

Science Overview

National Curriculum Coverage, Progression in Skills and Knowledge and Supporting Resources/Schemes of Work

EYFS

	3 & 4-year-olds will be learning to:	Children in Reception will be learning to:	ELG
Understanding the World	<ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and or/different properties. Explore how things work. Plants seeds and care for growing plants. Understand the key features of a life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. 	<ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear, smell and feel whilst outside. Recognise some similarities and differences between life in this country and life in other countries. Recognise some environments that are different to the one in which they live. Understand the effect of changing seasons on the natural world around them. 	The Natural world <ul style="list-style-type: none"> Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Year 1

Theme	National Curriculum	Progression in Skills	Disciplinary knowledge	Substantive knowledge			Drivers & 50 things	British Values & Protective Characteristics	Schemes/Resources/ Texts
				Key Questions	Key Facts	Key Vocab			
Working Scientifically <ul style="list-style-type: none"> Ask simple questions and recognise that they can be answered in different ways Use simple equipment to observe closely Perform simple tests Identify and classify Use his/her observations and ideas to suggest answers to questions Gather and record data to help in answering questions 									
Autumn Castles Naming and identifying Materials	Pupils should be taught to distinguish between an object and the material from which it is made. They will identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. They will describe the simple physical properties of a variety of everyday materials and compare and group together a variety of everyday materials on the basis of their simple physical properties.	Materials 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 Seasonal Changes	<u>Asking Questions</u> Children will ask simple questions about different materials <u>Setting up tests</u> Children will verbally state what they are going to investigate. <u>Observing and Measuring</u> Children will observe closely the differences between materials	What are the properties of materials? How can we change the shape of materials? What changes can you see in Autumn and Winter? What happens to animals in Autumn and Winter?	Objects are made from materials such as wood, fabric, glass, metal, cardboard, plastic or clay. Some materials are magnetic. Autumn is one of the four seasons of the year The coldest temperatures of	Metal Attract Repel Wood Plastic Glass Fabric Magnetic Rough Smooth Bending Squashing Twisting Stretching Brittle Absorbent Waterproof	Skipton Castle Building castles using materials in the playground. Play out in snow. Gardening (outdoor learning) Create leaf monsters 50 things build a den		The King who Banned the Dark Outstanding science Hamilton trust Science folder resources

Seasonal Changes	<p>Seasonal Changes</p> <p>Pupils should be taught to observe changes across the four seasons and describe weather associated with the seasons and how day length varies.</p>	<p>Observe changes across the four seasons.</p> <p>Observe and describe weather associated with the seasons</p>	<p>Carry out simple tests using nonstandard measurements when appropriate.</p> <p><u>Recording</u> Children will gather and record simple data.</p> <p>Sort objects and living things into groups based on simple properties.</p> <p><u>Interpreting Results</u> Children will explain what they found out to an adult or a partner.</p>		the year are in winter.	Environment	50 things: Build a snowman		
<p>Oracy opportunities for Autumn term</p> <p>End of topic discussion: Which material is the best to build a castle?</p>									
<p>Spring</p> <p>Eco Warriors</p> <p>Animals including Humans</p> <p>Seasonal Changes</p>	<p>Pupils should be taught to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>They will identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p> <p>Pupils will describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</p> <p>They will identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p>	<p>Animals Including Humans</p> <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores.</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> <p>Describe the basic needs of animals,</p>	<p><u>Asking Questions</u> Children will ask simple questions about the differences between a variety of common animals.</p> <p><u>Making Predictions</u> Children will predict and sort a variety of health and unhealthy foods</p> <p><u>Observing and Measuring</u> Children will observe the differences between plant life during the different seasons</p> <p><u>Recording</u> Children will record the changes photographically in seasonal change</p>	<p>What senses do humans have?</p> <p>How do humans change as they get older?</p> <p>What are the basic needs of humans?</p> <p>What do humans need to do to stay healthy?</p> <p>What happens to the environment in Spring?</p>	<p>The five senses are smell, touch, hear, feel and taste.</p> <p>Exercising is good for humans.</p> <p>Spring is the season when plants start to grow again.</p>	<p>Senses</p> <p>Amphibians</p> <p>Reptiles</p> <p>Mammals</p> <p>Carnivore</p> <p>Herbivore</p> <p>Omnivore</p> <p>Adults</p> <p>Air</p> <p>Hygiene</p>	<p>Healthy Nutrition</p> <p>STEM visit Careers/ Aspirations/science week</p> <p>Rethink food indoor garden</p> <p>Gardening (outdoor learning)</p> <p>Spring Walk</p>	<p>Age: Dear Earth- Grandad and granddaughter Grandad was an explorer.</p>	<p>Dear Earth by Isabel Otter</p> <p>Now Press Play</p> <p>Outstanding science Hamilton trust Science folder resources</p>
<p>Possible Misconceptions:</p> <p>Seasonal changes</p> <p>1 Misconception: The phenomenon of day and night is caused by the movement of the Earth around the Sun or the movement of the Sun around the Earth.</p> <p>Fact: Day and night is caused by the rotation of the Earth about its axis</p> <p>Materials</p> <p>1. Misconception: Confusion about hardness and strength</p> <p>Fact: The differences between the common usage and the scientific definitions of the terms 'hardness' and 'strength' should be emphasised to pupils. In science, hardness refers to the ability of a material to withstand scratching and strength refers to the ability of a material to support a heavy load without breaking or tearing. Thus, a piece of chalk which is conventionally considered to be hard is not considered hard in the scientific sense. It can easily be scratched.</p> <p>Animals</p> <p>1.Misconception: All ocean creatures are 'fish', e.g. whales, dolphins.</p> <p>Fact: Whales, dolphins, jellyfish and shellfish are not fish, but seahorses and sea dragons are.</p> <p>2.Misconception: Humans are not animals.</p> <p>Fact: Humans are members of a large group of animals known as mammals.</p>									

			<p>during the different seasons</p> <p><u>Recording</u> Children will record the changes photographically in seasonal change</p> <p><u>Interpreting Results</u> Children will explain what they found out to an adult or a partner.</p>				
Oracy opportunities for summer term	Ignite speech on the chosen habitat						

