

Science



Know more, remember more



Know yourself, grow yourself



Use your learning, develop your skills



Curriculum overview

Y6			Animals inc humans	Living things and habitats			Electricity		Space	Light	
Y5	Materials		Animals inc humans	Living things and habitats		Forces		Evolution			
Y4	States of matter		Animals inc humans	Living things and habitats			Electricity				Sound
Y3		Plants	Animals inc humans		Rocks	Forces				Light	
Y2	Materials	Plants	Animals inc humans	Living things and habitats							
Y1	Materials	Plants	Animals inc humans								seasons



Science Strands of Learning

Animals including Humans

Materials (inc' Rocks)

Plants

Living things and their habitats

Forces

Light

Electricity

Sound

Earth and Space

Evolution and Inheritance (links to rocks)



EYFS (Reception)

Autumn 1				
UTW – Science Science is	Changes as people and animals grow. Superheroes – strong and healthy Seasonal changes	People and animals grow and change e.g. baby to child. Healthy food is eating a balanced diet. Part of a balanced diet is eating fruit and vegetables Autumn is in September, October and November Leaves fall off the trees and change colours	Begin to make sense of their own life story and families history. Describe what they see, hear and feel outside. Understand the effect of changing seasons on the natural world around them. Explore the natural world around us. Make healthy choices about food, drink, activity Know and talk about different factors that support their overall health and well-being	Change Grow Baby Toddler Child Teenager Adult Seasons Autumn Winter Spring Summer Change Weather Temperature

Autumn 2				
UTW – Science Science is ...	Seasonal change	In Winter it is dark because the sun rises later and also sets earlier. In Winter it can be cold, icy, frosty and snow. Winter is December, January and February	Describe what they see, hear and feel outside Understand the effect of changing seasons on the natural world around them.	Winter Season



Spring 1				
UTW – Science Science is ...	Space	A force is a push or a pull	Explore and talk about different forces they can feel Explain how things work Understand some important processes and changes in the natural world around them including changing states of matter	Force Push Pull

Spring 2				
UTW – Science Science is ...	Ducks and Frogs Plants - growth Seasonal Changes	Animals can be put into different groups Ducks are birds Frogs are amphibians All animals and plants change through a life cycle Plants need different things to grow; they need water, air, nutrients, sunlight Animals need food, water, shelter, space and air to survive. Explore the world around us (4 seasons) In Spring, new life grows. It stays lighter for longer during the spring months. Spring months are March, April and May.	Explore the natural world around them Describe what they see, hear and feel whilst outside Make observations and draw pictures of animals and plants Talk about what they see, using a wide vocabulary Plant seeds and care for growing plants Begin to understand the need to respect and care for the natural environment and all living things Understand the key features of the life cycle of a plant and an animal. Plant seeds and care for growing plants	Ducks Frogs Birds Amphibians Life cycle Spring Season



Summer 1				
UTW – Science Science is ...	Animals	Animals live in different parts of the world. Animals need food, water, shelter, space and air to survive.	Make observations of animals and plants. Describe what they see, hear and feel outside Understand the effect of changing seasons on the natural world around them.	Animals World Survive Habitats

Summer 2				
UTW – Science Science is ...	Changes and weather. Seasonal changes	It gets warmer in Summer. Suitable clothes for different weathers. Keeping safe in the sun – apply sun cream, wear a hat and drink plenty of water The Summer months are June, July and August Sinking and Floating - Moana	Explore the natural world around them. Know some similarities and differences between the natural world around them and contrasting environments. Understand some important process and changes in the natural world. Explore collections of materials with similar and/or different properties Talk about the differences between materials and changes they notice	Change Weather Season Spring Summer Autumn Winter Hot Cold



Year 1

Strand of learning: Seasons			
Ongoing	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> Making simple and clear observations and recording these in different ways. Observing and discussing changes across the four seasons <p>Working scientifically:</p> <ul style="list-style-type: none"> asking simple questions and recognizing they can be answered in different ways. Working scientifically – gathering and recording information to help in answering questions. 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Making displays of what happens in the world around them, including day length, as the seasons change. Gather objects and make collections associated with each season Observe and describe weather associated with the seasons and how day length varies. Create a weather record. Make and use a rain Gauge to measure rainfall across seasons. Observe changes across the four seasons in the environment e.g. in plants on the school grounds. Create posters. Mind maps. Venn diagrams. Grouping activities. Create lists. Labelling diagrams/pictures. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <p>Science is the process of learning about the natural world through observation and experimentation</p> <p>Experience of discussion and observing the changes in the natural world around them and associated vocabulary</p> <p>Key Vocabulary: Seasons -part of the year Autumn, Spring, Summer, Winter Daylight, Night, Weather Rain, Wind, Sun</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p><i>How many seasons are there in a year and what are the names</i></p> <ul style="list-style-type: none"> There are 12 months in a year – January, February, March, April, May, June, July, August, September, October, November, December There are four seasons in a year – Spring, Summer, Autumn, Winter <p><i>How many months are in each season (and what are they)</i></p>	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Sun safety – wearing hats and sun cream can protect people from sun damage. Some animals prepare to hibernate for the winter in Autumn. Some animals hibernate in Winter 	<p><u>National Curriculum Links:</u></p> <ul style="list-style-type: none"> Observe changes across the four seasons Working scientifically – Asking simple questions and recognising that they can be answered in different ways.



	<ul style="list-style-type: none"> Each month is part of a season – i.e – Spring –March, April, May <i>How does the change of season effect the length of our days</i> The day length changes according to seasons – the longest days are in the summer and the shortest in the winter. <i>What weather do we expect and see in each season</i> Each Season displays different ‘typical’ weathers – with weather hottest in Summer and Coldest in winter. Temperatures and the amount of rain we have change in each season <i>What specific events and changes happen in each season</i> Some new plants begin to grow in the Spring. Young animals such as chicks and lambs are born during Spring. During Autumn, some leaves on trees change colour and some trees lose their leaves. 	<p><u>Possible Key Questions:</u></p> <ul style="list-style-type: none"> How many months do we have in a year and what are their names? What are the names of the seasons? What are the main changes in each season? Is the weather the same or different from yesterday? From last week? From last month? From last term? What happens to During Autumn, spring, summer, winter? How long are the days this week? Are they longer or shorter than in How much rain has fallen this week compared to..... 	
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<p>Strand of learning: Materials</p>			
	<p><i>Skills developed in this unit:</i></p> <ul style="list-style-type: none"> Finding simple similarities and differences through observation, touch and feel – identifying patterns and relationships Working scientifically – identifying and classifying materials based on simple properties Make decisions on how to sort and group items and what to sort/group by <p>Working scientifically:</p> <ul style="list-style-type: none"> performing simple tests to explore questions such as – what is the best material for an umbrella. Explore, name, discuss, raise and answer questions about everyday materials 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Sorting groups of materials into two smaller groups based on a property the children identify and discuss Sort groups of materials into smaller groups based on properties and criteria. Sort objects which are natural and which are man made Complete a rock hunt – collect samples – use hand lenses to look at what is similar and different. Sort rocks and other objects into groups based on different criteria (labels on the floor e.g. hard, heavy, light, rough, smooth) this can also be done with other materials Complete material hunt around school, local area Draw an label objects and materials Look at objects in different states and discuss e.g. Ice and water 	<p><u>Background Crucial Knowledge for this unit:</u></p> <p>Science is the process of learning about the natural world through observation and experimentation</p> <p>Vocabulary to compare materials – and discuss things they see. Touch, feel</p> <p>That objects can be sorted into groups</p> <p>Key Vocabulary:</p>

	<ul style="list-style-type: none"> Become familiar with the names and simple properties of materials 	<ul style="list-style-type: none"> Labelling diagrams and pictures Venn diagrams 	<p>Material – what an object is made from</p> <p>Soft, Hard, Shiny, Dull</p> <p>Heavy, Light, Rough, Smooth</p> <p><i>Extended words to introduce:</i></p> <p>Solid, Liquid, Melt, freeze</p> <p>Float, sink, absorb, waterproof</p> <p>Opaque, transparent</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p><i>What does the word material mean and how can we explain the differences between materials to others?</i></p> <ul style="list-style-type: none"> A material is what something is made of. Materials can be described by how they look and feel. <p><i>What types of materials are there and what makes them unique – how do we tell them apart and sort them?</i></p> <ul style="list-style-type: none"> There are lots of different materials, such as wood, plastic, glass, metal, water and rock. <p><i>What are natural materials?</i></p> <ul style="list-style-type: none"> Some materials are natural and come from plants and animals- such as wood comes from a tree, wool comes from sheep. <p><i>What are man-made materials</i></p> <ul style="list-style-type: none"> Some materials are made by humans (human-made) such as plastic, glass, paper etc. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Materials can be grouped based on what they are made out of. Liquids can be poured. A surface is something that can be seen or touched. <p><u>Possible Key questions:</u></p> <ul style="list-style-type: none"> What is this object? What material is it made from? How can we sort these materials? What is similar about these materials? What is different about these materials? What is _____ made from? How can you describe how this material looks, feels, moves? When you look closely at the material what do you see? Is it light/heavy? What is the name of this material? Is it natural or man made? 	<p><u>National Curriculum links:</u></p> <ul style="list-style-type: none"> distinguish between an object and the material from which it is made identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock describe the simple physical properties of a variety of everyday materials compare and group together a variety of everyday materials on the basis of their simple physical properties Working scientifically – identifying and classifying Working scientifically – using their observations to suggest answers to questions

Strand of learning: animals including humans			
	<p><u>Skills developed in this unit:</u></p> <ul style="list-style-type: none"> • Pupils should be able to name main the main body parts – including head, neck, arms, elbows, knees, legs, face, ears, eyes, hair, mouth, teeth • Pupils should use the local environment to explore and answer questions about animals and their habitats • Working scientifically – use observation to compare and contrast animals through first hand or other sources of information <p>Working scientifically:</p> <ul style="list-style-type: none"> • group animals according to characteristics • Pupils will use their senses to compare different textures, sounds and smells • Working scientifically – perform simple tests (around senses) 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Use of songs, rhyme and games for the identification of body parts • Undertake simple experiments for each of the senses e.g. throwing bean bags at a target but changing the level of vision • Complete sound walks • Identification of sounds through listening only • Food tasting • Feely bags – practical identification of objects by touch alone using hands then feet, wearing gloves and not gloves – what are the differences and why • Smell jars – smell walks around the local environment • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Do large body map by drawing around a child in the group • Sort and organise animals by their characteristics using venn diagrams and comparison tables. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <p>Science is the process of learning about the natural world through observation and experimentation</p> <p>People and animals grow and change e.g. baby to child</p> <p>Key Vocabulary: head, neck, arms, elbows, knees, legs, face, ears, eyes, hair, mouth, teeth Smell, taste, touch, hearing, sight Light, dark, blind, Sweet, sour, salty, bitter, savory Mammals, fish, reptiles, birds, insects, amphibians Characteristics</p>
	<p><u>Crucial Knowledge for indivlessons:</u></p> <p><u>Discuss the big question ... what are we and where do we belong when we talk about things that live on this planet</u></p> <ul style="list-style-type: none"> • We are humans and we are a type of animal called mammals. • Living things can be plants or animals. <p><u>What parts make up us and what are they used for?</u></p> <ul style="list-style-type: none"> • Name and identify basic parts of human body that can be seen. <p><u>What are our senses and which body parts do we associated with each sense – how do sense work?</u></p> <ul style="list-style-type: none"> • Humans have five senses -touch, taste, smell, hearing and sight. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Name basic bones of the body e.g. spine, skull, jaw bone, ribs. • Name parts of the internal body e.g. heart, lungs, stomach, brain. • Adults don't grow (height) anymore. Older adults will start to have lose hair or their hair will change colour (grey/white). Older adults develop wrinkles. • A human life cycle starts with the birth of a baby. • All mammals have hair, including whales and dolphins. 	<p><u>National Curriculum links:</u></p> <ul style="list-style-type: none"> • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)



	<p><u>What are the main groups of animals and what makes them different?</u></p> <ul style="list-style-type: none"> There are 6 main groups of animals including: mammals, fish, reptiles, birds, insects and amphibians. <p><i>What are the characteristics of different animal groups - what is the same and what is different?</i></p> <ul style="list-style-type: none"> Animal groups can be described by their characteristics. For example, gills, beaks, fur, cold blooded, warm blooded. 	<ul style="list-style-type: none"> Most mammals are helpless when they are born. They need protection from adult mammals until they can survive on their own. All birds have feathers. Insects are invertebrates- don't have bones. Insects have two antennae and 6 legs so spiders are not insects they are arachnids. 	<ul style="list-style-type: none"> identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense Working scientifically – ask simple questions and recognize that they can be answered in different ways Working scientifically – compare and contrast animals first hand or through other sources
		<p><u>Key Questions to ask</u></p> <ul style="list-style-type: none"> Where is your _____ ? Do you have more toes or teeth? Is your footprint longer or shorter than your partner? Do older children have bigger feet? Which body parts can you see and name? Can you name any body parts you cant see? Can you see if you cover one eye? How does it change? Can you see in the dark? Can you describe the sounds you hear? What body parts are used for each sense? What body parts are best for touch - is it easier or harder to feel things when you wear gloves - why? What are the main animal groups? Can you name the features of each type of animal? 	

