<p><b>What are the properties of wood, plastic, glass, metal, water, and rock?</b></p> <p>Identify and name everyday materials</p> <p>Identify and name paper in a variety of form</p> <p>Identify and name a variety of fabrics</p> <p>Recognise that most objects are made from more than one material</p> <p>Describe how the same type of object can be made using different materials</p> <p>Identify and describe the physical properties of a selection of materials</p> <p>Investigate the stretchiness and flexibility of selected materials</p> <p>Explore the properties of absorbency and waterproofing</p>	<p>Pupils <b>explore, name, describe, classify</b>, discuss and raise and answer questions about <b>everyday materials</b> so that they become familiar with the names of materials and properties such as: <b>hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent.</b></p> <p>When <b>working scientifically</b> there is a strong emphasis on pupils using <b>their senses to observe</b> - closely building learning from their previous unit of work on the senses. Pupils learn to <b>identify, name and sort materials</b>, they also learn how to <b>group and classify</b> them using separate and overlapping sorting rings, simple tables and <b>Carroll diagrams.</b></p> <p><i>NC Objectives:</i>  <i>Working scientifically</i></p> <p>&gt; <i>asking simple questions and recognising they can be answered in different ways</i>  &gt; <i>performing simple tests</i>  &gt; <i>observing closely using simple equipment</i>  &gt; <i>identifying and classifying</i>  &gt; <i>using observations and ideas that suggest answers to questions</i></p> <p>&gt; <i>distinguish between an object and the material from which it is made</i>  &gt; <i>identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</i>  &gt; <i>describe the simple physical properties of a variety of everyday materials</i>  &gt; <i>compare and group together a variety of everyday materials on the basis of their simple physical properties</i></p>	<p>Pupils continue to explore materials in:</p> <p><b>Year 2:</b> Pupils test the suitability of certain materials</p> <p><b>Year 5:</b> Pupils deepen their understanding of sorting materials, properties of materials and mixtures: reversible and irreversible changes</p>
Spring 2	<p><b>What is the same and what is different about plants and flowers?</b></p>	<p>Pupils use the local environment throughout the year to explore and answer questions about <b>plants</b> growing in their</p>	<p>Pupils have the opportunity to build on earlier learning during <b>EYFS</b>, where they will have had a</p>

	<p>Identify, name, describe and compare some familiar garden plants in the local environment</p> <p>Identify, name, describe and compare a variety of familiar wild plants in the local environment</p> <p>Compare a variety of familiar flowering plants and group them according to the similarities in their flowers</p> <p>Describe and compare the root systems of a variety of familiar plants</p> <p>Identify and name, describe and compare a variety of trees in the local environment</p>	<p><b>habitat.</b> Pupils <b>observe</b> the <b>growth</b> of <b>flowers</b> and <b>vegetables</b> that they have planted. Pupils become familiar with common names of flowers, examples of deciduous and evergreen trees.</p> <p>When working scientifically there is a strong emphasis on <b>observing</b> closely, <b>identifying and classifying</b>, and <b>comparing and contrasting</b>. Pupils use simple vocabulary to describe their <b>observations</b> and to identify <b>similarities and differences</b>, and <b>group</b> the evidence they collect in different ways,</p> <p><i>NC objectives:</i>  <i>Working Scientifically:</i>  <i>&gt;asking simple questions and recognising that they can be answered in different ways</i>  <i>&gt;observing closely, using simple equipment</i>  <i>&gt;identifying and classifying</i>  <i>&gt;using their observations and ideas to suggest answers to questions</i></p> <p><i>&gt;identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</i>  <i>&gt;identify and describe the basic structure of a variety of common flowering plants, including trees</i></p>	<p>variety of plant-related experiences: using their senses, looking at, smelling and tasting, planting and growing things, and becoming aware of obvious differences between things, for example, between different leaves and different flowers.</p> <p>Pupils develop their knowledge of plants in their environment in:  <b>Year 6:</b> In depth classification of plants</p>
Summer 1	<p><b>What do animals need to stay alive?</b></p> <p>Identify different animals seen around school at different times of the year</p> <p>Describe and identify birds that visit our bird feeders at different times</p> <p>Describe the needs of snails and what happens as they change and grow.</p> <p>Describe the day to day needs of a pet and how they should be cared for over an extended period of time</p>	<p>Pupils use the local environment throughout the year to <b>explore</b> and answer questions about animals in their habitat. They understand how to take care of animals taken from their local environment and the need to return them safely after study.</p> <p><i>NC objectives:</i>  <i>Working Scientifically:</i>  <i>&gt;asking simple questions and recognising that they can be answered in different ways</i>  <i>&gt;observing closely, using simple equipment</i>  <i>&gt;identifying and classifying</i>  <i>&gt;using their observations and ideas to suggest answers to questions</i></p>	<p>Pupils build on their observations of animals in their immediate environment.</p> <p>Pupils develop this classification throughout their Science careers at school:  <b>Year 2:</b> Pupils develop their knowledge of what groups of animals eat to learn about food chains  <b>Year 4:</b> Pupils develop their knowledge of what groups of animals eat to learn about food webs  <b>Year 6:</b> Pupils build on their knowledge in order to classify in a more detailed manner</p>

		<p><i>&gt;gathering and recording data to help in answering questions</i></p> <p><i>&gt;identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</i></p>	
Summer 2	<p><b>How do animals differ from one another?</b></p> <p>Identify and name a variety of common animals</p> <p>Describe and compare the body structures of different kinds of animals</p> <p>Describe and compare different kinds of fish</p> <p>Observe the main features of birds, including feathers, and to compare these in different kinds of birds</p> <p>Describe and compare how different kinds of animals move</p> <p>Recognise that some animals mainly eat meat (carnivores), some only eat plant materials (herbivores) and some eat both (omnivores)</p> <p>Describe how the lives of nocturnal animals differ from those of animals seen during the daytime</p>	<p>Pupils become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.</p> <p>Pupils compare <b>observable features</b> from a range of groups. Pupils use <b>classification</b> to group animals according to what they eat. Pupils are also introduced to the terms 'carnivore', 'herbivore' and 'omnivore'.</p> <p><i>NC objectives:</i></p> <p><i>Working Scientifically:</i></p> <p><i>&gt;asking simple questions and recognising that they can be answered in different ways</i></p> <p><i>&gt;identifying and classifying</i></p> <p><i>&gt;using their observations and ideas to suggest answers to questions</i></p> <p><i>&gt;identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</i></p> <p><i>&gt;identify and name a variety of common animals that are carnivores, herbivores and omnivores</i></p> <p><i>&gt;describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</i></p>	<p>Pupils build on their observations of animals in their immediate environment.</p> <p>Pupils develop this classification throughout their Science careers at Hadley Wood:</p> <p><b>Year 2:</b> Pupils develop their knowledge of what groups of animals eat to learn about food chains</p> <p><b>Year 4:</b> Pupils develop their knowledge of what groups of animals eat to learn about food webs</p> <p><b>Year 6:</b> Pupils build on their knowledge in order to classify in a more detailed manner</p>
Throughout the course of the year	<p><b>How do the seasons change our world around us?</b></p> <p>Observe and describe weather associated with the seasons</p>	<p>Pupils have the opportunity to <b>observe</b> and <b>record</b> their immediate environment at this time of the year. This also builds on their EYFS learning of the seasons, what they are and some particular observable details that define them.</p> <p>Pupils will observe the differences in <b>weather</b> associated with the seasons and how these change. They will consider</p>	<p>Pupils have the opportunity to explore this unit throughout their school career building animals and plants into the topic.</p> <p>In <b>year 5</b> pupils build on their understanding of day length in a unit about the sun, moon and earth</p>