Year 2

Working Scientifically	<ul style="list-style-type: none"> • Ask simple questions and recognise that they can be answered in different ways including use of scientific language from the national curriculum • Use simple equipment to observe closely including changes over time • Perform simple comparative tests • Identify, group and classify • Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns • Gather and record data to help in answering questions including from secondary sources of information 								
Theme	National Curriculum	Progression in Skills	Disciplinary Knowledge	Substantive knowledge			Drivers & 50 things	British Values & Protective Characteristics	Schemes/Resources/ Texts
				Key Questions	Key Facts	Key Vocab			
Autumn History of Flight Animals including humans	Pupils should be taught to: To notice that animals, including humans, have offspring which grow into adults To find out about and describe the basic needs of animals, including humans, for survival (water, food and air) To describe the importance for humans of exercise, eating the	<u>Animals Including Humans</u> Understand that animals, including humans, have offspring which grow into adults Describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the	<u>Asking Questions</u> Children will ask simple questions and recognise that they can be answered in different ways <u>Making Predictions</u> Children will make predictions about the basic needs for animals including humans <u>Setting up tests</u> Children will set up a test to investigate	What do animals need to help them survive? How do humans change as they get older? What are the offspring of animals called? What is a bulb? What do plants need to survive?	Animals and human beings need food, water, air, and shelter to survive. Humans can only survive without water for three days.	Bulb Survival Temperature Toddler Teenager Elderly Offspring	Cooking lessons Autumn walk- What happens to plants in Autumn and why? Planting out Autumn bulbs to create a Spring daffodil display Autumnal maths outside -making 2-digit number using acorns or concerns as ones and sticks as tens	Age Pregnancy	Cherry Blossom and Paper Planes Kites Outstanding science Hamilton trust Science folder resources

Plants	<p>right amounts of different types of food, and hygiene</p> <p>Plants</p> <p>Pupils should be taught to:</p> <p>To observe and describe how seeds and bulbs grow into mature plants</p> <p>To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>right amounts of different types of food, and hygiene</p> <p><u>Plants</u></p> <p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>what happens to their heart rate when they exercise</p> <p><u>Observing and Measuring</u></p> <p>Children will use stop watches and stethoscopes to listen to and time heart rate</p> <p>Children will observe and describe how seeds and bulbs grow and mature</p> <p><u>Recording</u></p> <p>Children will record the changes in their heart rate</p> <p><u>Interpreting Results</u></p> <p>Children will explain how their body changed during exercise.</p> <p><u>Evaluating</u></p> <p>Children will evaluate how they could have improved their test.</p>	<p>Possible Misconceptions:</p> <p>Plants</p> <p>1.Misconception: Minerals in the soil, water and carbon dioxide are food for plants.</p> <p>Fact: Plants make their own food. Minerals help in plant growth and health. Water and carbon dioxide are ingredients for photosynthesis.</p> <p>2.Misconception: Roots are organs for feeding.</p> <p>Fact: Roots absorb minerals and water for the plants. Minerals and water are not food for plants.</p> <p>3.Misconception: Leaves take in water; the main function of leaves is to capture rain, water or dew; water vapour moves into the leaf during photosynthesis.</p> <p>Fact: Roots take in water. The main function of leaves is to carry out photosynthesis.</p>	<p>50 things: Look after a pet</p> <p>50 things: Kick the Autumn leaves</p> <p>50 things: Grow some daffodils</p>				
Oracy opportunities for Autumn Term	<p><u>Just a minute:</u> Presenting one of the groups of animals (Amphibians, mammals, birds, reptiles)</p> <p>Each member of the group will have one minute to talk about a subject. They will have time to prepare, but will only have one minute to talk about it without saying um, er, repeating themselves or pausing to remember. You could add competition to the game by seeing who can get the fewest points.</p>								
<p>Spring</p> <p>My Country My City</p> <p>Materials</p> <p>Plants</p>	<p>Materials</p> <p>Pupils should be taught to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</p> <p>They will find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p>Plants</p>	<p>Materials</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties</p> <p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p>	<p><u>Asking Questions</u></p> <p>Children will ask simple questions and recognise that they can be answered in different ways</p> <p><u>Making Predictions</u></p> <p>Children will make simple predictions as to what will happen to a solid material when squashing, bending, twisting and stretching.</p> <p><u>Setting up tests</u></p>	<p>What materials are strong?</p> <p>What materials are weak?</p> <p>How are bulbs different from seeds?</p>	<p>Seeds need to wait for conditions to be just right before they start to grow.</p> <p>Bulbs can sprout new growth.</p>	<p>Material Properties</p> <p>Sprout</p>	<p>Now Press Play-Materials</p> <p>Material hunt outside</p> <p>50 things: Have a snowball fight</p> <p>STEM visit Careers/ Aspirations/science week</p> <p>Planting and growing plants in classroom and outdoors.</p>		<p>BBC Bitesize</p> <p>Outstanding science</p> <p>Hamilton trust</p> <p>Science folder resources</p>

	<p>Pupils should be taught to observe and describe how seeds and bulbs grow into mature plants.</p> <p>They should find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> <p>Plants</p> <p>Observe and describe how seeds and bulbs grow into mature plant.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>Children will identify what they will change and keep the same.</p> <p><u>Observing and Measuring</u> Children will observe closely different materials using simple equipment such as magnifying glasses.</p> <p>Perform simple tests using standard units when appropriate.</p> <p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p><u>Recording</u> Children will gather and record data to help in answering questions.</p> <p><u>Interpreting Results</u> Children will use their observations and ideas to suggest answers to questions.</p> <p><u>Evaluating</u> Children will talk about what they have found out and how they found it out.</p>	<p>Possible Misconceptions:</p> <p>Plants</p> <p>1.Misconceptions: Seeds are not alive. Fact: A seed is the embryo of a new plant and as such is a living thing, but in a dormant state, which requires being buried in soil or other suitable matter to trigger off the renewal process.</p> <p>2.Misconceptions: All plants start off as seeds. Fact: Not every plant grows from a seed. Some plants, like ferns and mosses, grow from spores.</p>					
Oracy opportunities for spring Term	Which material is the best to build a stage and why?								
Summer	Living things and their Habitats	<u>Living things and their Habitats</u>	<u>Asking Questions</u>	What types of habitats are there?	A habitat must provide food, shelter, water and space.	Habitat Shelter	Seaside Trip Filey	Age: David Attenborough (our environment linked to habitats)	Outstanding science Hamilton trust Science folder resources
The Great British Seaside	Pupils should be taught to explore and compare the differences between things that are living, dead, and things that have never been alive.	Explore and compare the differences between things that are living, dead, and things that have never been alive	Children will ask simple questions and recognise that they can be answered in different ways	How do animals adapt to certain habitats?	Different animals will require different things from their habitat.	Microhabitat	Now Press Play Habitats-year 2		
Living things and their habitats	They will 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	Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic	<u>Making Predictions</u> Children will make simple predictions based on a question	How do animals depend on each other?	Habitats can change in many ways.	Deforestation Food Chain Producers Consumer Respiration Excretion Reproduction	50 things: Walk in the sand barefoot		
Plants			<u>Setting up tests</u>	How do habitats provide what is needed for animals?	A food chain shows how animals depend on plants and other		50 things: Paddle in the sea		BBC Bitesize
							Sum 2: Re Think food Hydroponics		