Strand of learning: Plants			
	<p><u>Skills developed in this unit:</u></p> <ul style="list-style-type: none"> Pupils should understand plants grow from seeds or bulbs Pupils should be able to name all of the parts of a plant and have basic understanding of their roles. 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Observe and record with some accuracy e.g. the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <p>Science is the process of learning about the natural</p>

	<ul style="list-style-type: none"> • Pupils should be able to name some common plants and trees they will see in their local environment • They should be able to describe the difference between evergreen and deciduous trees <p>Working scientifically:</p> <ul style="list-style-type: none"> • Observing closely – using tools to help them make close observations such as magnifying glasses. • Comparing and contrasting familiar plants and trees • Identifying and grouping plants and trees • Recording and monitoring changes in plants over time 	<ul style="list-style-type: none"> • Use comparative tests e.g. to show that plants need light and water to stay healthy. • Plant bingo to practice names of plant parts • Snap – card game to match parts with pictures of those parts • Drawing with accuracy parts of a plant • Create a model of a plant and include all the correct elements • Trees – leaf identification • Leaf rubbings and comparisons 	<p>world through observation and experimentation</p> <p>Leaves fall off some trees and change colour in different seasons</p> <p>Key Vocabulary: Seed, bulb Roots, stem, flower, leaves Branches, trunk Deciduous, evergreen Growth</p>
	<p><i>Crucial knowledge for lessons:</i></p> <p><i>Where do new plants come from?</i></p> <ul style="list-style-type: none"> • Seeds/bulbs grow into plants • Know that plants have roots and grow from the ground. <p><i>What are the main parts of a plant and what do they do?</i></p> <ul style="list-style-type: none"> • Identify and describe the basic structure (roots, stem, leaves, flower) of a variety of common flowering plants and have basic understanding of its role. • Flowers are the part of a plant that blossoms to help produce seeds <p><i>What are the main parts of a tree and what do they do?</i></p> <ul style="list-style-type: none"> • Identify parts of a tree (including roots, trunk, branches and leaves) and have basic understanding of its role. <p><i>Why do some trees look different to other trees in Autumn/winter?</i></p> <ul style="list-style-type: none"> • Know what deciduous means- shredding of leaves annually. • Know what evergreen means- keeps its leaves all year around. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Identify and describe the basic structure of a variety of common flowering plants- blossom, petals, fruit, seeds. • Describe the basic function of the parts of the plant. For example, the flower attracts insects. • Compare and contrast familiar plants. • Know how plants over time change- leaves fall off, buds open. • Compare and contrast what they have found out about different plants. • Understand the words test, comparison and fair in relation to prove activities. <p><u>Key questions to ask:</u></p> <ul style="list-style-type: none"> • how do plants grow? • What are the main parts of a plant? • What is the job of the? • What is different between plants and trees? • What similarities do plants and trees have? • Why do some trees lose their leaves in autumn and Winter while others don't? 	<p><u>National Curriculum links:</u></p> <ul style="list-style-type: none"> • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees

Year 2:

Strand of learning: Materials			
Ongoing	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> Classification of materials based on their properties and uses/applications Understanding that materials can be used for multiple purposes and the same material can take different forms Understand that different materials can be used to do the same job e.g. spoons made of metal, wood, plastic Identifying the properties of materials which make them suitable/unsuitable for practical purposes <p>Working scientifically:</p> <ul style="list-style-type: none"> identifying and classifying making close observations and recording their findings asking simple questions (and setting criteria for investigations) performing simple tests 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Compare the use of everyday materials in and around school with the use of the same materials found in other place Identify and classify different materials into groups Complete a material hunt inside and outside – compare and groups the materials gathered using different properties Play games such as guess my rule (where objects are split and the children have to identify on which criteria) odd one out Try to change the shape of materials using folding/squashing, tearing Children could design tests on materials to further check properties – setting their own criteria such as does it float, is it transparent Undertake investigations to identify the suitability of materials (including fabrics) for certain jobs e.g. the best rain coat, the best boat body Find out about people who have developed useful new materials 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation A material is what an object is made from There are lots of different materials (and name these materials) Materials can be natural or man made How to identify and classify materials (grouping and organizing) <p>Key Vocabulary Man made, natural, recycle Squash, bend, twist, flex, stretch, Variable, waterproof, absorbent, light, strong, tough, brittle, hard, soft Fabric, flexible, dull, rigid, shinny Opaque, transparent</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p>Recap: know the names and basic properties of everyday materials as well as knowing if they are natural or man-made.</p> <ul style="list-style-type: none"> Recap materials can be natural or human-made. Recap the names of some everyday materials including wood, plastic, glass, metal, water and rock. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Know who has developed new materials. For example, John McAdams (tarmac), Charles Macintosh (waterproof materials) and John Dunlop (tyres). Identify/ group materials based on their properties. Understand there are a variety of ways to record their observations of materials. 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock,

	<p><i>Know about different properties of materials and use the appropriate words to describe them when discussing, sorting and classifying</i></p> <ul style="list-style-type: none"> Describe materials using its properties- waterproof means keep water out, absorbent means it can soak up liquid easily, opaque means not able to see through and transparent means easy to see through. <p><i>Know and experiment with different properties of materials to identify their suitability for different tasks – test materials in different ways and gather information to answer questions</i></p> <ul style="list-style-type: none"> Know that some solid materials can be squashed, twisted, bent stretched etc.. Identify and compare the suitability of materials for particular uses- metal can be used for cars, coins, cans etc. <p><i>Understand that some materials can be recycled and used again in different forms – this is not possible of all materials – and know the positive impact of this process</i></p> <ul style="list-style-type: none"> Understand some materials can be recycled and used for new purposes 	<p>Key questions to ask:</p> <ul style="list-style-type: none"> what are natural materials? What are man-made materials? How can we sort and group materials What material is paper/cardboard made from? Can you change the shape of the material – how? What material is most suitable for why? What material would be unsuitable for... Why? What words could you use to describe What are the differences between plastic and glass? When would glass/plastic be an unsuitable material for a job? What is the texture of this material? If you change the shape of the material, can it be changed back to its original form? 	<p>paper and cardboard for particular uses</p> <ul style="list-style-type: none"> find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
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Strand of learning: animals including humans – life cycles			
<p>Ongoing</p>	<p>Skills to be developed in this unit:</p> <ul style="list-style-type: none"> Pupils will suggest ways to find answers to their questions ..looking at sources of information and observation/testing. Develop understanding of teeth and how to look after them Children will be able to identify and discuss the growth and development of mammals and other animals in the form of lifecycles which show the phases of their lives. They will be able to make clear observations from both first hand experience and other sources of information and record their findings Pupils will be able to question and describe the basic things animals and humans need to survive 	<p>Application of skills/ proof I have learnt this crucial knowledge:</p> <ul style="list-style-type: none"> Describe animals based on their characteristics (pointing out key features such as wings, claws, tail etc..). Name and identify the 6 main groups of animals including: mammals, fish, reptiles, birds, insects and amphibians. Sort/group and classify animals/food items. Explain what a living thing is. Create and label a simple life cycle. Sort and classify animals into simple groups with some help. Compare two contrasting life cycles of animals. 	<p>Background Crucial Knowledge for this unit:</p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation Humans are mammals People and animals grow and change as they get older There are 6 main types of animals and they all have different characteristics. <p>Key Vocabulary Teeth, plaque, filling</p>

	<ul style="list-style-type: none"> Pupils will be able to ask questions about growth and development in people and animals <p>Working scientifically:</p> <ul style="list-style-type: none"> Observation and classification of animals and areas within keeping health such as food Performing simple tests Gathering and recording information through testing and observation to help them answer questions 	<ul style="list-style-type: none"> <i>Use gel and dried herbs to look at germs on hands and how they spread – then use this to show how handwashing properly clears these germs.</i> 	<p>Reproduction, lifecycles,</p> <p>Newborn, infant, toddler, teenager, adult, elderly</p> <p>spawn, tadpole, tadpole with legs, froglet and frog.</p> <p>Exercise, diet, hygiene</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p><i>Recap: know the 6 main animal groups and some of their characteristics</i></p> <ul style="list-style-type: none"> Year 1 RECAP: The 6 main groups of animals including: mammals, fish, reptiles, birds, insects and amphibians. <p><i>To understand reproduction is how new animals are born and this is the start of the growth cycle (with emphasis placed on growth)</i></p> <ul style="list-style-type: none"> Reproduction is where living things make a new living thing. Fish, insects, amphibians and birds start their life cycle as eggs. Mammals start their lifecycle as babies <p><i>To understand the Lifecycle of a human</i></p> <ul style="list-style-type: none"> Lifecycle of a human includes; baby (newborn), infant, toddler, child, teenager, adult and elderly. <p><i>To understand the lifecycle of different types of animal – such as frogs and birds</i></p> <ul style="list-style-type: none"> Lifecycle of a frog includes: spawn, tadpole, tadpole with legs, froglet and frog. <p><i>Why are exercise and diet so important in the growth and lifecycles of humans?</i></p> <ul style="list-style-type: none"> Exercise, diet and hygiene are very important for humans to survive and grow properly. To be healthy we need to: 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Some animals give birth to live young and other lay eggs. Mammals start their life cycle with live young. All mammal babies drink milk from their mothers. All mammals have hair, including whales and dolphins. Warm blooded is when an animal can self-regulate its body temperature (remains the same temperature all year around). Cold blooded is when an animal can't self-regulate its body temperature, its temperature is regulated by its surroundings.' Insect bodies have three parts, the thorax, abdomen and head. Insects are invertebrates- don't have bones. Insects have two antennae and 6 legs so spiders are not insects they are arachnids. Some animals have offspring that do not look like them when they are young e.g. frogs 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> notice that animals, including humans, have offspring which grow into adults find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene <p>Working Scientifically:</p>

	<ul style="list-style-type: none"> • Eat a balanced diet to get the right amount of nutrients for our bodies. • Exercise to keep our hearts healthy and maintain a healthy weight. <p><u>Why is keeping clean important to the health and development of Humans and animals?</u></p> <ul style="list-style-type: none"> • Keep our bodies clean to prevent illness and so we don't smell. • Keeping our Teeth clean is an important part of keeping our bodies healthy 	<p>Key Questions to ask:</p> <p>What stages of growth do humans go through? What are the features you would see in a person at each stage of the life cycle? Do all animal lifecycles follow the same patterns? Do all animals at each stage look like the fully grown animal that they develop into? What is a lifecycle and can you explain one for Why is exercise good for your body? What happens to your body when you exercise? Make predictions .. which form of exercise will raise your heart rate the most/least? What is a germ? Why should we make sure we wash our hands and keep clean? Why is it important to brush your teeth? What might happen if you didn't brush your teeth? How does brushing your teeth keep your body healthy?</p>	<ul style="list-style-type: none"> • gathering and recording data to help answer questions • observing through video or first hand observation and measurement
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<p>Strand of learning: Living things- Habitats</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • Develop understanding that all living things have certain characteristics which are essential for keeping them alive and healthy. • Understand the term habitat – a natural environment or home to a variety of plants and animals • Understand the term microhabitat – a very small habitat • Raise questions about the local environment that help them identify and study a variety of plants and animals • Make links on how living things rely on each other to survive • Compare and contrast animals from different habitats through observation and exploration. <p>Working scientifically</p> <ul style="list-style-type: none"> • Sorting and classifying – according to living/dead/never lived 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Look at groups of animals – where would they inhabit (simple first e.g. land/sea and then expand out) • Create environment on school grounds specific to one type of local mammal and monitor • Create mini pond in classroom and monitor the growth of the animals within this over time • Invite a vet into school for discussions on animal types • Yes/no questions to identify an animal based on characteristics • Identify and find habitats in the local area (e.g. school grounds). • Describe what a habitat has to have. • Sort habitats into groups. • Explain why an animal is best suited to a habitat. • Sort and classify animals/living things. • Compare living things which exist in a variety of habitats e.g. ocean and forest. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • Living things can be plants or animals • Humans and animals grow and develop as they get older. <p>Key Vocabulary Herbivore, omnivore, carnivore Habitat, Microhabitat</p>