	Observe and describe how day length varies.	the <b>variation in the length of the day</b> as the seasons change and how this affects them.	
	What flowers do we see?	<i>National Curriculum:</i> >observe changes across the 4 seasons	
	What colour are the leaves on the plants?	>observe and describe weather associated with the seasons and how day length varies	
<b>Year 2</b>	<b>Substantive Knowledge Content based around a Big Question</b>	<b>Recurring themes, ideas and language</b>	<b>Contribution on wider Science knowledge and what later content this prepares for</b>
Autumn 1	<p><b>What materials are suitable for covering a tent?</b></p> <p>describe objects, including naming the material from which they are made</p> <p>Identify objects made of particular materials</p> <p>Explain if a material is a good choice for an object</p> <p>Test different fabrics to decide which is the best to use for each of the briefs gi</p>	<p>Pupils consolidate their understanding that one type of object can be made from different <b>materials</b> and also that one <b>material</b> can be used for a number of different objects. They continue to develop their understanding of the simple <b>physical properties of materials</b> and consider in more detail how these properties make <b>materials useful</b> for particular purposes.</p> <p>Pupils <b>test</b> a range of different <b>materials</b> for different purposes. They also have an opportunity to think about creative and unusual uses of everyday materials and find out about <b>John Dunlop</b>, who invented rubber pneumatic tyres.</p> <p>When <b>working scientifically</b> pupils will be <b>classifying materials</b>, carrying out comparative tests for different properties and using the <b>results</b> of their tests to suggest suitable (good) choices for a particular purpose.</p> <p><i>NC objectives:</i> <i>Working Scientifically:</i> &gt;asking simple questions and recognising that they can be answered in different ways &gt;performing simple tests &gt;identifying and classifying &gt;using their observations and ideas to suggest answers to questions &gt;gathering and recording data to help in answering questions</p>	<p>Pupils build on learning from <b>Year 1</b> about different materials and their properties.</p> <p>These ideas are further developed in <b>Year 5</b> pupils will develop their understanding of everyday materials.</p>

		<p>&gt;identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>&gt;find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>	
Autumn 2	<p><b>What materials would be suitable for making a catapult?</b></p> <p>Understand and correctly use scientific words related to changing shape</p> <p>Recognise that different objects made from the same material can have different properties, and to sort objects according to how their shapes can be changed</p> <p>Test whether materials are flexible, rigid, stretchy, squashy, elastic or stiff</p> <p>Make links between materials and how they are used</p>	<p>Pupils are introduced to different ways of <b>changing</b> the <b>shapes of objects</b> made from different <b>materials</b>. They identify <b>materials</b> that can be <b>changed</b> by the actions of <b>squashing, bending, twisting and stretching</b>, and link these actions with the <b>properties of the materials</b> that allow them to be changed. They discover that some <b>materials have different properties</b> according to how they are shaped and what they are made into, and choose materials for uses according to their properties. They also learn that <b>pushes and pulls</b> can cause <b>movement or a change in shape</b></p> <p><i>NC objectives:</i>  <i>Working Scientifically:</i>          &gt;asking simple questions and recognising that they can be answered in different ways          &gt;observing closely, using simple equipment          &gt;performing simple tests          &gt;using their observations and ideas to suggest answers to questions</p> <p>&gt;identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>&gt;find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>	<p>Pupils build on their <b>year 1</b> learning by also thinking about the properties of materials that make them suitable or unsuitable for particular purposes and they are encouraged to think about unusual and creative uses for everyday materials.</p> <p>This unit of work will prepare pupils for learning in <b>Year 2</b>, where children link a range of other properties to the uses of materials.</p>
Spring 1	<p><b>How do animals survive in the harsh conditions of the Polar Regions?</b></p> <p>Recognise and compare the main components of some different habitats</p> <p>Construct examples of food chains for a selection of habitats</p>	<p>Pupils begin to learn about different <b>habitats</b>, how the <b>living things</b> are suited to the <b>habitat</b> and the interactions between the <b>living organisms</b> within a habitat.</p> <p>They will explore the <b>habitat</b> by identifying things that are <b>living, once-lived and never-lived</b>. Pupils will construct</p>	<p>This unit builds on prior understanding gained in <b>Year 1</b>, Looking at Animals. Pupils learn that animals eat different types of food.</p> <p>Pupils learn how living things are suited to a particular habitat, again building on work in <b>Year 1</b>, Looking at Animals.</p>

	<p>Identify ways in which living things are suited to their habitat</p>	<p><b>food chains</b> that show how living things depend on each other.  <i>NC objectives:</i>  <i>Working Scientifically:</i>  <i>&gt;asking simple questions and recognising that they can be answered in different ways</i>  <i>&gt;identifying and classifying</i>  <i>&gt;using their observations and ideas to suggest answers to questions</i></p> <p><i>&gt;explore and compare the differences between things that are living, dead, and things that have never been alive</i>  <i>&gt;identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</i>  <i>&gt;identify and name a variety of plants and animals in their habitats, including microhabitats</i>  <i>&gt;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</i></p>	<p>This is further developed in <b>Year 6:</b> Everything Changes unit of work.</p>
<p>Spring 2</p>	<p><b>How do animals (including humans) change throughout their lives?</b></p> <p>Recognise the needs of a human baby for survival</p> <p>Compare features of a baby and a child</p> <p>Classify and describe changes that happen as people grow older</p> <p>Investigate whether older children have bigger heads</p>	<p>Pupils are introduced to the processes of <b>reproduction</b> and <b>growth</b> in animals. This is also a topic learned in EYFS living and growing. Continuous provision allows the children to explore and have pets in their learning environment, such as chicks, butterflies and frogs.</p> <p>The following terminology are used in year 2: <b>egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep.</b> Growing into adults can include reference to baby, toddler, child, teenager, adult.</p> <p><i>NC objectives:</i>  <i>Working Scientifically:</i>  <i>&gt;asking simple questions and recognising that they can be answered in different ways</i>  <i>&gt;performing simple tests</i>  <i>&gt;identifying and classifying</i>  <i>&gt;using their observations and ideas to suggest answers to questions</i></p>	<p>When pupils reach <b>year 5</b> they continue their learning of life cycles and develop their knowledge by making comparisons within the animal kingdom.</p>

		<p><i>&gt;gathering and recording data to help in answering questions</i></p> <p><i>&gt;notice that animals, including humans, have offspring which grow into adults</i></p> <p><i>&gt;find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</i></p> <p><i>&gt;describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</i></p>	
Summer 1	<p><b>How do different elements of a habitat depend on each other?</b></p> <p>Observe and identify what plants and animals live in different habitats</p> <p>Construct examples of food chains for a selection of habitats</p> <p>Identify ways in which living things are suited to their habitat</p>	<p>Pupils learn about different <b>habitats</b>, how the <b>living things</b> are suited to the <b>habitat</b> and the interactions between the living organisms within a habitat.</p> <p>Pupils will explore the <b>habitat</b> by identifying things that are <b>living, once-lived and never-lived</b>. They construct <b>food chains</b> that show how living things depend on each other.</p> <p><i>NC objectives:</i></p> <p><i>Working Scientifically:</i></p> <p><i>&gt;asking simple questions and recognising that they can be answered in different ways</i></p> <p><i>&gt;identifying and classifying</i></p> <p><i>&gt;using their observations and ideas to suggest answers to questions</i></p> <p><i>&gt;gathering and recording data to help in answering questions</i></p> <p><i>&gt;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</i></p> <p><i>&gt;Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</i></p> <p><i>&gt; identify and name a variety of plants and animals in their habitats, including microhabitats</i></p>	<p>This builds on the understanding gained in <b>Year 1: Looking at Animals</b>, that animals eat different types of food. Finally they consider how living things are suited to a particular habitat, again building on work in Year 1,</p> <p>Understanding is further developed in <b>Year 6: Everything Changes</b></p>
Summer 2	<p><b>What do plants need to grow?</b></p> <p>Identify which seeds will grow into which types of plants</p> <p>Plan and set up an investigation into how seeds should be planted</p>	<p>Pupils will access the local environment throughout the year to observe how different plants grow. To build on their knowledge of the parts of a plant (year 1) they are introduced to the requirements of plants for <b>germination</b>,</p>	<p>Pupils' knowledge of plants is a recurring theme throughout the Hadley Wood science curriculum. Each year the pupils build on their knowledge:</p>