	<p>animals and plants, and how they depend on each other.</p> <p>Pupils will identify and name a variety of plants and animals in their habitats, including microhabitats.</p> <p>They will describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p> <p>Plants</p> <p>Pupils should be taught to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>They will identify and describe the basic structure of a variety of common flowering plants, including trees.</p> <p>Pupils should be taught to observe and describe how seeds and bulbs grow into mature plants. They will find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>	<p>needs of different kinds of animals and plants, and how they depend on each other</p> <p>Identify and name a variety of plants and animals in their habitats, including micro-habitats</p> <p>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food</p> <p><u>Plants</u></p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p> <p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>Children will identify what they will change and keep the same.</p> <p><u>Observing and Measuring</u> Children will observe closely, using simple equipment such as magnifying glasses.</p> <p>Perform simple tests using standard units when appropriate.</p> <p>Observe and describe how seeds and bulbs grow into mature plants.</p> <p><u>Recording</u> Children will gather and record data to help in answering questions.</p> <p>Identifying and classifying animals by their habitats and physical features</p> <p><u>Interpreting Results</u> Children will use their observations and ideas to suggest answers to questions.</p> <p><u>Evaluating</u> Children will talk about what they have found out and how they found it out.</p>	<p>What is a food chain?</p> <p>What is a food source?</p> <p>How do plants obtain the food?</p> <p>How do habitats change?</p>	<p>animals for their food and survival.</p> <p>A food chain can tell you about what animals eat.</p>		<p>Planting and growing plants in classroom and outdoors.</p>		
	<p>Possible Misconceptions:</p> <p>Plants</p> <p>1. Misconception: Plants do not respire, or they only respire in the dark. Fact: Plants respire all the time.</p> <p>2. Misconceptions: An animal's habitat is like its "home". Fact: A habitat is an area occupied by many species. A home is a place within a habitat where a particular animal species can protect itself and its young from the weather and predators. Homes include nests built by birds and wasps, and burrows dug by moles.</p>								
<p>Oracy opportunities for summer Term</p>	<p>Discussion: How do people change habitats?</p>								

Year 3

Working Scientifically									
<ul style="list-style-type: none"> • Ask relevant questions and use different types of scientific enquiries to answer them • Set up simple practical enquiries, comparative and fair tests • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gather, record, classify and present data in a variety of ways to help in answering questions • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Identify differences, similarities or changes related to simple scientific ideas and processes • Use straightforward scientific evidence to answer questions or to support his/her findings 									
Theme	National Curriculum	Progression in Skills	Disciplinary knowledge	Substantive knowledge			Drivers & 50 things	British Values & Protective Characteristics	Schemes/Resources/ Texts
				Key Questions	Key Facts	Key Vocab			
Autumn	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers	Plants	<u>Asking Questions</u> Children will ask questions and understand there are different enquiry types they could use to answer them.	What parts of the plant can we eat? Does the amount of water affect the growth of the plant? What are the three types of rock? How are fossils formed?	The three types of rock are: - sedimentary - igneous - metamorphic Fossils are the remains of traces of plants and animals that lived long ago.	Photosynthesis Trunk Nutrients Metamorphic Sedimentary Igneous Fossils Permeable Durable Density Molten	Aut 2 RE Think food indoor garden project Planting and growing plants in classroom and outdoors.		Outstanding science Hamilton trust Science folder resources Meadow Song
Who First Lived in Britain?	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	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers	<u>Making Predictions</u> Children will make relevant predictions about the characteristics of various types of rocks.						
Plants	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties	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	<u>Setting up tests</u> Children will identify what they will change, observe and keep the same.						
Rocks	Describe in simple terms how fossils are formed when things that have lived are trapped within rock	Investigate the way in which water is transported within plants	With support, set up simple practical enquiries.						
	Recognise that soils are made from rocks and organic matter	Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	<u>Observing and Measuring</u> Children will investigate the way in which water is transported within plants						
		Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties	Begin to use scientific equipment to make observations.						
		Describe in simple terms how fossils are formed when things that have	Carry out tests and simple experiments and take						
				Possible Misconceptions: Plants 1.Misconception: Plants carry out photosynthesis in the day and respiration at night. Fact: Plants carry out respiration all the time and photosynthesis when there is light. 2.Misconception: Plants breathe in carbon dioxide and breathe out oxygen. Fact: Plants take in carbon dioxide in the day when photosynthesis takes place and gives out oxygen at night or in the dark when photosynthesis stops, as respiration continues to take place.			Aspirations – Mary Anning Cliffe Castle Visit Now Press Play Planting and growing plants in classroom and outdoors.	Mary Anning – sex & age	Stone Girl, Bone Girl Hamilton Trust

		lived are trapped within rock Recognise that soils are made from rocks and organic matter	measurements using standard units. <u>Recording</u> Children will gather and record data in different ways to help answer questions. Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables <u>Interpreting Results</u> Children will report on findings from enquiries, including oral and written explanations. Make simple conclusions. Use results, findings or observations to answer questions. <u>Evaluating</u> Children will suggest questions for further investigation.						
Oracy opportunities for Autumn term	Ignite speech: What are the uses of rocks?								
Spring Here, There and Everywhere Animals including humans	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 explore the requirements of plants for life and growth (air, light, water, nutrients from soil,	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	<u>Asking Questions</u> Children will ask questions and understand there are different enquiry types they could use to answer them. <u>Making Predictions</u> Children will make relevant predictions. <u>Setting up tests</u> Children will identify what they will change, observe and keep the same.	What is diet and nutrition? Do all animals have a skeleton? How do muscles work? How is water transported through plants? What are the ways plants disperse their seeds?	Animals can be grouped according to their bone structure. Animals can be grouped according to what they eat. Some seeds are transported by wind, and have seeds designed to float, glide or spin through the air. Plants growing near a river may use the	Muscle Skeleton Lungs Diaphragm Biceps Triceps Diet Nutrition Vertebrate Invertebrate Xylem Transportation Pollination Seed dispersal	Healthy Lifestyles STEM visit Careers/ Aspirations/science week Plan and grow flowers outside		Outstanding science Hamilton trust Science folder resources Outstanding science Hamilton trust

<p>Plants</p>	<p>and room to grow) and how they vary from plant to plant</p> <p>investigate the way in which water is transported within plants</p> <p>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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</p> <p>Investigate the way in which water is transported within plants</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>	<p>With support, set up simple practical enquiries</p> <p><u>Observing and Measuring</u> Begin to use scientific equipment to make observations.</p> <p>Carry out tests and simple experiments and take measurements using standard units.</p> <p><u>Recording</u> Children will gather and record data in different ways to help answer questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables</p> <p><u>Interpreting Results</u> Children will report on findings from enquiries, including oral and written explanations.</p> <p>Make simple conclusions.</p> <p>Use results, findings or observations to answer questions.</p> <p><u>Evaluating</u> Children will suggest questions for further investigation.</p>		<p>flowing water to transport their seeds.</p> <p>Sometimes animals can move seeds.</p>				<p>Science folder resources</p> <p>Meadow Song</p>
<p>Oracy opportunities for spring term</p>	<p>Discussion: Consider life without plants</p>								
<p>Summer</p>	<p>compare how things move on different surfaces</p>		<p><u>Asking Questions</u> Children will ask questions and understand there are</p>	<p>What is a force?</p>	<p>Forces are the things that allow the movement of all objects around us.</p>	<p>Force Newtons Shadows Reflect</p>	<p>Planting and growing plants in classroom and outdoors.</p>		<p>Outstanding science Hamilton trust Science folder resources</p>