	<ul style="list-style-type: none"> Recording findings in a variety of ways such as charts and tables Set out to explore bigger questions and discuss ways of answering these questions 		
	<p><u>Crucial Knowledge for lessons:</u></p> <p><u>Recap: know that both plants and animals are living things and be able to discuss why</u></p> <ul style="list-style-type: none"> Year 1 RECAP Living things can be plants or animals. <p><u>Understand and discuss the characteristics which means something is alive and compare this to non-living things which can have some characteristics?</u></p> <ul style="list-style-type: none"> The seven life processes are: movement, respiration (breathe), sensitivity, growth, reproduction, excretion (get rid of waste) and nutrition. Understand the difference between living, dead and things which have never been alive. <ul style="list-style-type: none"> <p><u>Understand the three dietary groups of animals and be able to discuss how this affects the areas they live</u></p> <ul style="list-style-type: none"> Animals can fall into three different dietary groups – herbivores (eat plants), omnivores (eat plants and meat) and carnivores (meat). <p><u>Understand the basic needs of all living things and link this to places things can and can't live</u></p> <ul style="list-style-type: none"> All living things need water, food, air and shelter to survive. A habitat is a place which gives food and shelter. <p><u>Understand and explore different types of habitats, the conditions, the adaptations needed to live there, the animal and plant life</u></p> <ul style="list-style-type: none"> There are different types of habitat. For example, ocean, desert and forest. <p><u>Understand, create, monitor and explore microhabitats</u></p> <ul style="list-style-type: none"> A microhabitat is where insects and spiders tend to live. Microhabitats include: Under stones and rocks, in short grass, inside rotting wood, under fallen leaves, in and on the soil and in tall grass and flowers. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> The main 5 habitats including: ocean, desert, forest, grassland and tundra. Living things have special features that help them to survive in their habitat. <p><u>Key questions to ask:</u></p> <p>What features do different types of animals have? How are the needs of different animal groups e.g. birds and mammals the same? Are there any differences? Is a flame alive? Is a deciduous tree dead in winter? How is _____ adapted for its environment? What characteristics does an animal/plant need to live in a _____ habitat?</p>	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> identify and name a variety of common animals that are carnivores, herbivores and omnivores explore and compare the differences between things that are living, dead, and things that have never been alive identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other identify and name a variety of plants and animals in their habitats, including microhabitats

<p>Strand of learning: Living things – food chains</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> children build simple food chains in different ways, understanding the roles of animals in this food chain. Children understand that changing one link in this chain can damage the whole food chain and change the habitat. <p>Working scientifically:</p> <ul style="list-style-type: none"> Asking simple questions that can be answered in different ways Observing closely Gathering and recording data to help answer questions 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Make physical food chains with toys/pictures and arrows Make paper link food chains Create simple food chains on paper. Label simple food chains with producer, consumer, prey and predator, herbivore, omnivore and carnivore. Food chain art – with images of animals Food chain puzzles Food chain pyramids – these show images of the animals in the chain on one side, animal names on the other and their role in the chain on side three 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation Living things can be plants or animals There are 6 main types of animals and they all have different characteristics. Animals fall into three dietary groups – carnivores, omnivores, herbivores <p>Key Vocabulary Carnivore, herbivore, omnivore, food chain, producer, consumer, predator, energy, habitats</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p><u>What is a food chain and why are they important?</u></p> <ul style="list-style-type: none"> A food chain is how plants and animals get their energy. Animals get their energy from food (plants or other animals). <p><u>What are the roles animals can take in simple food chains?</u></p> <ul style="list-style-type: none"> All food chains include a producer, consumer and predator <p><u>What are producers, consumers and predators and how do they fit into a food chain?</u></p> <ul style="list-style-type: none"> A producer is something that has the ability to make its own food, usually a plant. A consumer is a living thing that eats a producer. Some consumers are either herbivores or omnivores because they both eat plants. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Know that if one or more parts of a food chain is taken away, then this will affect all of the other creatures in the food chain. Know humans are at the top of the food chain because there’s not many creatures that want to eat humans/ humans do not make easy prey. <p><u>Key questions to ask:</u></p> <ul style="list-style-type: none"> how do food chains work? What are the different roles for animals in food chains? How do food chains change depending on the habitats the animals live in? Can there be more than one of each type of animal in a food chain (food webs)? What is a 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> 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

	<ul style="list-style-type: none"> • A predator is a living thing that eats a consumer. They are carnivores. • Prey is an animal that is hunted by another animal for food. 	<ul style="list-style-type: none"> • How do changes in a food chain effect the habitats in which animals live? 	
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Strand of learning: Plants			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • develop an understanding of the main functions and roles of each part of a plant and be able to explain how these help the plant survive and thrive. • Understand germination as the first stage of plant growth and how this differs between bulbs and seeds • Know the conditions a plant needs to be healthy and strong as it grows • Understand that plants have a variety of ways to spread their seeds to ensure new plants grow. <p>Working scientifically:</p> <ul style="list-style-type: none"> • observing and recording with increasing accuracy by monitoring plant growth over time • set comparative tests to show plants need light and water to stay healthy 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Label parts of a plant and explain their roles for the plants growth/survival. • Describe/ explain the conditions a plant needs to thrive. • Observe and record with some accuracy e.g. the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth. • Use comparative tests e.g. to show that plants need light and water to stay healthy. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • Seeds and bulbs grow into plants • Plants have roots, stems, leaves and flowers. Trees have roots, branches, trunk and leaves • Some trees are evergreen and others deciduous <p>Key Vocabulary Bulb, germination Dispersal, growth Environmental conditions</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p><u>Recap lesson – what are the main parts of a plant and tree?</u></p> <ul style="list-style-type: none"> • Identify and describe the basic structure (roots, stem, leaves, flower) of a variety of common flowering plants, including trees (roots, trunk, branches, leaves). • deciduous means (shedding of leaves annually) and what evergreen means (keeps its leaves all year around). <p><u>What are the main roles of each plant part and how do they work together to make sure the plant is strong</u></p>	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • We can grow different plants by planting seeds and bulbs. • Most seeds and bulbs don't need light to start growing – they have a store of food inside them. • After a flower that has a bulb has wilted, it can be pulled out of the ground; it can be replanted and it will regrow. • Seeds cannot be replanted and regrow. • A young plant already has roots and leaves/stem inside the seed. 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature

	<ul style="list-style-type: none"> Know the basic function of the different parts of plants. For example, the roots anchor the plant, stem hold the plant upright, leaves produce food for the plant, flower attracts insects etc. <p><u>Where do new plants come from and what is the difference between a seed and a bulb?</u></p> <ul style="list-style-type: none"> A seed is what a new plant grows from. A bulb is the part of some plants, which stores food while the plant is in its resting stage. <p><u>How do plants grow from tiny seeds/bulbs to full plants?</u></p> <ul style="list-style-type: none"> Germination is when a plant starts to grow from its seed/bulb and a shoot bursts out. <p><u>What conditions do plants need to be able to grow and stay healthy?</u></p> <ul style="list-style-type: none"> Plants need the following to grow and stay healthy: soil, water, space, (sun)light and the right temperature. <p><u>How do plants spread their seeds so new plants can grow?</u></p> <ul style="list-style-type: none"> Name some seed dispersal methods- wind, water, food, etc. 	<ul style="list-style-type: none"> Every living thing carries out its own life cycle. Plants grow almost everywhere on Earth except the artic poles. Plants have special features that help them to grow in different environments. <p><u>Key questions to ask:</u></p> <ul style="list-style-type: none"> what are the parts of a plant and tree – what jobs do they do to help the plant grow and stay strong? How does a plant grow from a seed/bulb? What is germination and what happens in the first stages of this process? What job does the do ? What is seed dispersal and why is it important for plants? What environmental conditions do plants need to grow and remain healthy? 	<p>to grow and stay healthy</p>
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Year 3

<p>Strand of learning: Rocks</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> Pupils can make links with geography and explore different kinds of rocks, including those in the local environment Develop observation skills and gather visual information based to identify and classify based on their existing knowledge (and new CK) of rocks and soils Develop and raise questions from their observations that will stimulate further observations 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Observe rocks in the local area including in buildings and gravestones and explore how and why they have changed over time Investigate what happens when rocks are rubbed together, what happens when they are immersed in water (hardness and permeability tests) Identify and classify rocks in a variety of ways including venn diagrams 	<p><u>Background Crucial Knowledge for this unit:</u></p> <p>Background knowledge:</p> <ul style="list-style-type: none"> - Science is the study of the natural world through observation and experiment. - Scientists study science, setting up investigations and experiments to prove their scientific ideas.

	<ul style="list-style-type: none"> Use relevant scientific language to discuss their ideas and communicate their findings <p>Working scientifically:</p> <ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings 	<ul style="list-style-type: none"> Review different types of soil .. compare and contrast what is in the soil, how it feels, colour, texture etc.. make observations and record findings Set up and plan investigations to test rocks e.g. which rock soaks up the most water .. how do we control this and make it fair test Soil – layers of soil investigation – take different soil samples, mix with water and let it settle into different layers to observe Are all soils the same in terms of permeability and allowing the flow of water – look at flooding and erosion and then investigate using fair test. 	<p>- Rocks are a natural material found in the Earth.</p> <p>Key Vocabulary</p> <p>hard, soft, rough, smooth, porous, non-porous</p> <p>igneous, sedimentary and metamorphic</p> <p>magma, pressure</p> <p>clay, particle</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p><u>What do we observe when we look at different types of rock – how do we describe what we see?</u></p> <ul style="list-style-type: none"> Different rocks look different. <p><u>What are the properties of rocks and what scientific words can we use to describe them?</u></p> <ul style="list-style-type: none"> Different rocks have different properties, such as hard, soft, rough, smooth, porous, non-porous etc. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Pupils can name some different types of rocks that make up soil. Pupils can explain why specific rocks are used for different purposes. Pupils can explain how rocks change over time due to corrosion and erosion. Rocks are altered to create items of use for people e.g. bricks for buildings and salt for cooking Paleontology is the scientific study of life in the past that involves the analysis of plant and animal fossils 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties describe in simple terms how fossils are formed when things that have lived are trapped within rock

	<p><u>What are the three types of naturally occurring rock and how were they formed? What features do they have that makes them unique?</u></p> <ul style="list-style-type: none"> • There are 3 different types of naturally occurring rocks: igneous, sedimentary and metamorphic • Igneous rocks have been formed when magma or lava cools. • Sedimentary rocks are formed by layers of sediment (tiny pieces of rocks and animal skeletons) pressed down on top of each other • Metamorphic rocks started as igneous or sedimentary but changed as a result of extreme heat or pressure <p><u>What are fossils and why are they important?</u></p> <ul style="list-style-type: none"> • Fossils are formed when things that have lived are trapped within rock. <p><u>What is soil and are all soils the same?</u></p> <ul style="list-style-type: none"> • Soil is made from rocks and organic matter (minerals, air, water and organic matter) 	<p><u>Key questions to ask:</u></p> <ul style="list-style-type: none"> • Can you describe what a rock looks like and feels like ? • Which rocks are rough? Which are smooth? Which are heavy? Which are light? • How can we tell rocks apart? • How is _____ rock formed? • What is the differences between _____ rock and _____ rock? what is similar? • How are fossils formed? • What are fossils? • What is soil made from? • Are all soils the same? • What different properties do we see in different soils. 	<ul style="list-style-type: none"> • recognise that soils are made from rocks and organic matter
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<p>Strand of learning: animals including humans</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • name and identify bones (and some muscles) in the human body • link the bones within other animals to those within a human skeleton • understanding that bones have different functions and roles <p>Working scientifically:</p> <ul style="list-style-type: none"> • asking relevant questions and using different scientific enquires to answer them • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Children identify the function of the food groups through games • Plan and create health and balanced meals • Sort and organise foods into groups • Label skeletons or construct them from parts • Draw around a partners and correctly identify the places bones and muscles go in the human body • Allow children to look at animals in their local environment and identify if they have a spine or not – record findings • Create skeleton experts by splitting class into groups and giving them a skeleton type to explore • Make an arm model to show how muscles work by moving bones around a joint. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the study of the natural world through observation and experiment. • Scientists study science, setting up investigations and experiments to prove their scientific ideas. • Animals are living things that feed themselves • Nutrition is giving your body the food it needs for it to grow and be healthy. <p>Key Vocabulary</p>