	Decide how to improve the condition of an unhealthy plant	<p><b>growth and survival</b>, as well as to the processes of <b>reproduction</b> and <b>growth</b> in plants.</p> <p>Pupils learn that <b>seeds and bulbs</b> need <b>water</b> to <b>grow</b> but most do not need <b>light</b>; <b>seeds</b> and <b>bulbs</b> have a store of food inside them.</p> <p><i>NC objectives:</i>  <i>Working Scientifically:</i>  <i>&gt;asking simple questions and recognising that they can be answered in different ways</i>  <i>&gt;observing closely, using simple equipment</i>  <i>&gt;performing simple tests</i>  <i>&gt;using their observations and ideas to suggest answers to questions</i>  <i>&gt;gathering and recording data to help in answering questions</i></p> <p><i>&gt;observe and describe how seeds and bulbs grow into mature plants</i>  <i>&gt;find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</i></p>	<p><b>Year 3:</b> Explore the parts of plants and their functions, the requirements of plants for healthy growth and how this varies from plant to plant, start to investigate the life cycle.  <b>Year 4:</b> Classification  <b>Year 5:</b> Reproduction (building on the life cycle)  <b>Year 6:</b> Classification (building on learning in year 4)</p>
	Describe the different stages of germination		
	Identify what plants need for healthy growth		
<b>Year 3</b>	<b>Substantive Knowledge Content based around a Big Question</b>	<b>Recurring themes, ideas and language</b>	<b>Contribution on wider Science knowledge and what later content this prepares for</b>
Autumn 1 & Autumn 2	<p><b>Are all rocks the same?</b></p> <p>Examine different rocks in order to describe, compare and contrast their properties</p> <p>Sort rocks according to their properties using a key</p> <p>Recognise where and how rocks are used and explain how their properties make them suitable</p> <p>Test and compare rocks to identify which is the hardest</p> <p>Explore which rocks are waterproof</p> <p>Investigate how rocks change over time</p> <p>Recognise that soils are made partly from rock that has broken down into</p>	<p>Pupils will work as 'Rock Detectives' establishing core knowledge and understanding of <b>rocks</b>, their relationship to <b>soils</b> and how <b>fossils</b> have formed over time.</p> <p>Pupils will identify and name <b>rocks</b>, describing and comparing their observable properties and sorting them using a key. They will identify ways in which rocks are used in the local environment and suggest why the properties of certain <b>rocks</b> make them suitable for particular purposes. They will consider how <b>rocks</b> are affected by weathering over time and work scientifically to carry out tests to establish the <b>hardness</b> and <b>permeability</b> of different kinds of <b>rocks</b>.</p>	<p>Knowledge developed in this unit around soils will lay the foundations for learning in the <b>Year 5</b> Properties and changes of materials unit of work.</p>

	<p>smaller particles and describe some of the properties of different types of soils</p> <p>Investigate and test different kinds of soils to see how quickly water drains through</p> <p>Explore fossils to find out what they are</p> <p>Explain how fossils came to be formed</p>	<p>In learning about <b>fossils</b> pupils will discover what a <b>fossil</b> is and how they came to be formed from animal and plant remains. They will learn the names of a variety of common <b>fossils</b>, and about the stages of the <b>fossilisation</b> process.</p> <p><i>NC Objectives</i></p> <p><i>Working Scientifically:</i></p> <ul style="list-style-type: none"> <li>&gt;asking relevant questions and using different types of scientific enquiries to answer them</li> <li>&gt;setting up simple practical enquiries, comparative and fair tests</li> <li>&gt;gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>&gt;identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>&gt;using straightforward scientific evidence to answer questions or to support their findings.</li> </ul> <ul style="list-style-type: none"> <li>&gt;compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>&gt;describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>&gt;recognise that soils are made from rocks and organic matter</li> </ul>	
Spring 1	<p><b>How do magnets affect each other?</b></p> <p>Explore how a force is required to make something start to move</p> <p>Explore how air can make things move</p> <p>Explore how objects move on different materials</p> <p>Explore which materials are magnetic</p> <p>Measure the strength of a magnet in different ways</p> <p>Identify the two poles on a magnet and investigate how magnets attract or repel each other</p>	<p>Pupils will explore how <b>forces</b> can make objects start to move, speed up, slow down or change direction. They will compare how things move on different surfaces. They will learn that some <b>forces</b> need contact between two objects, but that <b>magnetic forces</b> can act at a distance.</p> <p>Pupils will identify that <b>magnets attract</b> some <b>materials</b> and not others and that these are known as <b>magnetic materials</b>. They will learn that some <b>metals</b>, but not all, are <b>magnetic</b> and that all <b>nonmetals</b> are non-magnetic.</p> <p><i>NC Objectives</i></p>	<p>Forces and magnets is a new concept introduced in Year 3. Pupils about a push and a pull force that is exerted on an object, and the effects that this force has. The children also learn that without this force, movement is not possible. In this unit the children also extend their knowledge of forces to include the attraction and repulsion of a magnet. This unit is language rich and pupils learn this language in order to stand them in good stead for the forces units that follow across KS2.</p>

		<p><i>Working Scientifically:</i></p> <ul style="list-style-type: none"> <li>&gt;asking relevant questions and using different types of scientific enquiries to answer them</li> <li>&gt;setting up simple practical enquiries, comparative and fair tests</li> <li>&gt;making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment,</li> <li>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>&gt;using straightforward scientific evidence to answer questions or to support their findings.</li> </ul> <ul style="list-style-type: none"> <li>&gt;compare how things move on different surfaces</li> <li>&gt;notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</li> <li>&gt;observe how magnets attract or repel each other and attract some materials and not others</li> <li>&gt;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</li> <li>&gt;describe magnets as having 2 poles</li> <li>&gt;predict whether 2 magnets will attract or repel each other, depending on which poles are facing</li> </ul>	<p>Although this is a new unit the children are prepared for this learning in <b>Year 1</b> and <b>Year 2</b> when they study Materials and their Properties. The children exert a push, pull, twist and bend force onto various materials to see the effects</p> <p>Pupils will compare how things move on different surfaces. This idea will be developed further in <b>Year 5</b> when they will learn about friction.</p>
Spring 2	<p><b>How does light affect our everyday life?</b></p> <p>Explore how we need light to see things and why some things are easier to see than others</p> <p>Investigate how different objects reflect different amounts of light</p> <p>Design and produce reflective strips for night safety</p>	<p>Pupils start their formal look at <b>light</b> in this unit of work and whilst they will have some prior experience at home, this has not been covered in school before.</p> <p>Pupils will learn about how we <b>see</b> objects, the ways in which different objects <b>reflect</b> different amounts of light and how these ideas can be applied to staying safe at night.</p> <p>They will explore what causes a <b>shadow</b>, as well as how the shape and size of a <b>shadow</b> can be affected by its position.</p>	<p>Pupils learn that light is necessary to see things in this unit of work. This concept is developed to include the path of light from objects to our eyes in order to see things in <b>Year 6</b>.</p> <p>In Year 3 pupil learn that light travels in a straight line, this is developed to an explanation of the consequences of the way light travels e.g. this affects the shape of a shadow.</p>

	<p>Explain how a mirror works and describe how images in mirrors may look 'different'</p>	<p>Pupils will also learn how exposure to <b>sunlight</b> can cause harm, and about ways by which they can protect themselves.</p>	<p>The children's knowledge of shadows is developed by the fact that shadows are made by opaque objects, to the size and shape of shadows according to the position of the light source. Patterns are investigated in <b>Year 6</b>.</p>
	<p>Identify how shadows are formed and what affects the shape</p>	<p><i>NC Objectives</i></p>	
	<p>investigate how to change the size of a shadow</p>	<p><i>Working Scientifically:</i></p> <ul style="list-style-type: none"> <li>&gt;asking relevant questions and using different types of scientific enquiries to answer them</li> <li>&gt;setting up simple practical enquiries, comparative and fair tests</li> <li>&gt;making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>&gt;gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>&gt;identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>&gt;using straightforward scientific evidence to answer questions or to support their findings.</li>   <li>&gt;recognise that they need light in order to see things and that dark is the absence of light</li> <li>&gt;notice that light is reflected from surfaces</li> <li>&gt;recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>&gt;recognise that shadows are formed when the light from a light source is blocked by an opaque object</li> <li>&gt;find patterns in the way that the size of shadows change</li> </ul>	
<p>Summer 1</p>	<p><b>What do plants need in order to grow and remain healthy?</b></p>	<p>Pupils will learn about the <b>absorption</b> and <b>transport of water</b> and <b>nutrients</b> and the role of the leaf in making food</p>	<p>In this unit of work pupils will build on their experiences of identifying and growing plants in</p>