<p>Forces and Magnets</p>	<p>notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</p> <p>observe how magnets attract or repel each other and attract some materials and not others</p> <p>compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>describe magnets as having 2 poles</p> <p>predict whether 2 magnets will attract or repel each other, depending on which poles are facing</p>	<p>Compare how things move on different surfaces</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>Compare and group together a variety of everyday materials</p> <p>Notice that light is reflected from surfaces</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect eyes</p>	<p>different enquiry types they could use to answer them.</p> <p><u>Making Predictions</u> Children will make relevant predictions based on their scientific understanding as to whether a material is magnetic or not.</p> <p><u>Setting up tests</u> Children will identify what they will change, observe and keep the same. Whilst testing different materials</p> <p>With support, set up simple practical enquiries.</p>	<p>Do things move differently on different surfaces?</p> <p>What materials are magnetic?</p> <p>Which magnetics poles attract and which repel?</p> <p>What is light?</p> <p>Which materials reflect light?</p>	<p>Magnets have two poles; north and south.</p> <p>Light is a form of energy that enables us to see the world around us.</p> <p>Light comes from different sources.</p> <p>Our main source of natural light is the Sun.</p>	<p>Transparent Translucent Opaque</p>	<p>50 things - Shadow puppets</p>		
<p>Light</p>	<p>recognise that they need light in order to see things and that dark is the absence of light</p> <p>notice that light is reflected from surfaces</p> <p>recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>recognise that shadows are formed when the light from a light source is blocked by an opaque object</p> <p>find patterns in the way that the size of shadows change</p>	<p>Recognise that light from the sun can be dangerous and that there are ways to protect eyes</p> <p>Find patterns in the way that the size of shadows change</p>	<p><u>Observing and Measuring</u> Begin to use scientific equipment to make observations.</p> <p>Carry out tests and simple experiments and take measurements using standard units.</p> <p><u>Recording</u> Children will gather and record data in different ways to help answer questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables</p> <p><u>Interpreting Results</u> Children will report on findings from enquiries, including oral and written explanations.</p>	<p>Possible Misconceptions:</p> <p>Light</p> <p>1.Misconception: reflective surfaces emit light. Fact: They do not themselves emit visible light but reflect incident natural sunlight and artificial light. For instance, an apple appears a shiny red colour because it has a relatively smooth surface that reflects red light and absorbs other non-red (such as green, blue, and yellow) wavelengths of light</p> <p>2.Misconception: opaque objects do not reflect light Fact: Opaque objects reflect some amount of light and absorb the rest. They do not transmit light.</p> <p>Magnets and Forces</p> <p>1.Misconception: A stationary object has no forces acting on it. The reason the object is stationary is because the forces acting on it are balanced. Fact: Even a stationary object has gravity acting upon it to push it downwards</p> <p>2.Misconception: Mass and weight are the same thing. Fact: Mass is a measure of the amount of matter in an object; weight is a measure of the force exerted by the object due to gravity.</p> <p>3.Misconception: All metals are magnetic Fact: Some metals such as Aluminium are not magnetic.</p>					<p>Outstanding science Hamilton trust Science folder resources</p>

			<p>Make simple conclusions.</p> <p>Use results, findings or observations to answer questions.</p> <p><u>Evaluating</u> Children will suggest questions for further investigation.</p>				
Oracy opportunities for summer term	Discussion: Imagine you had magnets for fingers, would it be good?						

Year 4

Working Scientifically	<ul style="list-style-type: none"> • Ask relevant questions and use different types of scientific enquiries to answer them • Set up simple practical enquiries, comparative and fair tests • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gather, record, classify and present data in a variety of ways to help in answering questions • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Identify differences, similarities or changes related to simple scientific ideas and processes • Use straightforward scientific evidence to answer questions or to support his/her findings 								
Theme	National Curriculum	Progression in Skills	Disciplinary knowledge	Substantive knowledge			Drivers & 50 things	British Values & Protective Characteristics	Schemes/Resources/ Texts
				Key Questions	Key Facts	Key Vocab			
Autumn Our Magical City States of Matter	<p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the</p>	<p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>Identify differences, similarities or changes</p>	<p><u>Asking Questions</u> Children will ask relevant questions and use different types of scientific enquiry to answer them.</p> <p><u>Making Predictions</u> Children will make predictions based on simple scientific knowledge</p> <p><u>Setting up tests</u> Children will identify what they will change, observe or measure and keep the same.</p>	<p>What are the different states of matter?</p> <p>How does a material change from one state to another?</p> <p>How are clouds in the sky formed?</p> <p>What temperature does water evaporate?</p>	<p>Matter is another word for the stuff things are made of.</p> <p>Everything falls into one of three categories; solid, liquid or gas.</p> <p>Materials can change from one state of matter to another through freezing and melting.</p> <p>The water cycle converts water into all three different states; liquid, solid (ice) and gas (vapour).</p>	<p>States of Matter</p> <p>Solid</p> <p>Liquid</p> <p>Gas</p> <p>Reversible</p> <p>Irreversible</p> <p>Precipitation</p> <p>Evaporation</p> <p>Condensation</p> <p>Filtering</p>	<p>Outdoor learning – physically making solids, liquids and gases</p> <p>Planting and growing plants in classroom and outdoors.</p> <p>50 things: Toast marshmallows</p>	<p>Outstanding science</p> <p>Hamilton trust</p> <p>Science folder</p> <p>resources</p> <p>The Rhythm of the Rain</p>	

	rate of evaporation with temperature	<p>related to simple scientific ideas and processes</p> <p>Use straightforward scientific evidence to answer questions or to support his/her findings</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>Set up simple practical enquiries, comparative and fair tests.</p> <p><u>Observing and Measuring</u> Children will make systematic and careful observations.</p> <p>Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p><u>Recording</u> Children will gather, record and classify data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p><u>Interpreting Results</u> Children will use straightforward scientific evidence to answer questions or to support their findings.</p> <p>Use results to draw simple conclusions.</p> <p>Begin to identify differences, similarities or changes related to simple ideas or processes.</p> <p><u>Evaluating</u> Children will begin to make predictions for new values, suggest improvements and raise further questions.</p>		<p>Clouds are formed after water from the earth is evaporated by the sun.</p> <p>Vapour that has turned into liquid can be released by clouds in the form of rain or snow.</p>				Yorkshire Water
Oracy opportunities	Debate: Solid, liquid, Gas – which one is most important?								