	<ul style="list-style-type: none"> • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • 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>Carnivore, Herbivore, omnivore</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p><i>What does the word nutrition mean and why is it so important for humans and animals?</i></p> <ul style="list-style-type: none"> • Animals including humans need the right type of nutrition. • Animals including humans cannot make their own food, they have to hunt, prepare and eat food <p><i>What is a skeleton and are they always the same in all animals and humans?</i></p> <ul style="list-style-type: none"> • Humans and some animals have skeletons and muscles. <p><i>What is the functions of the skeleton – do different bones have different jobs?</i></p> <ul style="list-style-type: none"> • Skeletons – support the body, protect the organs in the body, allow us to move <p><i>How do we move?</i></p> <ul style="list-style-type: none"> • Muscles are soft tissue that contract to cause movement <p><i>What are the differences between Vertebrates and invertebrates – interdictioin to terms and basic characteristics?</i></p> <ul style="list-style-type: none"> • Vertebrates have an endoskeleton (internal skeleton) • Invertebrates have an exoskeleton or hydrostatic skeleton 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Pupils can identify animals without skeletons. • Pupils can group animals based on diet, e.g. herbivores, omnivores and carnivores. • Pupils can name specific bones and muscles. • Pupils can explain how these bones and muscles support, protect and aid movement for our bodies. 	<p><u>National Curriculum Links:</u></p> <ul style="list-style-type: none"> • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement
		<p><u>Key Questions to ask:</u></p> <ul style="list-style-type: none"> • What are the names of the five food groups? • What food groups should you eat regularly/sometimes/occasionally? • What is a balanced diet and why is it important? • What is the job of our skeleton? • How many bones do we have? • Can you find the skull...ribcage... etc... • Can you identify the animal from its skeleton? • How are the skeletons of certain animals the same/different to human skeletons • Do these animals have ...ribcage • Name three animals that have a spine? • What is an exoskeleton, what is a Hydro skeleton • How can we sort and group animals based on their skeletons? • How do muscles work? 	

Strand of learning: Forces			
Ongoing	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> understand that there are always two objects involved in a force, one that exerts the force and one that the force acts on know that friction acts on all objects and plays a big part in everyday life understand that some forces do not require contact to act on objects but most forces do know that forces fall into push or pull understand that magnetic force can act on a range of objects but not all <p>working scientifically:</p> <ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Explore push and pull forces through practical testing are any forces non-contact forces? Mention gravity – give children paperclip on a piece of card can they move it without contact? Test the strength of magnetic attraction – how many felt squares can go between two magnets before they no longer attract each other – does the size of the magnet effect its strength? Look at a range of tests to show the impact of friction e.g. toy cars on different surfaces, use of newton meters to pull objects across surfaces, dropping marbles into different types of liquid an observing Test how forces can be grouped e.g. is a throw a push or pull force? Test if magnets are as powerful under water as they are in normal air Test magnetic objects with questions such as are all coins magnetic? 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the study of the natural world through observation and experiment. Scientists study science, setting up investigations and experiments to prove their scientific ideas. Forces are a push or a pull in a particular direction. <p>Key Vocabulary Force, push, pull Friction, resistance, surfaces, contact, newton (force measurement and meter) Magnet, magnetic force, attraction, repel</p>



	<p><u>Crucial Knowledge for lessons:</u></p> <p><u>What are forces?</u></p> <ul style="list-style-type: none"> • A force is a push or pull in a particular direction when objects interact • A push moves an object away • A pull moves an object towards <p><u>What is friction and how does it affect objects?</u></p> <ul style="list-style-type: none"> • Friction is the force that's created when 2 surfaces make contact with each other. • Friction slows objects down. • Different objects and surfaces create different amounts of friction. • The more friction there is, the slower an object will move on a surface <p><u>What is a magnetic force and how is it different from some other forces?</u></p> <ul style="list-style-type: none"> • Most forces need contact between 2 objects. • Magnetic forces do not need contact but can act from a distance. <p><u>How do magnets interact with each other and why?</u></p> <ul style="list-style-type: none"> • Magnets can attract or repel each other. • Magnets have 2 poles (North and South). • With poles opposites attract so north to south pole, while the same poles repel <p><u>Is everything attracted to a magnetic force?</u></p> <ul style="list-style-type: none"> • Some materials are magnetic but some are not. • Magnetic materials include iron, nickel, steel • Magnets do not attract things such as wood, rubber, plastic and some metals such as copper. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Magnets are used in everyday life, e.g. a compass or an MRI scanner. • Pupils can explain why some objects are purposefully made magnetic and others are not. • Pupils can group how different objects move. • Pupils can suggest creative uses for different magnets. <p><u>Key questions to ask:</u></p> <ul style="list-style-type: none"> • what is a force? • Why are there always two 'objects' involved in forces? • Do forces always have to have contact with an object to act on them? • What is friction? • Why is friction such a useful force? • How does friction help in our everyday lives? • What increases friction? • What decreases friction? • What is a magnetic force? • How many poles does a magnet have and what does this mean? • Are all objects magnetic? • What is a fair test and how do we make sure our tests are fair? 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> • compare how things move on different surfaces • notice that some forces need contact between 2 objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing
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Strand of learning: Light:			
Ongoing	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • Recognize that we need light to see and that darkness is an absence of light 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p>	<p><u>Background Crucial Knowledge for this unit:</u></p>

	<ul style="list-style-type: none"> • Notice that light travels from a source and is reflected by surfaces • Understand the light from the sun can be dangerous and eyes need to be protected • Recognize that shadow is formed when a light source is blocked by a solid object <p>Working scientifically</p> <ul style="list-style-type: none"> • Find and identify patterns in the way shadows change and are affected by light sources and their position. • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, • using straightforward scientific evidence to answer questions or to support their findings. 	<ul style="list-style-type: none"> • Look at objects in a box through a viewing hole – can they be described in the dark? Add holes to the top of the box how does that help? • Do a shadow search around school – map the shadows (which are darker and why) on map mark these and indicate light source and object blocking light • Explore what happens when light reflects off a mirror or other mirror surfaces, looking at how light travels • Explore shadow through measuring shadows over time in a day, looking at ow shadows change when the light source is moved closer of further away • Explore making shadow puppets and shadow images using light and distance – how can we change the size of a shadow • Test how changing the distance between the object affects the size and strength of the shadow (record this in a chart) • Explore how the angle at which light hits an object can change the length of a shadow using torches and dominoes – measure length at different angles e.g. 30 degrees 45 degrees 70 degrees 90 degrees 	<ul style="list-style-type: none"> • Science is the study of the natural world through observation and experiment. • Scientists study science, setting up investigations and experiments to prove their scientific ideas. • Light is a type of energy that makes it possible for us to see the world around us. <p>Key Vocabulary Dark, dull, bright Opaque, translucent, transparent Reflect, shadow, absence of light source</p>
	<p><u>Crucial Knowledge for lessons:</u> <i>What is light, where does it come from and why is it important?</i></p> <ul style="list-style-type: none"> • We need light to see. • Darkness is the absence of light. • Light comes from light sources, e.g. the sun. <p><i>Light travels from a source but can be reflected by other objects – why is this important?</i></p> <ul style="list-style-type: none"> • Some objects appear to be giving out light when in fact they are just reflecting it e.g. moon 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Pupils can explain what happens when light reflects off a mirror or another reflective surface. • Pupils can explain the term reflective, opaque, transparent and translucent. • Pupils know that light travels is straight lines. 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> • recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces

	<ul style="list-style-type: none"> • Light can be reflected from surfaces. <i>Our main source of natural light is the sun but we should be careful with this light, why?</i> • The light from the sun can be dangerous. • We should protect our eyes from the sun. <i>Light can travel through some objects but not others, what type of objects are there and how do we describe them?</i> • Transparent – you can see clearly through something e.g. glass window • Opaque – you can't see through it, does not let light through • Translucent – allows light through but does not give clear view. <i>How are shadows created and how do they change?</i> • Shadows are formed when light is blocked by an opaque object. • Shadows change based on distance from the light source. • Shadows change based on the strength of the light source. 	<p><u>Key questions to ask:</u></p> <ul style="list-style-type: none"> • what is a light source? • What is the main source of natural light? • Light travels away from a light source, how can we change the direction of this light? • Why can the light from the sun be dangerous? • How do we protect our eyes from light which is too strong? • What do the words transparent, translucent and opaque mean? • What creates shadows? • Can we change the size of a shadow? • Can we make shadows darker or lighter? 	<ul style="list-style-type: none"> • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change
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<p>Strand of learning: Plants</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • develop an understanding of each part of the plant and its functions • apply their knowledge of plants and environmental conditions to gain a deeper understanding of how best to ensure plants grow and how the changes in the environment can affect this. <p>Working scientifically:</p> <ul style="list-style-type: none"> • comparing the effect of different environmental factors on plant growth • discover how seeds are formed by observing the different stages of a plant lifecycle over time • look and identify patterns in plant structures that will allow them to identify how seeds will be dispersed from the plant. 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • dissect and explore flowers and other plants – carefully removing and setting out parts to label • allow pupils opportunity to try their own plant growing – they can bring whatever seeds or bulbs as well as any materials they feel will help them grow • explore how environmental conditions such as light effect plant growth • design your own perfect seed for dispersal using existing knowledge • explore the idea of animal seed dispersal by looking at a range of fruits and vegetables – which parts are edible, which are seeds, how will the seed survive? • Explore tree rings and growth 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the study of the natural world through observation and experiment. • Scientists study science, setting up investigations and experiments to prove their scientific ideas. • Plants are living things found on the Earth, which produce their own food • The basic names and functions of each plant part • That germination is the first part of growth

	<ul style="list-style-type: none"> • Observe how water is carried in plants and record findings • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams • identifying differences, similarities or changes related to simple scientific ideas and processes 	<ul style="list-style-type: none"> • Look at how plants transport water through experimentation • Explore if plants grow better with fertilizer (linking back to animal dispersal) • Colour changing flowers – can the children change the colour of a white flower • Show how the veins in leaves carry water through the use of coloured water testing • How does a leaf breath experiment – different type of leaves picked just before the experiment 	<ul style="list-style-type: none"> • <i>That plants need soil, water, light and the right temperature to grow well.</i> <p>Key Vocabulary Petals, anther, stigma, pollination, dispersal Absorbing, nutrients, anchoring, transport, photosynthesis</p>
	<p><u>Crucial Knowledge for lessons:</u> <i>Recap lesson: what are the main parts of a plant and what are their main functions?</i></p> <ul style="list-style-type: none"> • Plants have roots, stems, leaves and a flower <p><i>What are flowers, what parts make up a flower and what do job do they have in a plant?</i></p> <ul style="list-style-type: none"> • Flowers have petals, Anthers – which contain pollen – and Stigma – where the pollen from another plant is collected to make new seeds. • Petals attract bees to pollinate the flowers. • Pollen is passed on from bees to create more flowers. <p><i>What are roots and what job do they have in a plant?</i></p> <ul style="list-style-type: none"> • Roots have 4 functions: 1. Absorbing water and nutrients from soil 2. Anchoring the plant to the ground 3. To store food and nutrients 4. Move water and minerals to the stem <p><i>What is the stem/trunk and what job does it have in a plant?</i></p> <ul style="list-style-type: none"> • Stems have three functions 1. Support and hold up the leaves, flowers and fruits 2. Transport water and nutrients between the roots and the leaves/shoots 3. Store nutrients <p><i>What are leaves and what job do they have in a plant?</i></p>	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Pupils can explain how each part of a plant has a different function. • Pupils can explain how each part of a plant has a different purpose. • Pupils can explain how if a requirement is missing, it will affect the plant in certain ways, e.g. no light means a plant will be frail. • Plants have adaptations in order to grow in certain environments. 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination,
		<p><u>Key Questions to ask:</u></p> <ul style="list-style-type: none"> • what is the role of a flower in the plant lifecycle? • What jobs do the stigma and anthers do? • How do bees pollinate flowers? • What are the main jobs of? • How do plants make food? What is photosynthesis? • What do plants need to grow well? • What happens to the plant if something in the environment changes? • What is the lifecycle of a plant? • Do all plants have the same lifecycle? 	