Describe what we know about the different parts of plants and to ask questions about plants for further investigation		for the <b>plant</b> (knowledge of the process of photosynthesis is not required at this stage). They will also learn about the parts of the <b>flower</b> , their roles in plant <b>reproduction</b> and the stages of the <b>life cycle</b> of a flowering <b>plant</b> .	<b>Key Stage 1.</b> They will revise the names of the main parts of a plant (root, stem/trunk, leaf and flower) introduced in <b>Year 1</b> , learning their functions and how these relate to their appearance and structure.
Observe the similarities and differences in a variety of leaves, and relate these to the function of leaves		Pupils will study plants in their <b>natural habitats</b> , identifying their parts and observing the stages of their <b>life cycles</b> and the effect of <b>seasonal change</b> . They will also investigate the requirements for healthy growth	Pupils learning in this unit will build on observations of growth of seeds and bulbs in <b>Year 2</b> .
Identify the similarities and differences in a variety of roots, and to relate these to the function of roots			Knowledge in this unit on the stages of the life cycle of a flowering plant will support learning about different types of plant reproduction in <b>Year 5</b> .
Explain how water is transported in plants and make predictions based on observations		<i>NC Objectives</i>	
Identify the function of a stem		<i>Working Scientifically:</i>	
Explain the main stages of a flowering plant's life cycle		<i>&gt;asking relevant questions and using different types of scientific enquiries to answer them</i>	
Identify and compare the parts of flowers and describe their functions		<i>&gt;setting up simple practical enquiries, comparative and fair tests</i>	
Describe and model the process of insect pollination		<i>&gt;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>	
		<i>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</i>	
		<i>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</i>	
		<i>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</i>	
		<i>&gt;using straightforward scientific evidence to answer questions or to support their findings.</i>	
		<i>&gt;identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</i>	
		<i>&gt;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>	
		<i>&gt;investigate the way in which water is transported within plants</i>	
		<i>&gt;explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</i>	

Summer 2	<p><b>What do our bodies need in order to remain healthy?</b></p> <p>Classify food and understand a balanced diet</p> <p>Identify the similarities and differences between skeletons and explore their functions</p> <p>Apply knowledge of skeletons to design a vertebrate and its skeleton</p> <p>Identify different muscles in our body and what they do</p>	<p>Pupils will learn about the range of <b>nutrients</b> that humans need to <b>consume</b> in the correct amounts and the role that these <b>nutrients</b> play in keeping our bodies <b>healthy</b>. They will also learn that humans and some other animals have <b>skeletons</b> and <b>muscles</b> for support, protection and movement.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>  <i>&gt;asking relevant questions and using different types of scientific enquiries to answer them</i>  <i>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</i>  <i>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</i>  <i>&gt;using straightforward scientific evidence to answer questions or to support their findings.</i></p> <p><i>&gt;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</i>  <i>&gt;identify that humans and some other animals have skeletons and muscles for support, protection and movement</i></p>	<p>In this unit of work pupils will build on their knowledge of the human body developed in <b>Key Stage 1</b>. They will revisit the importance of eating the right amounts of different types of food, but will extend this knowledge to understand that the food we eat provides us with the nutrition that our bodies require to remain healthy.</p>
<b>Year 4</b>	<b>Substantive Knowledge Content based around a Big Question</b>	<b>Recurring themes, ideas and language</b>	<b>Contribution on wider Science knowledge and what later content this prepares for</b>
Autumn 1	<p><b>Has the invention of electricity made our lives easier?</b></p> <p>Sort electrical products according to their power source</p> <p>Make and record electric circuits</p> <p>Explain, using a model, how an electrical circuit works</p> <p>Identify and correct problems with circuits</p> <p>Describe what a switch does and how it works</p>	<p>This is a new topic. Pupils learn to construct a <b>simple circuit</b> and some simple ways that <b>electricity</b> behaves. It is vocabulary rich and has lots of opportunities to develop scientific vocabulary: if... then... type investigations. It also lends itself to pattern seeking.</p> <p>Although this unit is filled with new learning, the children can compare the behaviour of sound (Year 4) and light (Year 3) to the flow of current.</p> <p><i>NC Objectives</i></p>	<p>In <b>Year 6</b> the pupils' knowledge of electricity is developed through the scientific representation of the various components of the circuit. Their knowledge is also deepened by further if... then... investigation with various different components in one circuit.</p> <p>Pupils also build on their knowledge of switches by learning about types of switches and how they can control different components in a circuit.</p>

	Sort materials by testing for a property that makes them suited to replace a wire in a circuit	<p><i>Working Scientifically:</i></p> <ul style="list-style-type: none"> <li>&gt;asking relevant questions and using different types of scientific enquiries to answer them</li> <li>&gt;setting up simple practical enquiries, comparative and fair tests</li> <li>&gt;making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>&gt;gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>&gt;identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>&gt;using straightforward scientific evidence to answer questions or to support their findings.</li> </ul> <ul style="list-style-type: none"> <li>&gt;identify common appliances that run on electricity</li> <li>&gt;construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</li> <li>&gt;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</li> <li>&gt;recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</li> <li>&gt;recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul>	<p>Pupils also build on their knowledge of conductors and insulators by using different materials to make switches.</p> <p>Pupils also build on their knowledge of how electricity is used in everyday life, from questions like:  What uses electricity? <b>(Year 4)</b>  How can switches control various connected lights in a building? <b>(Year 6).</b></p>
Autumn 2	<p><b>What is sound and how can we manipulate it?</b></p> <p><b>explore different ways of making sounds</b></p> <p>Investigate how sounds travel</p>	<p>This is a new topic for pupils in KS2. Pupils learn what <b>sound</b> is, how it <b>travels</b> and how it behaves. It is vocabulary rich and has lots of opportunities to develop cultural capital: for if... then... type investigations. It also lends itself to pattern seeking.</p>	<p>This unit is a standalone unit and the knowledge learned here is not extended in KS2. Although the children do learn about the behaviours of light <b>(Year 3 and Year 6)</b>, which can be contrasted with their knowledge of the behaviours of sound</p>

	<p>Explore how we can make instruments louder and quieter</p> <p>Measure how the loudness of a sound changes as the distance from the source increases</p> <p>Explore the different notes that plucked bands make and discover how to alter the pitch of a sound</p> <p>Explore how we can change the pitch of instruments that are played using air</p>	<p>Although the children would not have come across the learning in this unit, their basic knowledge of the human body (especially the ear) and the 5 senses (especially hearing) from Year 1 is a good starting point. Also, the children learned about the behaviours of light (Year 3) which can be contrasted with the behaviours of sound (from this unit).</p> <p><i>NC Objectives</i></p> <p><i>Working Scientifically:</i></p> <ul style="list-style-type: none"> <li>&gt;asking relevant questions and using different types of scientific enquiries to answer them</li> <li>&gt;setting up simple practical enquiries, comparative and fair tests</li> <li>&gt;making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment</li> <li>&gt;gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>&gt;identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>&gt;using straightforward scientific evidence to answer questions or to support their findings.</li> </ul> <ul style="list-style-type: none"> <li>&gt;identify how sounds are made, associating some of them with something vibrating</li> <li>&gt; recognise that vibrations from sounds travel through a medium to the ear</li> <li>&gt; find patterns between the pitch of a sound and features of the object that produced it</li> <li>&gt; find patterns between the volume of a sound and the strength of the vibrations that produced it</li> </ul>	<p>(from this unit), sound is not repeated or built upon.</p> <p>It is imperative this is taught thoroughly and the children have a good understanding of the knowledge taught in this unit.</p>
--	--	---	--