Possible Misconceptions:

Changes in matter

1. Misconceptions: Liquids that evaporate/boil disappear forever.
Fact: The liquid becomes a gas when it is heated, the molecules move and vibrate so quickly that they escape into the atmosphere as molecules of water. When they cool they return back to their liquid state.

2. Misconceptions: A fizzy-drinks can or glass container becomes wet because liquid from the inside seeps through to the outside.
Fact: This is condensation. There's a temperature difference between the cold beverage inside, and the warmer air outside

3. Misconceptions: When a substance has dissolved it has 'disappeared'.
Fact: Dissolving involves two materials; the resulting solution is a mixture of both. The dissolved substance is still present in the solution even though it can't be seen.

4. Misconceptions: Substances (like sugar) 'melt' in water.
Fact: Substances that dissolve in water are called soluble substances. When you mix sugar with water, the sugar dissolves to make a transparent solution. Salt is soluble in water too. Substances that do not dissolve in water are called insoluble substances.

for Autumn Term										
<p>Spring</p> <p>17th Century Britain</p> <p>Electricity</p>	<p>identify common appliances that run on electricity</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</p> <p>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>recognise some common conductors and insulators, and associate metals with being good conductors</p> <p>recognise that living things can be grouped in a variety of ways</p>	<p>Identify common appliances that run on electricity</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors</p> <p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things</p> <p>Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things</p>	<p><u>Asking Questions</u> Children will ask relevant questions and use different types of scientific enquiry to answer them.</p> <p><u>Making Predictions</u> Children will make predictions based on simple scientific knowledge</p> <p><u>Setting up tests</u> Children will identify what they will change, observe or measure and keep the same.</p> <p>Set up simple practical enquiries, comparative and fair tests.</p> <p><u>Observing and Measuring</u> Children will make systematic and careful observations.</p> <p>Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p><u>Recording</u> Children will gather, record and classify data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p><u>Interpreting Results</u> Children will</p>	<p>What are the key components of a circuit?</p> <p>Which materials conduct electricity?</p> <p>Does the number of batteries affect the brightness of a bulb?</p> <p>How can we group different living things?</p> <p>What is a classification key?</p>	<p>Electricity is an energy. This energy can be used to power electrical items.</p> <p>Electricity can only travel if there is a complete circuit.</p> <p>A complete circuit is made up of different components - batteries (or cell), wires and bulbs, buzzers and motors.</p> <p>An organism is an individual animal, plant, or single-celled life form.</p> <p>A classification key is a series of questions that determine an organism's physical characteristics to help identify an unknown organism.</p>	<p>Circuit Cell Crocodile clip Switch Bulb Conductor Insulator Component Classification Characteristic Organism Amphibians</p>	<p>STEM visit Careers/Aspirations/science week</p> <p>Planting and growing plants in classroom and outdoors.</p>		<p>Outstanding science Hamilton trust Science folder resources</p> <p>Lux app</p> <p>Outstanding science Hamilton trust Science folder resources</p> <p>Seek app by iNaturalist</p>	
<p>Living things and their habitats</p>										
					<p>Possible Misconceptions:</p> <p>Electricity</p> <p>1.Misconceptions: Different coloured wires affect how the circuit works. Fact: The colours do not matter electrically. A wire is a wire is a wire, regardless of the colour of their insulation.</p> <p>2.Misconceptions: Wire is made of plastic. Fact: The outer layer of plastic is there to serve as insulation to the metal conducting wire beneath.</p>					

			<p>Use straightforward scientific evidence to answer questions or to support their findings.</p> <p>Use results to draw simple conclusions.</p> <p>Begin to identify differences, similarities or changes related to simple ideas or processes.</p> <p><u>Evaluating</u> Children will begin to make predictions for new values, suggest improvements and raise further questions.</p>	<p>3.Misconceptions: If a circuit is broken, energy goes off into the air. Fact: There is only one route for electricity to flow, so if a break occurs due to a gap in the circuit the current will stop and the whole circuit will not function.</p> <p>4.Misconceptions: Electricity comes out of both sides of the battery and leads to both sides of the component. Fact: In a circuit, current flows from the positive end (cathode) to the negative end (anode).</p>				
Oracy opportunities for spring Term	Concept cartoon: you must have at least one piece of wire in the circuit							
Summer The Great Escape Animals including humans	<p>describe the simple functions of the basic parts of the digestive system in humans</p> <p>identify the different types of teeth in humans and their simple functions</p> <p>construct and interpret a variety of food chains, identifying producers, predators and prey</p> <p>identify how sounds are made, associating some of them with something vibrating</p> <p>recognise that vibrations from sounds travel through a medium to the ear</p> <p>find patterns between the pitch of a sound and features of the object that produced it</p>	<p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>Identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey</p> <p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p>	<p><u>Asking Questions</u> Children will ask relevant questions and use different types of scientific enquiry to answer them.</p> <p><u>Making Predictions</u> Children will make predictions based on simple scientific knowledge</p> <p><u>Setting up tests</u> Children will identify what they will change, observe or measure and keep the same.</p> <p>Set up simple practical enquiries, comparative and fair tests.</p> <p><u>Observing and Measuring</u> Children will make systematic and careful observations.</p> <p>Take accurate measurements using standard units, using a</p>	<p>How many types of teeth do humans have?</p> <p>What are the roles of the different types of teeth?</p> <p>What happens to the food we eat?</p> <p>How is sound created?</p> <p>How does sound travel?</p> <p>Does the size of an object affect the pitch of the sound it produces?</p>	<p>We have three types of teeth - incisors, canines and molars.</p> <p>The large intestine is around 5ft long and the small intestine is around 16ft long.</p> <p>Sound comes from vibrations. These vibrations create sound waves which move through air and water before reaching our ears.</p> <p>The pitch of a sound is how high or low the sound is.</p>	<p>Canines Molars teeth Incisors Oesophagus Pharynx Intestines Saliva Vibrations Particles High pitched Low pitched Frequency Volume</p>	<p>Healthy Lifestyles – looking after teeth</p> <p>Planting and growing plants in classroom and outdoors.</p> <p>Sum 1 Rethink food indoor garden</p>	<p>Outstanding science Hamilton trust Science folder resources</p>
				Possible Misconceptions:				