	<ul style="list-style-type: none"> Leaves produce food for plants, which is known as photosynthesis. <i>What environmental conditions do plants need to grow and thrive?</i> Plants need light, water, space, CO2 and nutrients to grow and need different amounts of these requirements to grow. <i>What is the lifecycle of a flowering plant?</i> Plants have a life cycle: the seed, germination, growth, reproduction, pollination, and seed spreading. 		seed formation and seed dispersal
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Year 4:

<p>Strand of learning: States of Matter</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> understanding that materials can be split into three states of matter and that there can be changes between these states understand how change of state with water links to the water cycle in geography understand and investigate changes of state, temperature, evaporation and condensation. <p>working scientifically:</p> <ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Balloon experiment – one filled with water, one frozen and one filled with air – look at the similarities and differences and compare Transfer solids and liquids between containers, what do you see, what does this mean. Create Oobleck (Newtonian fluid) and explore the properties of this when force is applied. Perform changes of state e.g. melt different items, freeze different items and observe what happens. Experiment with measuring temperature over time e.g. hot water to show cooling Experiment melting ice in different temperature waters – what happens, what do the children observe and measure Create a model water cycle to show process of evaporation and condensation Evaporation experiments – how quickly does water evaporate in different conditions Drying materials – do all materials dry at the same rate 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation A material is what an object is made from There are lots of different materials (and name these materials) Materials can be natural or man made Materials have different properties Observing changes in materials through things such as cooking <p>Key Vocabulary Solid, liquid, gas, volume, flow, freezing, melting, boiling, condensation, evaporation</p>

	<ul style="list-style-type: none"> • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. 		
	<p><u>Crucial Knowledge for lessons:</u> <i>What are the three states of matter and how can we explain their properties?</i></p> <ul style="list-style-type: none"> • There are three states of matter • A solid is an object that is firm and stable. • A liquid is a substance that flows freely. • A gas has no fixed shape and will expand freely. <p><i>Some materials can exist in different states of matter and can change in between them</i></p> <ul style="list-style-type: none"> • Changing state means to change from a solid to a liquid, a liquid to a gas and the opposites to these processes. <p><i>How does temperature effect the state of a material?</i></p> <ul style="list-style-type: none"> • Water boils at 100 degrees Celsius (°C). • Water freezes at 0 degrees Celsius. (°C). • The temperature is how hot or cold something is. <p><i>What are the processes of evaporation and condensation?</i></p> <ul style="list-style-type: none"> • Evaporation is where a liquid turns into vapour. • Condensation is water which collects as droplets on a cold surface when humid air is in contact with it. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Some solids, when they are in large numbers, such as sand, salt, rice, flour can be poured (but individual pieces of the solid cannot) • Liquids keep the same volume even if they change container and shape • To change some solids into liquids e.g. ice/metal – they need to be heated • To change a gas into a liquid it needs to be cooled e.g. water vapour • Water can be a solid (ice), a liquid (water) or a gas (water vapour) <p><u>Key questions to ask:</u> <i>What are the properties of solids, liquids and gases?</i> <i>What are the similarities and differences between the states of matter?</i> <i>How are oil and honey different to water – yet similar</i> <i>Is toothpaste a solid, liquid or gas? How do you decide?</i> <i>Which materials are more difficult to classify as solids, liquids or gases?</i> <i>?</i> <i>Which materials can melt?</i> <i>What is condensation?</i> <i>What is evaporation?</i> <i>Can some changes of state be reversed? Can all changes of state be reversed?</i> <i>How does temperature effect how long it takes something to melt?</i></p>	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> • compare and group materials together, according to whether they are solids, liquids or gases • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature



		<p>What is the process of evaporation? What is the difference between boiling and evaporation? Dinosaurs drank water – how can the children in school be drinking the same water?</p>	
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<p>Strand of learning: Animals including Humans (digestion and teeth)</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> children understand what is meant by digestion and the role different parts of the body play in the process. Classification and identification of parts of the human body <p>Working scientifically:</p> <ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them gathering, recording, classifying and presenting data in a variety of ways to help in answering questions identifying differences, similarities or changes related to simple scientific ideas and processes 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> label diagrams of the human skeleton and muscular system explore and label parts of the digestive system create your own digestive systems to show the functions label and sort types of teeth make a physical model of the digestive system compare and contrast teeth from carnivores and herbivores – look at differences and discuss why this may be the case. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation Animals are living things which feed themselves Humans and some animals have skeletons and muscles Animals including humans need the right type of nutrition <p>Key Vocabulary Skeleton - skull, ribs, spine, humerus, pelvis, jaw, femur, scapula (shoulder blade) collar bone Incisors, canines, premolars, molars Digestion oesophagus, stomach, liver, small intestine, large intestine.</p>
	<p><u>Crucial Knowledge for lessons:</u> Recap lesson: identify and look at the human skeletal and muscular system as well as naming parts of body</p> <ul style="list-style-type: none"> The role of the skeleton is to support the body, protect the organs and allow us to move. Muscles are soft tissue that attach to bones and contract to allow us to move. <p><i>What are teeth and why do we have different types?</i></p>	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Teeth can be damaged by eating the wrong types of food We need to look after our teeth by brushing them twice a day 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> describe the simple functions of the basic parts of the digestive system in humans

	<ul style="list-style-type: none"> Humans have two sets of teeth in a lifetime – primary teeth in a young person (these are lost) and secondary teeth in an adult (these cannot be regrown) There are 4 types of teeth – incisors (used for cutting and chopping food), canines (used for ripping and tearing food), premolars (for crushing and grinding food) and molars (grinding and mashing food for swallowing) <p><i>What is digestion?</i></p> <ul style="list-style-type: none"> Digestion is how the body breaks down food so it can be taken in and used. Food goes in through your mouth, is chewed, travels through the digestive system and out of the rectum. <p><i>What parts make up the digestive system?</i></p> <ul style="list-style-type: none"> The main parts of the digestive system are: the mouth, oesophagus, stomach, liver, small intestine, large intestine. 	<ul style="list-style-type: none"> Major bones include – skull, ribs, spine, humerus, pelvis, jaw, femur, scapula (shoulder blade) collar bone Major muscles include – biceps, abs, calves, quadriceps, triceps, glutes Identify the parts in a tooth – the enamel, dentin, nerve and root Other parts of the digestive system include the gallbladder and pancreas <p><u>Key questions to ask:</u></p> <p><i>What is the job of the skeleton? Does the skeleton do anything else? Are all skeletons the same? What types of teeth do we have? Why do we have more than one type of tooth? What jobs do the teeth types do? How do teeth play a role in digestion? What is the digestive system? What is the role of digestion and why is it important for the body? What are the main parts of the digestive system and what are their roles? If we could not digest food what would happen? What happens to the parts of food we don't need (waste products)?</i></p>	<ul style="list-style-type: none"> identify the different types of teeth in humans and their simple functions
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<p>Strand of learning: Animals including Humans (food chains short unit)</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> widening knowledge of the fact food chains within a habitat intersect and become food webs understanding that consumers can be broken down into smaller groups. <p>Working scientifically:</p> <ul style="list-style-type: none"> gathering, recording, classifying and presenting data in a variety of ways to help in answering questions 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Create simple food chains to recap on the key understanding of producers, consumers and predators. Create more complex food webs introducing a wider number of animals to the food chain. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation <p>Key Vocabulary</p>

	<ul style="list-style-type: none"> recording findings using simple scientific language, drawings, labelled diagrams <p>Crucial Knowledge for lessons: <i>Recap lesson: what is a food chain and what parts make up a simple food chain?</i></p> <ul style="list-style-type: none"> A food chain is how plants and animals get their energy. Animals get their energy from food (plants or other animals). All food chains include a producer, consumer and predator <p><i>Do food chains always just involve one of each type of animal?</i></p> <ul style="list-style-type: none"> Food chains often have multiple animals which act as producers, consumers and predators. These become food webs 	<p>Extended Crucial Knowledge for this unit:</p> <ul style="list-style-type: none"> Decomposers are part of a food chain – these are bacteria and fungi Food webs are more complex and have – producers, primary consumers (herbivores) Secondary consumers (carnivores who eat the herbivores) Tertiary consumers (bigger carnivores who eat other carnivores) 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> construct and interpret a variety of food chains, identifying producers, predators and prey
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<p>Strand of learning: Living things and their habitats</p>			
<p>Ongoing</p>	<p>Skills to be developed in this unit:</p> <ul style="list-style-type: none"> how to use and build classification keys based on the characteristics of animal groups. <p>Working scientifically:</p> <ul style="list-style-type: none"> asking relevant questions and using different types of scientific enquiries to answer them making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Talk about criteria for grouping, sorting and classifying recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 	<p>Application of skills/ proof I have learnt this crucial knowledge:</p> <ul style="list-style-type: none"> Explore local environment – count the number of invertebrates they see and record these. Group sort and classify based on different characteristics. Use classification keys – get children to create classification keys Investigate environments in the local area and the wider world. Make a guide to local living things in the environment 	<p>Background Crucial Knowledge for this unit:</p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation There are different animal groups and these have different characteristics Habitats are the places where living things live and the habitat supports the life within it. Animals can be classified into different groups. <p>Key Vocabulary Vertebrate, invertebrate, Insect, Spider, classification, environment, habitat,</p>



	<ul style="list-style-type: none"> reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions 		
	<p><u>Crucial Knowledge for lessons:</u> <i>How do we use classification and classification keys to help us identify what an animal is and add it to a group?</i></p> <ul style="list-style-type: none"> Living things can be grouped and classified based on their characteristics. Classification keys are used to identify animals accurately <p><i>What are vertebrates and invertebrates and what characteristics do they share/have different?</i></p> <ul style="list-style-type: none"> Animals can be classified as either vertebrates or invertebrates. Vertebrates are animals that have a backbone inside their body. Invertebrates don't have a backbone. They either have a soft body, like worms and jellyfish, or a hard outer casing covering their body, like spiders and crabs. <p><i>Why is it better for some animals to have an internal skeleton and others not to?</i></p> <ul style="list-style-type: none"> Vertebrates include: mammals, fish, birds, reptiles, amphibians. Invertebrates include: insects, spiders, worms, slugs, snails. <p><i>Why is the environment in which plants and animals so important and why is the balance within the environment vital so all plants and animals can thrive?</i></p> <ul style="list-style-type: none"> Environment - where something is/lives. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Insects have three body sections, six legs and antenna Spiders have two body sections and eight legs Slugs and snails are invertebrates Classification keys are used to identify what type of animal or plant something is. <p><u>Key questions to ask:</u> <i>What characteristics do vertebrates and invertebrates have? Compare vertebrates and invertebrates – what are similarities and differences? Why do some animals have internal skeletons and some external? Why do we have vertebrates and invertebrates – how does this support them in surviving in their habitats? Why would it be dangerous for changes to happen in a habitat for all animals and plants living there? What would happen if you took the predator out of a food chain?</i></p>	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things

	<ul style="list-style-type: none"> Plants and animals rely on what their environment provides them, so any changes to do this could be dangerous to the animals and plants living there. 		
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<p>Strand of learning: Electricity</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> identify common electrical appliances and if they are driven by mains or battery understand the dangers associated with electrical current and how to stay safe practical building of circuits through experimentation and application of knowledge <p>working scientifically:</p> <ul style="list-style-type: none"> Observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries making systematic and careful observations recording findings using simple scientific language, drawings, labelled diagrams, using straightforward scientific evidence to answer questions or to support their findings. 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Identify common appliances that use electricity and identify if they are battery or mains driven Draw and map out simple circuits using diagrams (correct symbols are not needed at this stage) Identify what is wrong with a circuit and put it right to make sure the circuit is complete (this could be diagram or practical) Construct simple circuits which include bulbs and buzzers Build circuits which include switches and identify how these close the circuit Test which materials would make good conductors and which are good insulators by adding them to circuits Explore the importance of insulators through discussion. Make a circuit for a purpose e.g. to light a clown's nose in a model Explore how to make bulbs brighter in a circuit. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation Things in our homes are operated by battery and electricity Electricity can be dangerous <p>Key Vocabulary Cell, wire, battery, circuit, electrical current, mains electricity, flow, switch, buzzer, conductor, insulator</p>