		> <i>recognise that sounds get fainter as the distance from the sound source increases.</i>	
Spring 1	<p><b>How does temperature affect different objects?</b></p> <p>Classify materials as solids or liquids by observing their properties</p> <p>Plan a fair test investigation to test ideas about melting ice</p> <p>Collect, present and interpret data about melting ice</p> <p>Define melting and freezing</p> <p>Explain observations of air using scientific knowledge about materials</p> <p>Classify materials as solids, liquids or gases</p> <p>Describe and explain findings from an evaporation investigation</p> <p>Identify different materials from their boiling point</p> <p>Identify where condensation is happening</p>	<p>This is a new topic. Pupils learn about the <b>states of matter</b> and observe how things <b>change state</b>. This is a vocabulary rich unit and gives the children great opportunities to relate their learning to real life - the water cycle.</p> <p>This unit also lends itself to excellent scientific vocabulary: if... then... investigation and pattern seeking. Pupils will be given opportunities throughout the unit to measure temperature accurately.</p> <p>Although this is a new topic, some of the Materials work (Year 1 and Year 2) sets up a good basic understanding of the <b>properties</b> of different <b>materials</b>. This is woven through the learning in this unit as it is the properties of matter that defines what state it presents itself in.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>  &gt; <i>asking relevant questions and using different types of scientific enquiries to answer them</i>  &gt; <i>setting up simple practical enquiries, comparative and fair tests</i>  &gt; <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>  &gt; <i>gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</i>  &gt; <i>recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</i>  &gt; <i>reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</i>  &gt; <i>using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</i></p>	<p>Pupils' knowledge of the states of matter, the change of state and the properties of matter in its various states, prepares them for their Materials unit in <b>Year 5</b>.</p> <p>The process of change of state is built upon in their learning of reversible and irreversible changes.</p> <p>Their learning of the change of state of water (in the water cycle) will be explored in other materials.</p>

		<p>&gt;identifying differences, similarities or changes related to simple scientific ideas and processes</p> <p>&gt;using straightforward scientific evidence to answer questions or to support their findings.</p> <p>&gt;compare and group materials together, according to whether they are solids, liquids or gases</p> <p>&gt;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)</p> <p>&gt; identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	
Spring 2	<p><b>How does the food we eat fuel our bodies?</b></p> <p>Investigate where our food goes after it has been eaten</p> <p>Identify the different teeth that humans have and their simple functions</p> <p>Recognise how to look after our teeth and explain its importance</p> <p>Construct food chains and webs for a particular habitat</p> <p>describe how food is broken down in the digestive system</p>	<p>Pupils will be introduced to the main body parts associated with the <b>digestive system</b>; the <b>mouth, tongue, teeth, oesophagus, stomach, intestines, rectum and anus</b>. They will learn that the role of the <b>digestive system</b> is to break down the food we eat so that the <b>nutrients, energy</b> and other requirements we derive from it can be used in the rest of the body.</p> <p>Pupils will learn about how food can be broken down through <b>mechanical and chemical processes</b>. They will learn in more detail about the roles of the different types of <b>teeth</b> in breaking food down, and how to care for their teeth. They will also learn about <b>milk teeth</b> and <b>permanent teeth</b>.</p> <p><i>NC Objectives</i></p> <p><i>Working Scientifically:</i></p> <p>&gt;asking relevant questions and using different types of scientific enquiries to answer them</p> <p>&gt;setting up simple practical enquiries, comparative and fair tests</p> <p>&gt;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>&gt;gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</p>	<p><b>Year 1:</b> learns the names of body parts, this is the first introduction to teeth in the Science curriculum.</p> <p><b>Year 2:</b> Learns about hygiene and a balanced diet, which includes looking after our teeth and having a healthy gut</p> <p>This specific biology topic is a new unit, Parts of the human body are covered in Years 3, 4 and 6. Although the digestive system is not revisited again in Year 5 or 6, a healthy diet is revisited in <b>Year 6</b> specifically focused on the circulatory system (biology unit).</p>

		<p>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>&gt;identifying differences, similarities or changes related to simple scientific ideas and processes</p> <p>&gt;using straightforward scientific evidence to answer questions or to support their findings.</p> <p>&gt;describe the simple functions of the basic parts of the digestive system in humans</p> <p>&gt;identify the different types of teeth in humans and their simple functions</p> <p>&gt; construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	
Summer 1	<p><b>How are keys useful in to classify and organise living things?</b></p> <p>Identify pond/seashore animals using a key</p> <p>Use yes/no questions to sort animals found in a water habitat</p> <p>Classify vertebrates into groups using their key characteristics</p> <p>Recognise characteristics of some of the main invertebrate groups</p>	<p>Pupils will construct <b>keys</b>, learning to ask yes/no questions about <b>characteristic</b> differences between the animals. They will learn about pond and seashore animals and common land invertebrates through images and first-hand experience.</p> <p>In addition to identifying animals pupils will also classify them, learning to <b>identify characteristics</b> of the main <b>vertebrate</b> groups and some of the <b>common invertebrate</b> groups.</p> <p>When working scientifically pupils will make detailed observations and learn which features are useful for identification and classification.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>          &gt;asking relevant questions and using different types of scientific enquiries to answer them          &gt;setting up simple practical enquiries, comparative and fair tests</p>	In this module pupils will further develop the understanding of keys they gained in the <b>Year 3</b> rocks module, using them to identify animals from a range of habitats.

		<p>&gt;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>&gt;gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</p> <p>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p> <p>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>&gt;identifying differences, similarities or changes related to simple scientific ideas and processes</p> <p>&gt;using straightforward scientific evidence to answer questions or to support their findings.</p> <p>&gt;recognise that living things can be grouped in a variety of ways</p> <p>&gt; explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>&gt; recognise that environments can change and that this can sometimes pose dangers to living things.</p>	
Summer 2	<p><b>What is the impact of habitat destruction in other parts of the world?</b></p> <p>Give examples of positive and negative ways in which humans change the environment</p> <p>Carry out a litter survey, collecting and presenting data</p> <p>Research and present information about the impact of litter on animals</p> <p>Demonstrate understanding of the potential human impact on food chains in a UK habitat</p>	<p>Pupils will learn about some of the <b>positive</b> and <b>negative</b> ways that humans change the environment, locally and globally, with a particular focus on how this affects other living things. They will begin to understand that actions can have both <b>positive</b> and <b>negative consequences</b>, that situations are not black and white, and that decisions involve compromises. They will consider how industry, housing and thoughtless behaviour can damage local habitats and also how humans can increase <b>biodiversity</b> by developing <b>environments</b> such as country parks and nature reserves.</p> <p><i>NC Objectives</i> <i>Working Scientifically:</i></p>	<p>Learning in this unit will be related to a developing understanding of food chains (building on what children learned in <b>Year 2</b>) and what happens if food chains are broken by habitat disruption or the removal of a species from an ecosystem.</p>

	Explore the impact on food chains and habitats in another part of the world	<ul style="list-style-type: none"> <li>&gt;asking relevant questions and using different types of scientific enquiries to answer them</li> <li>&gt;setting up simple practical enquiries, comparative and fair tests</li> <li>&gt;making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>&gt;gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>&gt;recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>&gt;reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>&gt;using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>&gt;identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>&gt;using straightforward scientific evidence to answer questions or to support their findings.</li> </ul> <ul style="list-style-type: none"> <li>&gt; recognise that environments can change and that this can sometimes pose dangers to living things.</li> <li>&gt; construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>	
<b>Year 5</b>	<b>Substantive Knowledge Content based around a Big Question</b>	<b>Recurring themes, ideas and language</b>	<b>Contribution on wider Science knowledge and what later content this prepares for</b>
Autumn 1	<p><b>What properties make a material suitable for a particular use?</b></p> <p>Recognise that materials are used in many different ways and for particular purposes within buildings</p> <p>Achieve an in-depth knowledge of the properties of certain materials and how and why those specific properties make them suitable for particular uses.</p>	Pupils explore familiar objects in detail and find out about accidental scientific discoveries, such as the 'non-sticky' glue developed by Spencer Silver and used in 'Post it' notes, and how properties of 'super absorbent powders' can make them useful in everyday life. Specific scientific and other vocabulary is used by pupils as they describe, explain and communicate their understanding of <b>materials</b> , succinctly and in ways appropriate to a science context.	<p>This topic follows Materials in:</p> <p><b>Year 1:</b> sorting</p> <p><b>Year 2:</b> properties and suitability for various uses</p> <p>This knowledge is developed in <b>Year 5</b> through investigation skills, the children explore and ask and answer their own questions. The activity of sorting is developed by including the children's knowledge</p>