<p>Sound</p>	<p>find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>recognise that sounds get fainter as the distance from the sound source increases</p>	<p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p>	<p>range of equipment, including thermometers and data loggers.</p> <p><u>Recording</u> Children will gather, record and classify data in a variety of ways to help in answering questions.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p><u>Interpreting Results</u> Children will Use straightforward scientific evidence to answer questions or to support their findings.</p> <p>Use results to draw simple conclusions.</p> <p>Begin to identify differences, similarities or changes related to simple ideas or processes.</p> <p><u>Evaluating</u> Children will begin to make predictions for new values, suggest improvements and raise further questions.</p>	<p>Sound</p> <p>1.Misconceptions: The features of an object do not affect the pitch of sounds that it produces. Fact: Smaller, shorter, thinner, tighter and denser objects make more high-pitched sounds. Low pitched sounds are made by slow vibrations. Larger, longer, thicker, looser and less-dense objects make more low-pitched sounds</p> <p>2. Misconceptions: Sounds stop after traveling away from the source. Fact: Sounds travel as vibrations. As the sound waves travel, the particles of whatever they are travelling through vibrate, or move quickly on the spot. The further the vibrations travel, the more they spread out.</p> <p>Animals including Humans</p> <p>1.Misconceptions: Food is digested only in the stomach Fact: Food is digested in the mouth, stomach and small intestine. digested food is absorbed into the blood stream in the small intestine. excess water is absorbed back into the body in the large intestine. any undigested food passes out of the anus as faeces.</p> <p>2. When you have a meal, your food goes down one tube and your drink down another. Fact: From the throat, both food and liquids travel down a muscular tube in the chest called the esophagus to the stomach.</p>			
<p>Oracy opportunities for summer Term</p>	<p>Debate: The tongue is more important than teeth</p>						

Year 5

Working Scientifically									
Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary <ul style="list-style-type: none"> • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line • Use test results to make predictions to set up further comparative and fair tests • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • Identify scientific evidence that has been used to support or refute ideas or arguments 									
Theme	National Curriculum	Progression in Skills	Disciplinary knowledge	Substantive knowledge			Drivers & 50 things	British Values & Protective Characteristics	Schemes/Resources/ Texts
				Key Questions	Key Facts	Key Vocab			
Autumn Adventures Earth and Space	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. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	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 Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	<u>Asking Questions</u> Children will ask scientific questions and begin to understand which questions would be best suited to each enquiry type. <u>Making Predictions</u> Children will make predictions based on scientific knowledge. <u>Setting up tests</u> Children will with support, plan different types of scientific enquiry. Where appropriate, identify the dependent, independent and controlled variables. <u>Observing and Measuring</u> Children will use a range of scientific equipment to make systematic and careful observations. <u>Recording</u> Gather, record and classify data with increasing complexity to help in answering questions.	How do we know the Sun, Moon and Earth are spherical? What is the name of the planets in our solar system, in order? What is the difference between heliocentric and geocentric ideas of planetary movement? How do night and day occur? Why does night time and day time occur at different times around the world? How does the moon move in relation to earth? How does the earth move in relation to the sun?	A day is how long it takes a planet to rotate fully. A year is how long it takes a planet to orbit the Sun. The Moon has a diameter of 2,159 miles (3,476 kilometres) and is about one-quarter the size of Earth. The Moon weighs about 80 times less than Earth. Saturn is the lightest planet.	Solar system Orbit Planet Mercury Venus Mars Jupiter Saturn Uranus Neptune Pluto Rotate Axis	Outdoor/active learning – rotation of planets and moon in relation to the sun. ReThink Food indoor garden life on Mars Project Planting and growing plants in classroom and outdoors.	Sex: The women involved in getting man to the moon in the USA (Hidden Figures)	<u>Earth and Space</u> The Mysteries of the Universe by Will Garter Now press play – Mission to Mars Outstanding science Hamilton trust Science folder resources Hidden Figures
				Possible Misconceptions: Earth and Space 1.Misconception: The sun travels across the sky. Fact: The Earth orbits the sun. 2.Misconceptions: It is dark at night because the sun is blocked. Fact: It is dark at night because we are turned away from the Sun. 3.Misconception: Earth is the biggest object within our Solar System because the Sun, Moon and other planets appear to be small from Earth.					

			<p><u>Interpreting results</u> Children will use scientific evidence to answer questions.</p> <p>Make conclusions based on scientific evidence and from their own testing and findings.</p> <p><u>Evaluating</u> Children will make predictions for new values, suggest improvements and raise further questions.</p>	<p>Fact: This is because we are looking at them from a distance. Many children are also surprised to learn that the Sun is a star. They may also believe that Mars is a hot planet because of its colour.</p> <p>4.Misconceptions: Stars are only present in the sky during the night because that is when they can be seen. Fact: In the daytime, even on a dull day, the brightness of the Sun will stop all of the other stars in the sky from being seen.</p>				
Oracy opportunities for Autumn term	Debate – is there life on other planets?							
<p>Spring</p> <p>Beautiful Britain</p> <p>Forces</p> <p>Animals Including Humans</p>	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.</p> <p>Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.</p> <p><u>Animals Including Humans</u> Describe the changes as humans develop to old age.</p>	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p> <p><u>Animals Including Humans</u> Describe the changes as humans develop to old age</p>	<p><u>Asking Questions</u> Children will ask scientific questions and begin to understand which questions would be best suited to each enquiry type.</p> <p><u>Making Predictions</u> Children will make predictions based on scientific knowledge.</p> <p><u>Setting up tests</u> Children will with support, plan different types of scientific enquiry. Where appropriate, identify the dependent, independent and controlled variables.</p> <p><u>Observing and Measuring</u> Children will use a range of scientific</p>	<p>What is the effect of gravity on unsupported objects?</p> <p>How does air resistance affect moving objects?</p> <p>How can you minimise the effect of water resistance on objects?</p> <p>What is the purpose of a lever?</p> <p><u>Animals Including Humans</u> What are the 6 different stages of human development, in order?</p> <p>What are the main changes that occur during puberty?</p>	<p>Gravity keeps the Earth and all the planets in our solar system in orbit around the Sun.</p> <p>A ship floats on water because the force from the water pushing it up is equal to the force pulling it down.</p> <p>Forces are measured in newtons (N) using a newton meter, named after Sir Isaac Newton.</p> <p><u>Animals Including Humans</u> Human beings always grow more brain cells than they need. This enables mental development in old age to continue.</p>	<p>Gravity Air resistance Water resistance Buoyancy Friction Lever Gear Cog Pulley Puberty Foetus Fertilisation Adolescence</p>	<p>STEM visit Careers/ Aspirations/science week</p> <p>Planting and growing plants in classroom and outdoors.</p> <p>Spring 2 – Rethink Food</p> <p>50 things: Make snow angels</p>	<p>Outstanding science</p> <p>Hamilton trust</p>