	<p><u>Crucial Knowledge for lessons:</u> <i>Start unit by explaining to the children how dangerous electricity can be and how to stay safe around electricity.</i></p> <p><i>What is electricity?</i></p> <ul style="list-style-type: none">• Electricity is the flow of an electrical current or a charge through a material.• Electricity powers many things we use either through batteries or mains current. <p><i>What is a circuit and why is it important?</i></p> <ul style="list-style-type: none">• A circuit is a pathway for electricity to flow around• Electricity needs to flow around a complete circuit in order for it to work.• A circuit includes a cell, wires, bulbs and can also include switches and buzzers. <p><i>What are conductors and insulators and why are they important?</i></p> <ul style="list-style-type: none">• A conductor is a material electricity can pass through• Metals make good conductors• An insulator is a material that electricity cannot pass through	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none">• Plastic is a good insulator• Insulators are used to cover electrical items for safety• Switches break the flow of electricity in a circuit when they are open and when they are closed allow electricity to flow.• A cell is a single device that provides power• A battery is two or more cells together which provides power. <p><u>Key questions to ask:</u></p> <ul style="list-style-type: none">• how do we stay safe around electrical items and electricity?• What is electricity?• What types of things can power electrical items?• What is a circuit?• What happens if there is a gap in a circuit?• How do we make a bulb in a circuit brighter?• How can we use a switch to open and close a circuit?• How can we draw circuits so other people could make them?• What is a conductor?• What materials make good conductors?• What is an insulator?• Why are insulators so important?	<p>National Curriculum Links:</p> <ul style="list-style-type: none">• identify common appliances that run on electricity• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers• identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery• recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit• recognise some common conductors and insulators, and associate metals with being good conductors
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Strand of learning: Sound			
Ongoing	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> understand sound is a wave of vibrations that reaches the ear explore how sounds can be changes and reduced by slowing the vibrations and muffling them. <p>Working scientifically”</p> <ul style="list-style-type: none"> find patterns in sounds e.g. a set of the same objects but of different sizes asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, 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><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Demonstrate vibrations using musical instruments e.g. drums with rice on the surface of the skin, use speakers to show the same thing Use elastic bands and tuning forks to show vibrations Listen for sounds in the environment – what can be heard, why do the children think they are not all the same level of sound, why are some fainter, or quieter? Model sound waves using human sound waves or other items Do sound waves travel the same through the air as other media – test this What materials prevent sound waves from travelling (experiment making sound proof boxes or ear muffs) How far do sounds travel – create experiments to test the distance sound waves travel and can still be heard Create string telephones – what effects the quality of the sound within this system – test how they can make them better Use stringed instruments to explore pitch Explore how the features of an object effect the pitch of the sound Make instruments to explore pitch 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation <p>Key Vocabulary Vibration, sound wave, volume, pitch</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p><i>What is sound?</i></p> <ul style="list-style-type: none"> Sounds are created by vibrations Vibrations are movements backwards and forwards of particles <p><i>How does sound travel and how do we hear it?</i></p> <ul style="list-style-type: none"> Sound waves (vibrations) travel through solids, liquids and gases to our ear 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Sound waves travel in straight lines but act like a ripple created when a stone is dropped into water Sound waves can be reflected back from surfaces – this helps some animals navigate e.g. bats 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel

	<ul style="list-style-type: none"> • Our ear collects these vibrations and our brain interprets them as sounds <i>What makes a sound louder?</i> • Volume tells you how loud or quiet a sound is • The louder the sound the bigger the vibrations are <i>Why does sound get fainter as the distance from the source increases?</i> • The further away from a sound you are the quieter it is as the vibrations have further to travel and are weaker when they reach your ear <i>What is the pitch of a sound?</i> • The pitch of a sound is how high or low that sound is 	<p>Key questions to ask:</p> <ul style="list-style-type: none"> • how are sounds made? • What is a vibration? • What is a sound wave? • Do sound waves carry the same way through all materials? • Are some materials better than others at reducing sound? • How can we amplify and make sounds louder? • What is pitch? • How do we change the pitch of sounds? • Why do sounds get quieter when they are further away? 	<p>through a medium to the ear</p> <ul style="list-style-type: none"> • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases
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Year 5:

<p>Strand of learning: Materials and their Properties</p>			
<p>Ongoing</p>	<p>Skills to be developed in this unit:</p> <ul style="list-style-type: none"> • Recap key points of learning from Y4 – materials can be compared and grouped based on their properties and there are three states of matter • Use this knowledge to support new learning by applying it to investigations and tasks. • Understand that the properties of materials dictate their use in the real world and investigate how these properties make material effective for certain jobs. • Understand the concept of reversible and irreversible changes and apply this <p>Working scientifically:</p> <ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary 	<p>Application of skills/ proof I have learnt this crucial knowledge:</p> <ul style="list-style-type: none"> • To name a variety of reversible and irreversible changes. • To recommend a material for a purpose e.g. slate is used for roofs because it is hard, durable and waterproof. • Give reasons based on evidence from testing for the particular uses of every day materials including wood, metal and plastic • Which material is best for making a warm jacket, for keeping things cold, for making blackout curtains • Compare the changes which take place when burning materials or baking bread/cakes • Explore turning pulp into paper – is this a change of state ? • Explore thermal insulators – what materials keep hot things hot and cold things cold for the longest – these would make good cups • Growing salt crystals 	<p>Background Crucial Knowledge for this unit:</p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • There are three states of matter, solids, liquids and gases • Materials can change their state of matter <p>Key Vocabulary Solid, liquid, gas, material, matter, change of state, reversible,</p>

	<ul style="list-style-type: none"> taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions 	<ul style="list-style-type: none"> <i>Investigation – does temperature effect how much material will dissolve in a liquid?</i> <i>How do we clean our dirty water investigation</i> <i>What material makes the best sole for a trainer?</i> 	<p>irreversible, dissolve, solution, saturation point, durable, transparent, thermal/electrical conductivity</p>
	<p><u>Crucial Knowledge for lessons:</u> <i>How can we group, organise and sort materials - what criteria is looked at?</i></p> <ul style="list-style-type: none"> Everything is made from particles. Properties are the characteristics used to describe a material. Materials can be grouped based on their properties Certain materials are used for specific jobs due to their properties. <p><i>Can properties of materials be used to help us decide what material is right for a specific job?</i></p> <ul style="list-style-type: none"> Durable – means something is hard wearing and strong. Transparency is where something is transparent (see through) Electrical conductivity is how well a current can travel through a material Thermal conductivity is how well a material can let heat travel through it Properties example – Glass is used for windows as it is hard, durable and transparent. <p><i>Recap: What are the three main states of matter (all materials exist in one of these states) and can materials change their state?</i></p> <ul style="list-style-type: none"> A solid is – relatively rigid and has a defined volume and shape (molecules are all closely packed) A liquid – has a definite volume but is able to change shape and flow (molecules are more loosely bonded) 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> A particle is the smallest possible unit of matter. When a solid mixes with a liquid, then the solid has been dissolved. Sieving is where small and large materials can be separated by allowing smaller ones to fit through the holes in the sieve Filtering is where a solid particle gets caught in the filter but the liquid goes through Some chemical reactions are irreversible as they create new substances. <p><u>Key questions to ask:</u></p> <ul style="list-style-type: none"> <i>What does the word property mean and how can we use this to sort materials?</i> <i>Why are some materials used for specific jobs and not others?</i> <i>What material is best for? Why? How do we know its best?</i> <i>What properties would a material need to be used for a rain coat, a sleeping bag, a flask?</i> <i>Can you describe the differences between a solid, a liquid and a gas?</i> <i>Can materials change their state?</i> <i>What is a reversible change of state, can you describe one?</i> 	<p><u>National Curriculum Links:</u></p> <ul style="list-style-type: none"> compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating give reasons, based on evidence from

	<ul style="list-style-type: none"> • A gas – no definite volume or shape (molecules are free to move) • Changing state means to change from a solid to a liquid, a liquid to a gas and the opposites to these processes. <i>When I put sugar into my tea it disappears ...why? Can I put in as much sugar as I want and it will all disappear?</i> • Some materials will dissolve in liquid to form a solution – this is called solubility • The saturation point is the stage no more of the solid can be dissolved into the liquid <i>When materials are in a liquid – can I get them back and separate them so I have my original materials?</i> • Some changes are reversible – meaning they can go back to their original form • Dissolving is a reversible change and materials can be recovered from a mixture. • Some mixtures can be separated using a variety of methods e.g. filtering, sieving and evaporating. • Evaporating is where the liquid changes to a gas leaving the solid behind. <i>Can all changes of state be reversed?</i> • An irreversible change is when a mixture cannot be separated back into the original components. • With irreversible changes, some materials result in the formation of new materials. • Burning is an irreversible reaction e.g. burning wood makes a new material – ash. 	<ul style="list-style-type: none"> • What is dissolving? • If I have materials in a liquid and I need all of the materials to be separate again how can I do this? • What is evaporation – how does this help us recover our materials? • What is an irreversible change of state? • Why is it irreversible? 	<p>comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <ul style="list-style-type: none"> • demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda
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Strand of learning: Forces			
Ongoing	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • Understand the effects of gravity and how gravity is a force that affects the weight of objects • Understand and explore the fact that gravity has the same effect on all objects but other forces such as air resistance can act against it and change the rate of a falling object 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Look at ways of increasing air resistance e.g. parachute experiments, sycamore seeds. Explore falling objects • Look at streamlining objects – both for air resistance and for water resistance. Test these changes for impact • Create balloon rockets – look at the effect of air resistance on these as they travel or balloon buggies 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • A force is a push or pull

<ul style="list-style-type: none"> • Know that air and water resistance act on objects in a similar way to friction between surfaces <p>Working scientifically:</p> <ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations 	<ul style="list-style-type: none"> • <i>Get children to run with large pieces of paper and then discuss what they feel</i> • <i>Test how objects fall and measure the rate of fall</i> • <i>Explore water resistance looking at how surface area affects the level of resistance.</i> • <i>Test boat shapes and how objects can move through water</i> 	<ul style="list-style-type: none"> • <i>Some forces such as magnetic force do not need contact with objects to act on them, most forces do</i> • <i>Friction is a force that act on objects.</i> <p>Key Vocabulary Force, push, pull, equal, opposite, reaction Friction, resistance Gravity, mass, weight Air resistance, water resistance, surface area, streamline</p>
<p><u>Crucial Knowledge for lessons:</u> <i>Recap lesson: what is friction and how does it act on objects?</i></p> <ul style="list-style-type: none"> • Friction is a force that acts between an object and a surface when trying to move. • Different types of surfaces will have different levels of friction between them and an object <p><i>What is gravity and how does it act?</i></p> <ul style="list-style-type: none"> • Gravity is a pulling force • It pulls things with mass towards the center of the Earth • Earth's Gravity is what keeps you on the ground and what causes objects to fall. • Gravity acts on all objects in the same way with the same level of force <p><i>What is the difference between mass and weight and how is this affected by gravity??</i></p> <ul style="list-style-type: none"> • Mass is the amount of material in an object – usually weighed in KG and g 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Isaac Newton was a prominent scientist who discovered and explored gravity as a force. • Ensure misconceptions are addressed – there is gravity in space and on the moon. • All objects fall at the same rate – in makes no difference if they are heavier of lighter. <p><u>Key questions to ask:</u> <i>What is friction and why is it important?</i> <i>How do forces work?</i> <i>What is gravity?</i> <i>What effect does gravity have on objects?</i> <i>Does gravity have the same effect on all objects?</i> <i>What is mass?</i> <i>What is the difference between mass and weight?</i> <i>What is air resistance?</i></p>	<p><u>National Curriculum Links:</u></p> <ul style="list-style-type: none"> • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms including levers, pulleys and

	<ul style="list-style-type: none"> • Mass is not the same as weight as weight changes due to gravity <i>What is air resistance and how does this help to reduce the effect of gravity on objects?</i> • Air resistance is a type of friction that happens between air and another object (such as a parachute) • Air resistance can help slow the effects of gravity by acting as an opposing force <i>What is water resistance and how does this help to reduce the effect of gravity on objects?</i> • Water resistance is a type of friction that happens between water and another object • Water resistance can slow the effects of gravity by acting as an opposing force. 	<p><i>What is water resistance? How do these forces work against the effects of gravity? How does knowing about these forces help humans?</i></p>	<p>gears allow a smaller force to have a greater effect</p>
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<p>Strand of learning: animals including humans</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • understand the differences in the time offspring grow during gestation in different animals and compare the growth cycles • understand changes during puberty and how they change how we have to look after ourselves and our hygiene <p>Working scientifically:</p> <ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions • identifying scientific evidence that has been used to support or refute ideas or arguments 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Create timelines to indicate the stages in growth and development of humans • Look at changes experienced during puberty through diagrams and discussions • Compare the gestation period of other animals to humans and look at length and mass of these babies at key points in the gestation cycle to compare. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • Reproduction is where living things make new living things • All living things reproduce and have offspring • All living things get older <p>Key Vocabulary Gestation, lifecycle, foetus, infant, teenager, adolescent, adult, elderly, puberty</p>
	<p><u>Crucial Knowledge for lessons:</u> <i>Recap Lesson:</i></p> <ul style="list-style-type: none"> • Humans are mammals 	<p><u>Extended Crucial Knowledge for this unit:</u></p>	<p>National Curriculum Links:</p>