	Describe the properties of materials and recognising that the same material can have different properties depending on how it is being used.	<p>When working scientifically, pupils plan and carry out <b>comparative</b> and <b>fair tests</b> to answer questions about how and why certain <b>materials</b> are selected and used because of their <b>properties</b>. They do this increasingly independently, recognising and controlling <b>variables</b> where necessary.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>  <i>&gt;planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i>  <i>&gt; taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</i>  <i>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</i>  <i>&gt; using test results to make predictions to set up further comparative and fair tests</i>  <i>&gt;reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i>  <i>&gt;identifying scientific evidence that has been used to support or refute ideas or arguments.</i></p> <p><i>&gt;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>  <i>&gt; know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</i></p>	of electricity ( <b>Year 4</b> ), magnets ( <b>Year 3</b> ) and light ( <b>Year 3</b> ).
Autumn 2 and Spring 1	<p><b>How does the Earth's relationship with the sun, together with the movement of the Earth and Moon affect our lives?</b></p> <p>Describe the shapes, positions and movement of the planets in the solar</p>	<p>Pupils develop their knowledge of the <b>Earth's</b> (and other <b>planets'</b>) place in the <b>solar system</b>, and their relationships with other bodies in <b>space</b>, in particular with the <b>Sun</b>.</p> <p>Pupils learn about time differences around the <b>world</b> and investigate time differences using resources including the</p>	<p>This is a new Science topic (although the children will have some knowledge of the learning in this unit from their LQ topics).</p> <p>The children will however build on their knowledge of the <b>seasons</b> in the 'Our changing world' unit in</p>

	<p>system and some of the differences between these and stars</p> <p>Use a model to describe and compare the movements of different planets in space</p> <p>Use a model or diagram to explain the effect of the Earth's rotation in space.</p> <p>Use a model to explain why sunrise and sunset occur at different moments in time in different parts of the world</p> <p>Explain how the Earth's tilt leads to seasonal changes</p> <p>Explain how the Earth's tilt affects the times of sunrise and sunset in different places at different times of the year</p> <p>Identify the phases of the Moon and explain why these occur</p>	<p>internet. They will find out about how time was standardised around the world, about the need for scientists to choose a starting point in the continuous process of cycles of sunrise and sunset, and investigate <b>longitude</b>. They are introduced to the <b>International Date Line</b> and the <b>Greenwich Meridian</b>.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>  <i>&gt;planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i>  <i>&gt; taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</i>  <i>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</i>  <i>&gt; using test results to make predictions to set up further comparative and fair tests</i>  <i>&gt;reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i>  <i>&gt;identifying scientific evidence that has been used to support or refute ideas or arguments.</i></p> <p><i>&gt;describe the movement of the Earth, and other planets, relative to the Sun in the solar system</i>  <i>&gt;describe the movement of the Moon relative to the Earth</i>  <i>&gt;describe the Sun, Earth and Moon as approximately spherical bodies</i>  <i>&gt;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><b>Year 1 and 2.</b> The seasons also affect the plants and habitats of animals that all year groups observe in their Biology topics (animals including humans). Their knowledge is extended in this unit by learning about how the earth's tilt affects seasons. The <b>KS3</b> curriculum also introduces space physics.</p> <p>This unit of work draws on pupil's previous use of the calendar to calculate the duration of events (<b>Year 4 Mathematics</b>) and solve problems involving units of time (<b>Year 5 Mathematics</b>). Pupils also learn how the Earth's orbit determines the length of a year and why we have leap years.</p> <p><b>Key Stage 1</b> observations of the Sun's movement across the sky and <b>Year 3</b> work on shadows provide a sound basis for investigating how the Earth's rotation causes night and day, and is responsible for the apparent movement of the Sun across the sky, and its changing height in the sky.</p>
Spring 2	<p><b>How can we separate mixtures?</b></p> <p>Explain that materials can mix and to demonstrate that mixtures of solid materials can be separated by the technique of sieving</p> <p>Identify through investigation some solids that dissolve and others that do</p>	<p>In this module pupils further develop their <b>conceptual knowledge</b> and understanding of how <b>different mixtures of solids</b> and <b>liquids</b> might be <b>separated</b>. They learn that certain <b>solids dissolve</b> while others do not, and how these <b>dissolved solids</b> might be retrieved from a <b>mixture</b>. They explore how the rate at which <b>solids dissolve</b> can vary, investigating <b>variables</b> that might make a difference. They</p>	<p>Pupils are prepared for this unit through their learning of the states of matter - <b>Year 4</b>. Themes such as evaporation, condensation and solids, liquids and gases are developed in this unit.</p>

	<p>not, and describe how to tell that a solid has dissolved.</p> <p>Demonstrate and explain how pure salt can be separated from a rock salt mixture, using techniques based on the properties of the materials involved</p> <p>Explain the processes of evaporation and condensation and how these might help to produce drinkable water from a plentiful supply of seawater</p>	<p>use their knowledge of <b>separating mixtures</b> in solving a number of real world based enquiries, which require them to apply their growing subject knowledge to an unusual context.</p> <p><i>NC Objectives</i></p> <p><i>Working Scientifically:</i></p> <ul style="list-style-type: none"> <li>&gt; <i>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i></li> <li>&gt; <i>taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</i></li> <li>&gt; <i>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</i></li> <li>&gt; <i>using test results to make predictions to set up further comparative and fair tests</i></li> <li>&gt; <i>reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i></li> <li>&gt; <i>identifying scientific evidence that has been used to support or refute ideas or arguments.</i></li> </ul> <ul style="list-style-type: none"> <li>&gt; <i>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</i></li> <li>&gt; <i>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</i></li> <li>&gt; <i>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</i></li> <li>&gt; <i>demonstrate that dissolving, mixing and changes of state are reversible changes</i></li> <li>&gt; <i>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.</i></li> </ul>	
--	--	---	--

Summer 1	<b>How do forces affect the way objects move?</b>	<b>Forces</b> is a topic introduced in <b>Year 3</b> . The <b>Year 5</b> unit extends and deepens that initial knowledge of <b>forces</b> by introducing <b>resistance</b> . The pupils' knowledge of <b>friction</b> is broadened with different materials tested.	<b>Forces</b> is not a body of knowledge that is developed in <b>Year 6</b> .
	Use evidence to explain how objects fall through the air		In <b>KS3</b> , all force knowledge is revisited:
	Recognise the effects of water resistance	This unit introduces <b>mechanisms</b> and how they affect the amount of force needed. Another unit that builds on the if... then... investigation skills.	<ul style="list-style-type: none"> <li>• Push and pull as a result of an interaction between two objects</li> <li>• The turning effect of a force</li> <li>• forces that twist, stretch and bend</li> </ul>
	Identify and explain the effect of upthrust on objects in water		Resistance is also revisited to consolidate understanding in Year 6.
	Demonstrate how levers work and how they reduce the force required to move objects	<i>NC Objectives</i>	Non-contact forces are also built upon e.g. gravity, magnets. This body of knowledge is developed through pressure in fluids, balanced forces and forces in motion.
	Explain why pulleys make lifting objects easier.	<i>Working Scientifically:</i>	
	Explain how gears allow a smaller force to have a greater effect	<ul style="list-style-type: none"> <li>&gt; <i>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i></li> <li>&gt; <i>taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</i></li> <li>&gt; <i>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</i></li> <li>&gt; <i>using test results to make predictions to set up further comparative and fair tests</i></li> <li>&gt; <i>reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i></li> <li>&gt; <i>identifying scientific evidence that has been used to support or refute ideas or arguments.</i></li> </ul> <ul style="list-style-type: none"> <li>&gt; explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>&gt; identify the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>&gt; recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</li> </ul>	
Summer 2	<b>How do plants and animals reproduce?</b>	Pupils will learn that plants can reproduce in other ways, through <b>asexual reproduction</b> . As they learn about <b>reproduction in animals</b> pupils will find out more about <b>specific mammals, birds, insects</b> and <b>amphibians</b> and	As they learn about plant reproduction children will extend their knowledge from <b>Year 3</b> of the function of the different parts of flowering plants.
	Describe the process of sexual reproduction in many flowering plants,		