			<p>equipment to make systematic and careful observations.</p> <p><u>Recording</u> Gather, record and classify data with increasing complexity to help in answering questions.</p> <p><u>Interpreting results</u> Identify differences, similarities or changes related to simple ideas or processes. evidence to answer questions.</p> <p>Make conclusions based on scientific evidence and from their own testing and findings.</p> <p><u>Evaluating</u> Children will make predictions for new values, suggest improvements and raise further questions.</p>	<p>What are the main changes that take place during old age?</p> <p>Some animals go through metamorphosis where they change into a very different animal.</p>					
				<p>Possible Misconceptions:</p> <p>Forces</p> <p>1. Misconceptions: The best place to put the fulcrum is in the centre of the lever. Fact: The mechanism will in fact have a bigger effect when it is closer to the object being moved.</p> <p>2. Misconceptions: A greater force on a mechanism always has a greater effect on the object. Fact: A mechanism can allow a smaller force to have a greater effect.</p> <p>3. Misconceptions: Mass and weight are the same thing. Fact: Mass is a measure of the amount of matter in an object; weight is a measure of the force exerted by the object due to gravity. It is important to define these measurements and the difference must be clear when introducing pulleys.</p>					
Oracy opportunities for spring term									
<p>Summer</p> <p>The Industrial Revolution</p> <p>Properties and changes of materials</p> <p>Living things and habitats</p>	<p>Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</p> <p>Recognise that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids, and gases to decide how to group them.</p>	<p>Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>Recognise that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p>	<p><u>Asking Questions</u> Children will ask scientific questions and begin to understand which questions would be best suited to each enquiry type.</p> <p><u>Making Predictions</u> Children will make predictions based on scientific knowledge.</p> <p><u>Setting up tests</u> Children will, with support, plan</p>	<p>How categories can we use to classify materials, based on their properties?</p> <p>What is the difference between melting and dissolving?</p> <p>What is the difference between sexual and asexual reproduction?</p> <p>What are the three different types of mammals?</p>	<p>The most common example of filtering is making a cup of tea.</p> <p>The material with the highest known melting temperature is a metal called tungsten which melts at 3387 degrees Celsius.</p> <p>Burning is an irreversible chemical change.</p>	<p>Dissolve Insoluble Chemical Solution Permeable Soluble Resistance Filter Sieve a device Gestation period Asexual Cell Embryo</p>	<p>Planting and growing plants in classroom and outdoors.</p>		<p>Outstanding science Hamilton trust Science folder resources</p>

<p>Demonstrate that dissolving, mixing and changes of state are reversible changes.</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</p> <p>Describe the differences in the life cycles of a mammal, an amphibian, an insect, and a bird.</p> <p>Describe the life process of reproduction in some plants and animals.</p>	<p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p> <p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals</p>	<p>different types of scientific enquiry. Where appropriate, identify the dependent, independent and controlled variables.</p> <p><u>Observing and Measuring</u> Children will use a range of scientific equipment to make systematic and careful observations.</p> <p><u>Recording</u> Children will take accurate measurements using a range of scientific equipment.</p> <p>Start to take repeat readings when appropriate.</p> <p>Gather, record and classify data with increasing complexity to help in answering questions.</p> <p><u>Interpreting results</u> Children will use scientific evidence to answer questions.</p> <p>Make conclusions based on scientific evidence and from their own testing and findings.</p> <p>Identify differences, similarities or changes related to simple ideas or processes. evidence to answer questions.</p> <p>Make conclusions based on scientific evidence and from</p>		<p>The ostrich lays the biggest eggs of any land animal.</p> <p>A small number of animals are asexual which means they can self-fertilise.</p> <p>Elephants have the longest gestation period of all mammals, carrying their babies for almost two years (22 months).</p>				
<p>Possible Misconceptions:</p> <p><u>Living things</u></p> <p>1. Misconceptions: A baby grows in a mother's tummy. Fact: The baby grows in uterus, or womb, it is a hollow, pear-shaped organ</p> <p>2. Misconceptions: Mammals don't lay eggs. Fact: Only two mammals lay eggs: the platypus and the echidna.</p>								

			<p>their own testing and findings.</p> <p>Identify differences, similarities or changes related to simple ideas or processes.</p> <p><u>Evaluating</u> Children will make predictions for new values, suggest improvements and raise further questions.</p>				
Oracy opportunities for summer term	Debate: the heart is the most important organ in the body.						

Year 6

Working Scientifically	<ul style="list-style-type: none"> Plan different types of scientific enquiries to answer their own or others' questions, including recognising and controlling variables where necessary Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Use test results to make predictions to set up further comparative and fair tests Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Describe and evaluate their own and other people's scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources Group and classify things and recognise patterns 								
Theme	National Curriculum	Progression in Skills	Disciplinary knowledge	Substantive knowledge			Drivers & 50 things	British Values & Protective Characteristics	Schemes/Resources/ Texts
				Key Questions	Key Facts	Key Vocab			
Autumn Light Animals Including Humans	<p>Recognise that light appears to travel in straight lines.</p> <p>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</p> <p>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</p> <p>Use the idea that light travels in straight lines to explain why</p>	<p>Recognise that light appears to travel in straight lines</p> <p>Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</p> <p>Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</p>	<p><u>Asking Questions</u> Children will ask relevant scientific questions and choose which enquiry type would be best suited to answer them.</p> <p><u>Making Predictions</u> Children will make predictions based on scientific knowledge.</p> <p><u>Setting up tests</u></p>	<p>How does light travel?</p> <p>How do we see things?</p> <p>What do mirrors do to light?</p> <p>How do we see colours?</p> <p>Why do shadows have the same shape as the object that casts them?</p> <p>What is the circulatory system?</p>	<p>Light travels slower through different materials like water and glass.</p> <p>We see different colours because each colour has its own wavelength.</p> <p>InfraRed rays are invisible to humans.</p> <p>Light travels nearly 900,000 times faster than sound.</p>	<p>Absorb</p> <p>Refract</p> <p>Prism</p> <p>Lens</p> <p>Ray</p> <p>Beam</p> <p>Focal point</p> <p>Blood vessel</p> <p>Circulatory system</p> <p>Plasma</p> <p>Platelets</p>	<p>Optician visit</p> <p>Planting and growing plants in classroom and outdoors.</p> <p>Cooking Lessons</p> <p>Healthy Nutrition</p> <p>Planting and growing plants in classroom and outdoors.</p> <p>50 things: Go on a night time walk (residential)</p>		<p>Outstanding science</p> <p>Hamilton trust</p>