	<ul style="list-style-type: none"> • Reproduction is where living things make new living things • All living things reproduce and have offspring • All living things develop and get older <p><i>What is gestation and do all animals have the same gestation period for their offspring?</i></p> <ul style="list-style-type: none"> • Gestation is the length of time it takes for an offspring to develop before it is born. <p><i>What is the lifecycle of a human?</i></p> <ul style="list-style-type: none"> • Humans go through changes in a lifecycle: foetus to a baby (infant), to a child, teenager (adolescent), early adult, middle adult, late adult (elderly) <p><i>What is puberty?</i></p> <ul style="list-style-type: none"> • Puberty is the physical developments and changes from a child to an adult. • In puberty changes will include: growing taller, hair growing over the body and in pubic areas, voice changes, skin changes, muscles grow, sweat glands produce more sweat 	<ul style="list-style-type: none"> • Fertilization – the male and female sex cells fuse together • Prenatal – the cells develop and grow into a foetus inside the mothers uterus, after nine months the baby is born • Infancy – rapid growth and development. Learn to walk and talk • Childhood – learn new skills become more independent • Adolescence – body changes • Early adulthood – peak of fitness and strength • Middle adult hood – changes to body as it ages e.g. possible grey hair • Late adult hood – healthy lifestyle can help slow down the decline in fitness <p><u>Key questions to ask:</u></p> <p><i>Are all gestation times the same in animals?</i> <i>What is the lifecycle of a human?</i> <i>What happens to humans at each stage of the cycle?</i> <i>What is puberty?</i> <i>When does puberty happen?</i> <i>What changes does the body go through?</i> <i>Why does hygiene become even more important?</i></p>	<ul style="list-style-type: none"> • describe the changes as humans develop to old age
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Strand of learning: Living things and habitats			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • observation of the local environment, identification of local plants and animals and discussion around lifecycles of these plants • mapping out detailed lifecycles showing more complex stages of development in different plant and animal types. • Wider understanding of how animals and plants reproduce <p>Working Scientifically:</p>	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Study and raise questions about the local environment throughout the year. • Observe life cycles in a variety of living things including plants and vegetables as well as animals • Draw and map out a range of lifecycles for different animals, looking in detail at each developmental stage • Look at the work of naturalists e.g. David Attenborough and Jane Goodall. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • People and animals grow and change e.g. baby to child • There are 6 main groups of animals including: mammals, fish, reptiles, birds, insects and amphibians.

	<ul style="list-style-type: none"> planning different types of scientific enquiries to answer questions taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 	<ul style="list-style-type: none"> Try to grow new plants from different parts of a parent plant e.g. seeds, stem, root Observe changes in an animal over a period of time Look at how different plants and animals reproduce and grow. 	<ul style="list-style-type: none"> Reproduction is where living things make a new living thing. Fish, insects, amphibians and birds start their life cycle as eggs. Mammals start their lifecycle as babies Lifecycle of a human includes; baby (newborn), infant, toddler, child, teenager, adult and elderly. Lifecycle of a frog includes: spawn, tadpole, tadpole with legs, froglet and frog. <p>Key Vocabulary Life cycle, mammals, amphibians, insects, birds, asexual reproduction, sexual reproduction, pollination, metamorphosis</p>
	<p><u>Crucial Knowledge for lessons:</u> <i>What is a lifecycle and are they all the same for plants and animals?</i></p> <ul style="list-style-type: none"> Life cycles are the different stages that take place for plants, mammals, amphibians, insects and birds to become adults <p><i>Do all animals and plants reproduce? Do they all do it in the same way?</i></p> <ul style="list-style-type: none"> Asexual reproduction – is when a living thing makes a copy of itself Sexual reproduction – is when opposite sexes mix to create offspring. <p><i>Do all types of animal have the same stages and changes in their lifecycles?</i></p> <ul style="list-style-type: none"> Butterflies go through a metamorphosis to become an adult – caterpillar, pupa, emerging butterfly, adult butterfly, egg 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Asexual reproduction mainly occurs in some plants and fungi – e.g. potatoes, strawberry plants Some plants use sexual reproduction (pollination) e.g. apple trees, tomato plants, roses Sexual reproduction in plants occurs through pollination <p><u>Key questions to ask:</u> What is a lifecycle? Are all plant lifecycles the same? Do all plants reproduce in the same way? What different ways can plants reproduce? What is the difference between asexual reproduction and sexual reproduction? Do different classifications of animals reproduce in the same way? Are the lifecycles of all animals the same?</p>	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals

	<ul style="list-style-type: none"> • Amphibians such as frogs are laid as eggs (frog spawn) then go through a series of changes before becoming an adult. • Birds are hatched from eggs • Mammal – embryo, young, adult 		
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<p>Strand of learning: evolution and inheritance:</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • Understand that characteristics are passed from parents to their offspring e.g. when dogs are crossed they get characteristics from both parents • Understand that variations in offspring over time can make them more or less likely to survive in particular environments. <p>Working scientifically:</p> <ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables • identifying scientific evidence that has been used to support or refute ideas or arguments where necessary 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Name and explain how animals are adapted to their environment; comparing how some are adapted to survive in extreme conditions, e.g cactuses, penguins and camels. • Look at and explore the advantages and disadvantages of certain specific adaptations e.g. being on 2 feet rather than 4, having a long beak, having gills, brightly coloured and scented flowers. • Explore the beaks of birds, how have they adapted to ensure they can eat certain types of food • How are animals adapted to survive winter in their environments – explore the ways animals cope with extreme weather • Design your own species to suit an environment and fit into a food chain • To create a family tree showing inherited characteristics (can be self or fictional/media celebrity based photographs). • Observe and compare animals that live in the local environment – how are they adapted to cope? 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • Paleontology is the scientific study of life in the past that involves the analysis of plant and animal fossils. <p>Key Vocabulary Inheritance, evolution, adaptation, characteristic, offspring, variation</p>
	<p><u>Crucial Knowledge for lessons:</u> <i>What does the term inheritance mean for living species?</i></p> <ul style="list-style-type: none"> • When living things reproduce they pass on characteristics to their offspring – Inheritance is when characteristics are passed on from one generation to the next. • Offspring are not identical to their parents – these are known as variations. • Variation in offspring over time can make animals more or less able to survive in particular environments <p><i>What is evolution and how have scientists shown the process of evolution?</i></p>	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Specific examples of variation include e.g. how giraffes’ necks got longer or the evolution of colour change in the peppered moth brought about by the industrial revolution in the Midlands area of the UK. • Explain the impact of Mary Anning and Charles Darwin’s scientific work. <p><u>Key questions:</u> What is inheritance?</p>	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago

	<ul style="list-style-type: none"> • Evolution is a process of change that takes place over many generations, during which species of animals, plants, or insects slowly change some of their physical characteristics. This is because offspring are not identical to their parents. <p><i>What part does natural selection play in the evolution of a species and why does it occur?</i></p> <ul style="list-style-type: none"> • Natural selection occurs when there is competition to survive. • Adaptation is when animals and plants have evolved so that they have changed to survive in their environments. 	<p><i>What type of characteristics can be passed on from parent to child?</i></p> <p><i>Why are children not identical to their parents?</i></p> <p><i>Why is variation so important?</i></p> <p><i>Do variations always improve a species chance of survival?</i></p> <p><i>What is evolution?</i></p> <p><i>How can we prove evolution?</i></p> <p><i>Why are animals around us not constantly evolving e.g. why are primates still primates – why have they not progressed further over time?</i></p> <p><i>What is natural selection?</i></p> <p><i>How do animals adapt to their environment?</i></p> <p><i>Who is Charles Darwin and why is he important?</i></p>	<ul style="list-style-type: none"> • recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
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Year 6:

<p>Strand of learning: Light</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • Recognise that we need light in order to see things and that dark is an absence of light • Find patterns in the way that shadows change • Understand the connection between light and the eye <p>Working scientifically:</p> <ul style="list-style-type: none"> • Investigate the relationship between light sources and shadows • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • Test materials for their properties – are they opaque, translucent or transparent • Light box investigations to show how light travels in straight lines • Refraction of light to show the range of colours – observe and monitor this • Create shadow puppets • Create sundials • Monitor shadows of objects during the course of the day and make notes on outcomes • Investigate light travelling in a straight line by using mirrors to reflect e.g. have a target in the room, shine a torch away from the target can children use mirror to reflect the light to the target. • Investigate which materials are the most reflective so work best for safety features at night 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • We need light to see • Dark is the absence of light • There are different light sources <p>Key Vocabulary</p> <p>Light source, opaque, translucent, transparent, refraction, shadows</p> <p>Iris, pupil, lens, retina, optic nerve</p>

	<ul style="list-style-type: none"> • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • understand how to set up fair tests • make own decisions on what to observe, for how long and with what equipment and frequency • use relevant scientific language 	<ul style="list-style-type: none"> • What materials and colours work best for sunglasses – experiment to investigate • Make a periscope 	
	<p><u>Crucial Knowledge for lessons:</u> <i>What are the sources of light and how does it travel?</i></p> <ul style="list-style-type: none"> • Light sources include natural (sun/fire) and artificial (torch/bulb) • Light travels from a source in a straight line <p><i>How can we change the direction in which light travels</i></p> <ul style="list-style-type: none"> • Reflection changes the direction light travels <p><i>How does light enable us to see objects?</i></p> <ul style="list-style-type: none"> • The pupils control the amount of light let into the eye • Light bouncing off objects and into our eyes enables us to see <p><i>Is light all one colour? How do we see different colours?</i></p> <ul style="list-style-type: none"> • Light is made up of different colours – some surfaces absorb some colours and not others which lets us see things in different colours. <p><i>Light travels in straight lines and this creates shadows, how does light affect shadow?</i></p> <ul style="list-style-type: none"> • Shadows have the same shape as the object which casts them, the closer the light source the bigger the shadow as more light is blocked. • The size of a shadow can change depending on where the light source is 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Identify and name the parts of the eye and explain how we see • Patterns can be found in the way shadows change <p><u>Key questions to ask:</u> <i>How can you see your pencil?</i> <i>If I turned the lights off and the room was dark would I still be able to see it?</i> <i>How do we see different colours?</i> <i>How do glasses work?</i> <i>How does light get to our eyes if it can only travel in a straight line?</i></p>	<p><u>National Curriculum Links:</u></p> <ul style="list-style-type: none"> • recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them



<p>Strand of learning: Living things and their habitats</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> •pupils discuss reasons why living things are placed in one group and not another, giving clear reasons for the classifications •develop an understanding that broad groups such as microorganisms, plants and animals can be further sub divided. <p>Working scientifically</p> <ul style="list-style-type: none"> •Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment (non-statutory). •Identify scientific evidence that can be used to support or refute ideas or arguments •taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate •recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs •using test results to make predictions to set up further comparative and fair tests •planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • collect examples of living and non-living organisms or objects from the local area and explain decisions as to why they have been chosen as representatives of those groups. • Create simple classification keys for basic objects and then expand out to animals and plants e.g. provide children with a set of 5 buttons that are all different but have some features in common and ask them to create a classification key • Investigate how microorganisms spread through touch • Look at the role of yeast in breadmaking – investigate how this effects the way the bread dough behaves • Growing mould – take swabs from areas around the school and grow these swabs on a growth medium – look at areas of high microbe build up around the school, are these where the children expected them to be? 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • The seven life processes are: movement, respiration (breathe), sensitivity, growth, reproduction, excretion (get rid of waste) and nutrition. • Vertebrates include: mammals, fish, birds, reptiles, amphibians. • Invertebrates include: insects, spiders, worms, slugs, snails. <p>Key Vocabulary Organism, excretion, reproduction, living, microorganism, bacteria, viruses, fungi</p>
	<p><u>Crucial Knowledge for lessons:</u></p> <p>What is classification and what is the purpose of classifying things?</p> <ul style="list-style-type: none"> • Classification is the sorting of things into different groups based on their characteristics. • Characteristics are special qualities or appearances that make an individual or group of things different to others. 	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Plants can be grouped as flowering and non-flowering. Flowering plants produce flowers and fruits. Non-flowering plants do not. • Trees can be classified as deciduous, evergreen and coniferous (produces cones not flowers) 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> • describe how living things are classified into broad groups according to common observable characteristics and based