	<p>naming parts of the flower and explaining their importance within the process</p> <p>Recognise that flowers are not all the same and identify how they are different</p> <p>Describe how plants can reproduce asexually, by creating new plants from different parts of the parent plant rather than by producing seeds</p> <p>Describe the life process of reproduction in amphibians and most insects and recognise this process as sexual reproduction</p> <p>Describe the life process of reproduction in mammals and birds and recognise this process as sexual reproduction</p> <p>Describe puberty in girls and boys</p>	<p><b>how they reproduce.</b> There are three lessons focusing on humans, one of which is about the complete human life cycle and two of which focus on <b>puberty.</b></p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>  <i>&gt;planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i>  <i>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</i>  <i>&gt;reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i>  <i>&gt;identifying scientific evidence that has been used to support or refute ideas or arguments.</i></p> <p><i>&gt;describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</i>  <i>&gt;describe the life process of reproduction in some plants and animals.</i>  <i>&gt;describe the changes as humans develop to old age.</i>  <i>&gt;Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.</i>  <i>&gt; Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.</i></p>	
<b>Year 6</b>	<b>Substantive Knowledge Content based around a Big Question</b>	<b>Recurring themes, ideas and language</b>	<b>Contribution on wider Science knowledge and what later content this prepares for</b>
Autumn 1	<p><b>How do the main parts of the circulatory system work together to enable our bodies to function?</b></p> <p>Describe how the human circulatory system works</p> <p>Investigate and describe the main functions of the heart</p>	<p>Pupil learn about the <b>human circulatory system</b> and how it enables their bodies to function. They find out about the main parts of the <b>circulatory system: the heart, blood vessels (arteries, veins and capillaries)</b> and <b>blood</b>, and how these work together to deliver <b>oxygen</b> and <b>nutrients</b> to every part of the body. They will find out how the heart works, the main components of <b>blood</b> and the function of</p>	<p>This module builds on learning about the human body from <b>Key Stage 1</b>, when they learned that humans and other animals need water, food and air in order to survive, and also during <b>lower Key Stage 2</b>, when they investigated the muscular, skeletal and digestive systems.</p>

	<p>Pose and answer a range of relevant questions about how blood transports gases round the body</p> <p>Identify the contents of blood and describe their function</p> <p>Explain the function of valves, veins, arteries and capillaries in the human circulatory system</p> <p>Explain how water helps humans' and other animals' bodies to function</p>	<p>the different types of <b>blood vessels</b>. They will also learn about how water is transported through the body and develop their understanding of the importance of water to human health.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>  <i>&gt;planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i>  <i>&gt; taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</i>  <i>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</i>  <i>&gt; using test results to make predictions to set up further comparative and fair tests</i>  <i>&gt;reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i>  <i>&gt;identifying scientific evidence that has been used to support or refute ideas or arguments.</i></p> <p><i>&gt;identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</i>  <i>&gt; describe the ways in which nutrients and water are transported within animals, including humans</i></p>	
Autumn 2	<p><b>How do our lifestyle choices, including diet, exercise and drug use affect our bodies?</b></p> <p>Describe the impact of diet and exercise on human health</p> <p>Evaluate healthy eating guidance</p> <p>Identify criteria to judge whether a drink or snack is healthy</p> <p>Investigate variables that affect pulse rate</p>	<p>Pupils learn about how to keep their bodies healthy and how their bodies might be damaged. The focus is on lifestyle choices that humans make, including diet, exercise and drug use, and how these are informed by scientific evidence.</p> <p>Pupils will explore the effects of <b>exercise</b> on the body and develop their understanding of the <b>circulatory</b> and <b>respiratory</b> systems as they investigate the effects of exercise on the <b>pulse</b> and its <b>recovery rate</b>. They then find</p>	<p>Children will build on their learning from <b>Year 3</b> about the types of food that humans and other animals need in order to stay alive. They will develop a deeper understanding of what constitutes a healthy diet, through exploring food groups and how the body uses them.</p> <p>In addition, the module draws on children's learning in <b>Year 3</b> about the functions of the skeleton and muscles.</p>

	<p>Identify the impact exercise has on the way the body functions</p> <p>Identify and present the long-term effects on the body of drug use</p> <p>Describe the long-term effects on the body of smoking</p>	<p>out about the training regimes of athletes and learn about special diets and training programmers.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>  <i>&gt;planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i>  <i>&gt; taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</i>  <i>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</i>  <i>&gt; using test results to make predictions to set up further comparative and fair tests</i>  <i>&gt;reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</i>  <i>&gt;identifying scientific evidence that has been used to support or refute ideas or arguments.</i></p> <p><i>&gt;recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</i></p>	
Spring 1	<p><b>How and why do living things adapt to their environment?</b></p> <p>Identify ways in which living things of the same kind vary and to begin to think about why these variations exist</p> <p>Recognise how organisms can be bred to select particular characteristics in their offspring</p> <p>Describe selective breeding and evaluate different people's opinions</p> <p>Investigate the effect of environmental variables on plants and interpret the results</p> <p>Evaluate variables that contribute to the extinction of living things</p>	<p>This is a challenging module in which pupils build on their knowledge of <b>living things</b> and how they are <b>adapted</b> to particular <b>environments</b>. They are introduced to the idea that <b>variation in organisms</b> can result in the <b>species</b> becoming better adapted to its environment and that the process of <b>natural selection</b>, over a long period of time, leads to <b>evolution</b>.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>  <i>&gt;planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</i>  <i>&gt; taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</i></p>	<p>Although pupils may have been introduced to the concept of adaptation during their time at school, natural selection and evolution will not have been formally discussed at school prior to this unit. Pupils learn about how inherited characteristics are passed on from parents to offspring and that environmental variables also affect how organisms look and behave to support learning in <b>KS3</b>.</p>

		<p>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>&gt; using test results to make predictions to set up further comparative and fair tests</p> <p>&gt; reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>&gt; identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>&gt; recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>&gt; recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>&gt; identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>	
Spring 2	<p><b>Light travels in a straight line – How can the behaviour of light be influenced?</b></p> <p>Describe how a mirror reflects an image of an object</p> <p>Identify the variables that affect the size of a shadow, and plan a fair test to investigate one of them</p> <p>Recognise that whilst light does travel in straight lines, sometimes it changes direction when travelling from one thing into another</p> <p>Understand that white light is made of many colours and these can be separated out</p>	<p>Pupils develop their understanding of <b>mirrors</b> and the <b>reflections</b> that they form, and apply this understanding to make a <b>periscope</b>. They are introduced to <b>ray diagrams</b> that can be used to represent the behaviour of <b>light</b>. They use these diagrams, together with the fact that <b>light</b> travels in straight lines, to explain the formation of <b>shadows</b> and how their size and shape can be affected.</p> <p>Pupils explore refraction in a number of contexts to see how <b>light</b> does not always appear to travel in straight lines. They investigate how <b>white light</b> is made up of many colours of light and how these can be split apart by a prism or in a rainbow, as well as how the colours can be joined together to make white again.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>          &gt; planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p>	<p>Light is a topic children learn about in <b>Year 3</b>. The children learn that light is necessary to see things (<b>Year 3</b>), this is developed to include the path of light from objects to our eyes in order to see things (<b>Year 6</b>). In <b>Year 3</b> children learn that light travels in a straight line, this is developed to an explanation of the consequences of the way light travels e.g. this affects the shape of a shadow.</p> <p>The children’s knowledge of shadows is developed by the fact that shadows are made by opaque objects, to the size and shape of shadows according to the position of the light source. Patterns are investigated in <b>Year 6</b>.</p>

		<p>&gt; taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>&gt; using test results to make predictions to set up further comparative and fair tests</p> <p>&gt; reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>&gt; identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>&gt; recognise that light appears to travel in straight lines</p> <p>&gt; use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</p> <p>&gt; explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</p> <p>&gt; use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>	
Summer 1	<p><b>How does an increasing number of components in an electrical circuit, effect the function of the components?</b></p> <p>Use recognised symbols when representing a simple circuit in a diagram</p> <p>Use a switch in a simple circuit, show it in a diagram and describe how it works</p> <p>Demonstrate the effects of changing the current flowing through components in a circuit</p> <p>Demonstrate how circuits can be represented in, and constructed from, diagrams</p>	<p>Pupils learn to use the <b>recognised electrical symbols</b> to record <b>circuits</b>, particularly as the <b>circuits</b> become more complex. They research how <b>electricity</b> is generated both traditionally using coal and gas, and by <b>renewable resources</b>, and investigate how <b>electricity</b> is transmitted across the country, and what sort of electricity generating plant they might site in their locality.</p> <p><i>NC Objectives</i>  <i>Working Scientifically:</i>          &gt; planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary          &gt; taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p>	<p>Electricity is a topic children learn about in <b>Year 4</b>. In <b>Year 6</b> the pupils' knowledge of electricity is developed through the scientific representation of the various components of the circuit. Their knowledge is also deepened by further if... then... investigation with various different components in one circuit.</p> <p>Pupils also build on their knowledge of switches (<b>Year 4</b>) by learning about types of switches and how they can control different components in a circuit.</p> <p>Pupils also build on their knowledge of conductors and insulators (<b>Year 4</b>) by using different materials to make switches.</p>