<p>shadows have the same shape as the objects that cast them.</p> <p>Pupils should be taught to:</p> <p>identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>describe the ways in which nutrients and water are transported within animals, including humans</p>	<p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p> <p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans</p>	<p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p><u>Observing and Measuring</u> Children will use a range of scientific equipment to make systematic and careful observations with increased complexity.</p> <p><u>Recording</u> Children will record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p><u>Interpreting Results</u> Children will use scientific evidence to answer questions</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of</p>	<p>How does diet effect growth?</p> <p>Are all drugs bad for you?</p> <p>How is water used within the body?</p> <p>What is blood made of?</p> <p>What are the main organs within the human body?</p> <p>What are the main systems of the human body?</p> <p>Possible Misconceptions: Light 1.Misconception: Sight is purely an active human process 'I am looking at something, which is why I can see it' or that eyes give out a form of light to enable us to see. Fact: When light hits the retina (a light-sensitive layer of tissue at the back of the eye), special cells called photoreceptors turn the light into electrical signals. These electrical signals travel from the retina through the optic nerve to the brain. Then the brain turns the signals into the images you see.</p>	<p>A prism splits a beam of light into the colours of the visible spectrum.</p> <p>The heart beats 2.5 billion times during the life of a 75-year-old.</p> <p>Blood is a mixture of fluid, plasma, white and red blood cells.</p> <p>Red blood cells transport oxygen to every cell and remove carbon dioxide.</p>	<p>50 things: Climb a tree (residential)</p>			
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			<p>trust in results, in oral and written forms such as displays and other presentations.</p> <p><u>Evaluating</u> Children will use test results to make predictions to set up further comparative and fair tests.</p> <p>Suggest investigation improvements including accuracy of results.</p> <p>Provide some simple examples of how to extend the investigation.</p>						
Oracy opportunities for Autumn Term	Ignite speech: explain the lifecycle of an animal/plant of your choice, discussing each stage and how the animal/plant develops.								
Spring Electricity	<p>Pupils should be taught to:</p> <p>associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</p> <p>use recognised symbols when representing a simple circuit in a diagram</p>	<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</p> <p>Use recognised symbols when representing a simple circuit in a diagram</p>	<p><u>Asking Questions</u> Children will ask relevant scientific questions and choose which enquiry type would be best suited to answer them.</p> <p><u>Making Predictions</u> Children will make predictions based on scientific knowledge.</p> <p><u>Setting up tests</u> Plan different types of scientific enquiries to answer questions, Including recognising and controlling variables where necessary.</p> <p><u>Observing and Measuring</u> Children will use a range of scientific equipment to make</p>	<p>How has electricity changed over time?</p> <p>What are the different symbols on an electrical circuit?</p> <p>What are the effects of differing voltages in a circuit?</p> <p>What happens if you increase or decrease the voltage on differing parts of the circuit?</p>	<p>Lightning is caused by the discharge of electricity in the atmosphere.</p> <p>Electricity was first discovered in 600BC by the Ancient Greeks.</p> <p>Kilowatt is a unit used for measuring electrical power.</p>	<p>Alternating Direct current Battery Motor Buzzer Voltage</p>	<p>Engineering/Problem solving</p> <p>STEM visit Careers/ Aspirations/science week</p> <p>Spring 1 Re Think Food indoor garden project Planting and growing plants in classroom and outdoors.</p>		Outstanding science Hamilton trust
				<p>Possible Misconceptions:</p> <p>Electricity 1.Misconceptions: Current, voltage and electricity are all the same thing. Fact: Voltage is the measure of electric potential energy per unit charge, while current is the flow of electric charge through a circuit. Units: Voltage is measured in volts, while current is measured in amperes.</p> <p>2.Misconceptions: Current gets less as it passes through components.</p>					

			<p>systematic and careful observations with increased complexity.</p> <p><u>Recording</u> Children will record data and results of Increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p><u>Interpreting Results</u> Children will use scientific evidence to answer questions</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p><u>Evaluating</u> Children will use test results to make predictions to set up further comparative and fair tests.</p>	<p>Fact: The current is not used up by the components in a circuit. This means that the current is the same everywhere in a series circuit, even if it has lots of lamps or other components.</p> <p>3.Misconceptions: Electricity is an object that can be seen. Fact: Electricity is a form of energy, not a physical object. It is a flow of electric charge through a conductor.</p>			
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			Suggest investigation improvements including accuracy of results. Provide some simple examples of how to extend the investigation.							
Oracy opportunities for spring Term	Ignite speech: choose a force, and tell the class how we come across that force in our daily life.									
Summer Evolution and Inheritance	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	<u>Asking Questions</u> Children will ask relevant scientific questions and choose which enquiry type would be best suited to answer them. <u>Making Predictions</u> Children will make predictions based on scientific knowledge. <u>Setting up tests</u> Plan different types of scientific enquiries to answer questions, Including recognising and controlling variables where necessary. <u>Observing and Measuring</u> Children will use a range of scientific equipment to make systematic and careful observations with increased complexity.	Who was Charles Darwin/ Mary Anning? How are fossils formed and how long (on average) do they take to form? Are inherited characteristics always physical? What is the difference between inherited and acquired characteristics? How do animals and plants adapt to their environment? How could adaptation lead to evolution? What is a fungus?	All living things have a common ancestor – a bacterium that lived billions of years ago. The closest living relation of birds is the crocodile. Darwin said that monkeys, apes and humans had a common ancestor. Humans, unlike other animals, have opposable thumbs making it easier for us to pick things up and hold things. Up until 10,000 years ago, all humans had brown eyes. Microorganisms are found in almost every habitat present in nature.	Evolution Adaptation Inherited traits Inheritance Adaptive traits Natural selection DNA Genes Variation Micro organism Taxonomy	50 things: Take a walk through a forest Planting and growing plants in classroom and outdoors. Nature Walk Gardening	Sex: Ruth Ella Moore (micro biologist)	Outstanding science Hamilton trust Science folder resources	
Living Things and Their Habitats	describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals give reasons for classifying plants and animals based on specific characteristics	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics	<u>Recording</u> Children will record data and results of Increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	Possible Misconceptions: Evolution 1.Misconceptions: Humans used to be monkeys Fact: Humans are not descended from monkeys or any other primate living today. We do share a common ape ancestor with chimpanzees. It lived between 8 and 6 million years ago. 2.Misconceptions: An individual can evolve during its own lifespan Fact: Individual organisms don't evolve. Populations evolve. Because individuals in a population vary, some in the population are better able to survive and reproduce given a particular set of environmental conditions.						

			<p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p><u>Interpreting Results</u> Children will use scientific evidence to answer questions Identify scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p><u>Evaluating</u> Children will use test results to make predictions to set up further comparative and fair tests.</p> <p>Suggest investigation improvements including accuracy of results.</p> <p>Provide some simple examples of how to extend the investigation.</p>	<p>3.Misconceptions: Evolution produces living things perfectly adapted to their environment Fact: Evolution is not a goal driven process. There is no such thing as a perfectly adapted organism, the pinnacle of a species, because adaptation depends on the environmental context and that is constantly in flux.</p> <p>4.Misconceptions: Natural selection is an active process, i.e. an individual or a species can try to adapt Fact: Natural selection is a process rather than as a guiding hand. Natural selection is the simple result of variation over time to suit an environment.</p>			
<p>Oracy opportunities for summer Term</p>	<p>Hot seating: asking Darwin questions about evolution and inheritance.</p>						