	<p>Create ways to classify living things which show a deep understanding of characteristics and have clear reasons for the classifications?</p> <ul style="list-style-type: none"> You can classify living things (plants, animals, micro-organisms) by comparing similarities and differences. <p>Understand what a microorganism is and how they affect all other living things?</p> <ul style="list-style-type: none"> A micro-organism is a living thing that is too small to be seen with your eye (eg. bacteria, viruses, some molds). 	<ul style="list-style-type: none"> Carl Linnaeus had a significant contribution to classification of animals – he divided animals into six classes – mammals, birds, amphibians, fish, insects and worms. <p>Key questions to ask:</p> <p>How do you know if something is living? How can you group organisms based on their conditions for life? What are the features of vertebrates and invertebrates? Which of these plants can be flowering and non-flowering? How can we identify, group and classify plants, animals and microorganisms? What are classification keys What questions can be used to create classification keys? What are the different ways we can classify plants? What is a microorganism? Where can bacteria be found and what do they do? How are some bacteria helpful to humans? How can you classify a microorganism?</p>	<p>on similarities and differences, including micro-organisms, plants and animals</p> <ul style="list-style-type: none"> give reasons for classifying plants and animals based on specific characteristics
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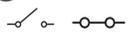
<p>Strand of learning: animals including humans</p>			
<p>Ongoing</p>	<p>Skills to be developed in this unit:</p> <ul style="list-style-type: none"> understand that the body has a number of systems which have to work together to keep the body functioning. Discuss and explore the functions of the circulatory system, the heart, blood Understand the effects of diet and exercise on the human body and be able to explore these through experimentation Understand drugs and harmful substances – that some drugs help us but only if they are taken for a purpose. Understand the negative impact drugs, smoking and alcohol can have on the human body. <p>Working scientifically:</p>	<p>Application of skills/ proof I have learnt this crucial knowledge:</p> <ul style="list-style-type: none"> Describe the effect of diet, exercise, drugs and lifestyle on animals (humans). To know and describe how to keep our bodies healthy To take pulse measurements (including a control) and repeat readings to find a mean rate for a variety of questions E.g. What happens to my heartbeat when I exercise? What happens to my heartbeat when I lie down? What is recovery rate and how do we test this in people – how could we improve recovery rate? What does recovery rate indicate? Explain how water and nutrients are transported around the body. Review a range of body systems and look at how they work in tandem to operate Explore the effects of smoking and alcohol on organs of the body 	<p>Background Crucial Knowledge for this unit:</p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation Animals are living things which feed themselves Humans and some animals have skeletons and muscles Animals including humans need the right type of nutrition

	<ul style="list-style-type: none"> planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments 	<ul style="list-style-type: none"> Look at snack bars and explore if they are healthy or should be banned Explore physical hearts and look at valves 	<ul style="list-style-type: none"> The role of the skeleton is to support the body, protect the organs and allow us to move There are a number of systems in the human body such as the digestive system, the skeletal system and the muscular system. <p>Key Vocabulary Muscular skeletal system, digestive system, respiratory system, circulatory system, heart, veins, arteries, capillaries, oxygenated, deoxygenated, nutrients, drugs</p>
	<p><u>Crucial Knowledge for lessons:</u> Recap lesson:</p> <ul style="list-style-type: none"> The human body is made up of a number of systems which work together to keep the body functioning well – skeletal system, muscular system, digestive system, respiratory system. <p><i>How does the body transport the nutrients and oxygen the muscles and organs need to function?</i></p> <ul style="list-style-type: none"> The circulatory system is responsible for the movement of blood around the body. The circulatory system is composed of the heart, veins, arteries and capillaries. The circulatory system operates as a double loop <p><i>What is the role of the heart in a human body and how does it work?</i></p> <ul style="list-style-type: none"> The heart (an organ) is a pump. The heart pumps blood around all of the blood vessels. <p><i>What is the main purpose of blood and why does it need to reach every part of the body?</i></p>	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> The heart is divided into four chambers; the left and right atrium and the left and right ventricle. There are three types of blood cell – red blood cells carry oxygen from the lungs, white blood cells – fight infection, platelets – keep blood from clotting. Pulse is a wave of blood flow going through the arteries (aorta) causing it to stretch and recoil. Pulse rates can be measured. <p><u>Key questions to ask:</u> <i>What systems do you know in the human body? What parts of the human body can you name and can you explain what they do? What is blood? What is circulation and the circulatory system?</i></p>	<p><u>National Curriculum Links:</u></p> <ul style="list-style-type: none"> identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function describe the ways in which nutrients and water are transported



	<ul style="list-style-type: none"> • Blood carries oxygen from the lungs around the body. • When the oxygen has been used from in the blood, then it known as deoxygenated blood, which is taken to the lungs. • Nutrients and water are transported around the body via the circulatory system. • Diet, exercise, drugs and lifestyle impact upon the body. <i>How do we keep our bodies healthy through diet?</i> • A balanced diet consists of all food groups in the right proportion and is important for body health <i>How does exercise help keep the body working correctly?</i> • A healthy lifestyle (diet and exercise) has a positive effect on the body's functions <i>What are drugs and how can they affect the body?</i> • A drug is a substance containing natural or man made chemicals that have an effect on your body when it enters your system • Some drugs, alcohol and smoking have a negative effect on the body's functions. 	<p><i>What parts of the body make up the circulatory system?</i> <i>What is the job of the circulatory system?</i> <i>Why does the body need oxygen, nutrients and water?</i> <i>What is the job of the heart?</i> <i>How does the heart work?</i> <i>What is a balanced diet?</i> <i>Why is it important to have the right nutrients in your diet?</i> <i>What is the role of exercise in staying healthy?</i> <i>Why is exercise important?</i> <i>What is a drug?</i> <i>Are all drugs bad for us?</i></p>	<p>within animals, including humans</p>
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<p>Strand of learning: electricity</p>			
<p>Ongoing</p>	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> • Understand series circuits and how they work – all components are on one circuit. • Learn how to represent a simple circuit diagram using recognized symbols for components. • Knowledge of how to work safely and the precautions needed when working with electricity. <p>Working scientifically:</p> <ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> • explore series circuits to answer questions about what happens when different components are used. • Explore how to make bulbs brighter, buzzers louder and the opposite effect too. • Draw circuit diagrams to keep records of the circuits used and use the correct symbols to do so • Make circuits for a purpose e.g. design and make a set of traffic lights or a burglar alarm. • Investigate things such as wire length and thickness and their effects on the brightness of a bulb in a circuit. 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> • Science is the process of learning about the natural world through observation and experimentation • Electricity powers many things we use • A circuit is a pathway for electricity to flow around and must be complete • A conductor is a material electricity can pass through • An insulator is a material electricity cannot pass through.

	<ul style="list-style-type: none"> reporting and presenting findings from enquiries, including conclusions 		<p>Key Vocabulary</p>
	<p>Crucial Knowledge for lessons: <i>Start unit by explaining to the children how dangerous electricity can be and how to stay safe around electricity.</i></p> <p><i>Recap lesson: what is electricity and what is a circuit?</i></p> <ul style="list-style-type: none"> Electricity is the flow of an electrical current or a charge through a material. A circuit is a pathway for electricity to flow around Electricity needs to flow around a complete circuit in order for it to work. A circuit includes a cell, wires, bulbs and can also include switches and buzzers. <p><i>How can I change how bright bulbs are and how loud buzzers are in a circuit?</i></p> <ul style="list-style-type: none"> The greater the number of cells or voltage, the brighter the bulb or louder the buzzer will be. The shorter the circuit path the less electricity is used getting to the bulb so bulbs are brighter (shorter wires) Bulbs and buzzers will be dimmer and quieter if there is more than one in a serial circuit as the voltage is shared among each item. <p><i>How do I show others what my circuits are like so they can copy them accurately?</i></p> <ul style="list-style-type: none"> Circuit diagrams use a set of symbols to represent their component parts. The symbol for a cell is  The symbol for a bulb is...  The symbol for a switch is  The symbol for a buzzer is  The symbol for a motor is  	<p>Extended Crucial Knowledge for this unit:</p> <ul style="list-style-type: none"> Parallel circuits are circuits which have multiple pathways Parallel circuits can keep electricity flowing within the circuit even if one part of the circuit is damaged or broken. <p>Key questions to ask:</p> <ul style="list-style-type: none"> What is an electrical current? If there is a break in a circuit why does the electricity stop flowing? How can I make a bulb brighter? What happens to bulbs if there are more than one in a circuit? How do I make a buzzer louder? How can I show other people how to make the circuits I have completed? What happens if I use shorter wires in a circuit? What happens if I use longer wires? Can I make circuits to do specific jobs? 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches use recognised symbols when representing a simple circuit in a diagram

Strand of learning: space			
Ongoing	<p><u>Skills to be developed in this unit:</u></p> <ul style="list-style-type: none"> understand and explain a full model of the solar system understand that scientific thinking has changed over time as new discoveries have been made <p>Working scientifically:</p> <ul style="list-style-type: none"> planning different types of scientific enquiries to answer questions taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments 	<p><u>Application of skills/ proof I have learnt this crucial knowledge:</u></p> <ul style="list-style-type: none"> Name and order the planets in the solar system. Describe the movements of the planets around the sun. Explain the movement of the Earth in relation to the Sun. (Rotation/Axis/Orbit) Explain the movement of the Moon in relation to the Earth. (Rotation/Axis/Orbit) Construct shadow clocks and sundials – which they can calibrate to show midday and the end of the school day Compare time of the day in different locations around the world through internet links Create simple models of the solar system 	<p><u>Background Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> Science is the process of learning about the natural world through observation and experimentation The sun is a source of energy which producers such as plants feed off Without the sun there would be no light or heat and nothing could survive on Earth <p>Key Vocabulary Celestial body, planet, moon, orbit, rotation, axis, sun, universe, solar system, Mercury, Mars, Venus, Earth, Jupiter, Saturn, Uranus, Neptune, dwarf planet, Pluto</p>
	<p><u>Crucial Knowledge for individual lessons:</u></p> <p><i>What objects are in our solar system?</i></p> <ul style="list-style-type: none"> To know that the planets orbit around the sun There are 8 planets – Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune There is one dwarf planet - Pluto <p><i>What is the sun and why is it so important?</i></p> <ul style="list-style-type: none"> To know that the sun is at the centre of the solar system and that it is a star The sun does not move All planets rotate around the sun To know that it is dangerous to look directly at the sun (even wearing dark glasses) <p><i>Understanding the Earth as the planet we live on:</i></p>	<p><u>Extended Crucial Knowledge for this unit:</u></p> <ul style="list-style-type: none"> The four inner planets (terrestrial planets) – mercury, Venus, Earth and Mars are mostly rock The four outer planets (or giant planets) – Jupiter, Saturn, Neptune and Uranus are mostly gases and ice The path of the Earth orbiting the sun is responsible for the seasons That space is a vacuum That no sound can be heard in a Space There are 8 phases of the moon and this cycle repeats every 29.5 days 	<p>National Curriculum Links:</p> <ul style="list-style-type: none"> describe the movement of the Earth and other planets relative to the sun in the solar system describe the movement of the moon relative to the Earth describe the sun, Earth and moon as approximately spherical bodies



	<ul style="list-style-type: none">• Earth is the third planet from the sun• Earth rotates on its axis once every 24 hours• This rotation is one earth day and causes day and night• It rotates in an anti-clockwise direction• It takes 365 days and 6 hours (1 year) to orbit the sun• The Earth is a terrestrial planet made of three layers – the molten core, the mantle and the crust. <p><i>What is a moon?</i></p> <ul style="list-style-type: none">• The moon is a celestial body (Earth's own natural satellite) which orbits the Earth• Other planets in the solar system have moons.	<ul style="list-style-type: none">• Geocentric model of universe came first – Earth was center of universe and everything revolved around it.• Heliocentric model replaced this – Sun is center of the universe and we orbit it. <p><u><i>Key questions:</i></u></p> <p><i>What is a solar system?</i></p> <p><i>What objects are in our solar system?</i></p> <p><i>What are the names of the planets?</i></p> <p><i>What characteristics do the different planets have?</i></p> <p><i>What is the sun?</i></p> <p><i>Why is the sun so important to life on Earth?</i></p> <p><i>How do we know we orbit the sun?</i></p> <p><i>Why is it dangerous to look directly at the sun even with dark glasses on?</i></p> <p><i>What does the Earth rotating on its axis create?</i></p> <p><i>How do we get seasons?</i></p> <p><i>How long is a day, a year?</i></p>	<ul style="list-style-type: none">• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
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