		<p>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>&gt; using test results to make predictions to set up further comparative and fair tests</p> <p>&gt; reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>&gt; identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>&gt; 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>&gt; 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>&gt; use recognised symbols when representing a simple circuit in a diagram</p>	
Summer 2	<p><b>How and why are organisms classified?</b></p> <p>Demonstrate an understanding of the process of classification</p> <p>Apply the process of classification to plants</p> <p>Explore the classification of animals and recognise the main groups of vertebrates</p> <p>Explore the classification of the main groups of invertebrates</p> <p>Recognise that micro-organisms are groups of living things and explain what they are</p> <p>Investigate the growth of micro-organisms</p> <p>Explore, using the example of plant classification and children's own classification of seeds, how scientists handle disagreements in science</p>	<p>This is a challenging module in which pupils will build on their knowledge of <b>living things</b> from previous years and deepen their understanding of why and how <b>organisms are classified</b>. They will explore the process of <b>classification</b> in some detail and how it differs from, but relates to, the identification of living things.</p> <p>Pupils will become aware of the types and <b>characteristics of organisms</b> that belong in each of the five kingdoms of living things (<b>animals, plants, fungi, bacteria and Protista</b>) and the major sub-groups the kingdoms include. Although they will devise their own systems of <b>classification</b>, children will learn about how Linnaeus developed the system for classifying all living things using their <b>observable characteristics</b>.</p> <p><i>NC Objectives</i> <i>Working Scientifically:</i></p>	Prior learning about living organisms across <b>KS2</b> will support learning in this unit of work.

		<p>&gt;planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>&gt; recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p>&gt;reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>&gt;identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>&gt;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</p> <p>&gt;give reasons for classifying plants and animals based on specific characteristics</p>	
--	--	--	--

## Progression in Subject Knowledge

For further detail of the progression of ideas through Key Stage 1 and 2 for biology, chemistry and physics please click on this link:

[https://hadleywoodpri-my.sharepoint.com/:b/g/personal/jrose11\\_308\\_o365\\_hadleywood\\_enfield\\_sch\\_uk/Ee8ajB3IKG5FgJcBC0LJnSqBK4zv73f0qXBRhjWZ5eEYhw?e=HuQ60G](https://hadleywoodpri-my.sharepoint.com/:b/g/personal/jrose11_308_o365_hadleywood_enfield_sch_uk/Ee8ajB3IKG5FgJcBC0LJnSqBK4zv73f0qXBRhjWZ5eEYhw?e=HuQ60G)

## Progression of Working Scientifically Skills

For further information on EYFS, please see the top of this document, where statements and age bands are provided.

	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Asking questions and carrying out fair and	<p>Asking simple questions and recognising that they can be answered in different ways.</p> <p>Performing simple tests.</p> <p>Children can:</p>	<p>Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests.</p>	<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p>

comparative tests	<ul style="list-style-type: none"> <li>• explore the world around them, leading them to ask some simple scientific questions about how and why things happen;</li> <li>• begin to recognise ways in which they might answer scientific questions;</li> <li>• ask people questions and use simple secondary sources to find answers;</li> <li>• carry out simple practical tests, using simple equipment;</li> <li>• experience different types of scientific enquiries, including practical activities;</li> <li>• talk about the aim of scientific tests they are working on.</li> </ul>	<p>Children can:</p> <ul style="list-style-type: none"> <li>• start to raise their own relevant questions about the world around them in response to a range of</li> <li>• scientific experiences;</li> <li>• start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions;</li> <li>• recognise when a fair test is necessary;</li> <li>• help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used;</li> <li>• set up and carry out simple comparative and fair tests.</li> </ul>	<p>Children can:</p> <ul style="list-style-type: none"> <li>• with growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences;</li> <li>• with increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions;</li> <li>• explore and talk about their ideas, raising different kinds of scientific questions;</li> <li>• ask their own questions about scientific phenomena;</li> <li>• select and plan the most appropriate type of scientific enquiry to use to answer scientific questions;</li> <li>• make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them;</li> <li>• plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary;</li> <li>• use their test results to identify when further tests and observations may be needed;</li> <li>• Use test results to make predictions for further tests.</li> </ul>
Observing and measuring changes	<p>Observing closely, using simple equipment.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>• observe the natural and humanly constructed world around them;</li> <li>• observe changes over time;</li> <li>• use simple measurements and equipment;</li> <li>• make careful observations, sometimes using equipment to help them observe carefully.</li> </ul>	<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>Children can:</p> <ul style="list-style-type: none"> <li>• make systematic and careful observations;</li> <li>• observe changes over time;</li> <li>• use a range of equipment, including thermometers and data loggers;</li> <li>• ask their own questions about what they observe;</li> </ul>	<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>Children can:</p> <ul style="list-style-type: none"> <li>• make systematic and careful observations;</li> <li>• observe changes over time;</li> <li>• use a range of equipment, including thermometers and data loggers;</li> <li>• ask their own questions about what they observe;</li> </ul>

		<ul style="list-style-type: none"> <li>where appropriate, take accurate measurements using standard units using a range of equipment.</li> </ul>	<ul style="list-style-type: none"> <li>where appropriate, take accurate measurements using standard units using a range of equipment.</li> </ul>
Identifying, classifying, recording and presenting data	<p>Identifying and classifying. Gathering and recording data to help in answering questions.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>use simple features to compare objects, materials and living things;</li> <li>decide how to sort and classify objects into simple groups with some help;</li> <li>record and communicate findings in a range of ways with support;</li> <li>sort, group, gather and record data in a variety of ways to help in answering questions such as in simple sorting diagrams, pictograms, tally charts, block diagrams and simple tables.</li> </ul>	<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>Children can:</p> <ul style="list-style-type: none"> <li>talk about criteria for grouping, sorting and classifying;</li> <li>group and classify things;</li> <li>collect data from their own observations and measurements;</li> <li>present data in a variety of ways to help in answering questions;</li> <li>use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge;</li> <li>record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables</li> </ul>	<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>independently group, classify and describe living things and materials;</li> <li>use and develop keys and other information records to identify, classify and describe living things and materials;</li> <li>decide how to record data from a choice of familiar approaches;</li> <li>record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.</li> </ul>
Drawing conclusions, noticing patterns and presenting findings	<p>Using their observations and ideas to suggest answers to questions.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>notice links between cause and effect with support;</li> <li>begin to notice patterns and relationships with support;</li> <li>begin to draw simple conclusions;</li> <li>identify and discuss differences between their results;</li> <li>use simple and scientific language;</li> </ul>	<p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>draw simple conclusions from their results;</li> <li>make predictions;</li> <li>suggest improvements to investigations;</li> <li>raise further questions which could be investigated;</li> </ul>	<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.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>notice patterns;</li> <li>draw conclusions based in their data and observations;</li> <li>use their scientific knowledge and understanding to explain their findings;</li> </ul>

	<ul style="list-style-type: none"> <li>• read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1;</li> <li>• talk about their findings to a variety of audiences in a variety of ways.</li> </ul>	<ul style="list-style-type: none"> <li>• first talk about, and then go on to write about, what they have found out;</li> <li>• report and present their results and conclusions to others in written and oral forms with increasing confidence.</li> </ul>	<ul style="list-style-type: none"> <li>• read, spell and pronounce scientific vocabulary correctly;</li> <li>• identify patterns that might be found in the natural environment;</li> <li>• look for different causal relationships in their data;</li> <li>• discuss the degree of trust they can have in a set of results;</li> <li>• independently report and present their conclusions to others in oral and written forms.</li> </ul>
Using scientific evidence and secondary sources of information		<p>Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>• make links between their own science results and other scientific evidence;</li> <li>• use straightforward scientific evidence to answer questions or support their findings;</li> <li>• identify similarities, differences, patterns and changes relating to simple scientific ideas and processes;</li> <li>• recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.</li> </ul>	<p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>• use primary and secondary sources evidence to justify ideas;</li> <li>• identify evidence that refutes or supports their ideas;</li> <li>• recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact;</li> <li>• use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas;</li> <li>• talk about how scientific ideas have developed over time.</li> </ul>