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	• 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. • Explore and talk about the different forces they can feel	• 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.	**<u>The Natural world</u>** • 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.

Nursery

Theme	EYFS Curriculum	Disciplinary Knowledge	Substantive Knowledge			Drivers & 50 things	British Values & Protective Characteristics	Resources and texts
			Key Questions	Key Facts	Key Vocab			
Learning Overview	We will explore the natural world, commenting on seasonal changes and the weather. We will look at what happens to trees and the weather during autumn and winter. We will use our senses during our exploration of the outdoor environment.							
Autumn **Who Am I?**	Use all their senses in hands -on exploration of natural materials. Explore collections of materials with similar and or/different properties.	I can collect autumn treasures and explore them using my senses I can use simple words and phrases to describe the autumn treasures I can use simple words and phrases to describe changes in the season	What is the weather like today? How does the conker feel? How does the acorn feel? **Possible misconceptions:** Children may think that it was winter rather than autumn	The leaves start to fall off the tress The weather gets colder and wetter It gets darker earlier in the autumn	Autumn Conker Acorn Spikey Smooth Soft Hard Shiny Colder Darker Wetter Weather Season	Run a mile		My first seasons
Learning Overview	We will look at the change of seasons and what happens to some plants and animals during spring. We will look at the school grounds and local environment, observing and learning about the life-cycles of chickens and plants. We will also look at other life-cycles such as butterflies. We will look at plants identifying parts.							

Spring **Cycle A: Amazing Nature** **Cycle B: Ready Steady Cook**	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.	I can use simple words to describe what happens to plants in the spring. I can use simple words and phrases to describe changes in the season I can use simple words and phrases to describe the life cycle of a chicken	What happens to plants in the spring? What do we need to do to keep the plant alive? Where do chickens come from?	Buds start to grow on trees in the Spring New plants start to grow in the spring Chickens hatch from eggs	Snow Spring Leaf Petal Stem hatch egg life cycle chick bud	Run a mile		The Very Busy Spider Bugs Rosa Explores Life-cycles Errol's Garden The Odd Egg The Enormous Turnip Gloria's Porridge
			Possible misconceptions: Children might think that plants need lots of water every day					
Learning Overview	We will look at how our environment has changed over the year. We will look at what happens to the weather at different times during the year and make simple comparisons. We will explore the movement of some toys and talk about the forces we can feel.							
Summer **Cycle A: All Creatures Great and Small** **Cycle B:Land of Make Believe**	Explore how things work. Explore and talk about the different forces they can feel Talk about the differences between materials and changes they notice	I can use simple words to describe what happens to plants in the summer. I can use simple words and phrases to describe changes in the season. I can use simple words and phases to describe some forces I feel.	What happens to plants in the summer? What force can you feel?	Push and pull are forces. Many plants flower in the summer.	Push Pull Summer Flower	Run a mile		Naughty Bus What are stars? Welcome to the Zoo
			Possible misconceptions: Children may think that you can only push and pull with your hands					

Reception

Theme	EYFS Curriculum	Disciplinary Knowledge	Substantive Knowledge			Drivers & 50 things	British Values & Protective Characteristics	Resources and texts
			Key Questions	Key Facts	Key Vocab			
ELG	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.							
Learning Overview	We will explore the natural world, commenting on seasonal changes and the weather. We will look at what happens to trees and the weather during autumn and winter. We will use our senses during our exploration of the outdoor environment.							

Autumn **Who Am I?**	Understand the effect of changing seasons on the natural world around them.	I know that the leaves on trees change colour in Autumn. I can describe what I see, hear and feel whilst in an outside environment.	What happens to the leaves on trees in Autumn? How does the weather change in Autumn?	Leaves change colour because they are decaying The days get shorter and the nights get longer	decay soggy veins nocturnal			When Autumn comes It's Autumn Night Monkey, Day Monkey
			Possible misconceptions: The children may think that the leaves on the trees are green in autumn					
Learning Overview	We will look at the change of seasons and what happens to some plants and animals during spring. We will look at the school grounds and local environment, observing and learning about the life-cycles of butterflies and plants. We will also look at other life-cycles such as chickens. We will look at plants identifying parts.							
Spring **Amazing Nature**	Explore the natural world around them. Describe what they see, hear, smell and feel whilst outside.	To understand what changes happen in Autumn and winter and note some differences. To understand what changes happen in spring, discussing when and how things grow. To observe and draw pictures of animals. To name 3 animals and their young To explain the lifecycle of one animal. To explain the life-cycle of a plant. To name the parts of a flower.	What happens to leaves on trees in Spring? What other changes can you see? What are the stages of the life cycle of a butterfly?	In Spring the leaves and buds begin to grow on the trees and plants. There are 4 stages in a life cycle.	roots buds bean stalk chrysalis cocoon ice melting frozen			The growing story Hattie Peck The Hungry Caterpillar Jack and the Beanstalk The Seedling The Odd Egg
			Possible misconceptions: Children may think that a butterfly is born from an egg Children may think that the butterfly has eaten the caterpillar Children may think that the caterpillar changing to a butterfly in magic					
Learning Overview	We will recognise some similarities and differences in how our environment looks now compared to the past year. We will look at what happens to the weather/climate during spring to summer and compare it to a different country. We will explore materials and identify what materials would make the best boat. We will think about materials being waterproof or not waterproof and test our theories as well as identifying objects that float/sink and explain their reasons.							
Summer **All Creatures Great and Small**	Recognise some environments that are different to the one in which they live.	To talk about similarities and differences between materials and changes they notice. To identify the best material that is	What happens to ice when it gets warm? How do we know a material is waterproof? How many seasons are there in the year?	When ice warms up it melts. Waterproof material does not absorb water. The four seasons are Spring, Summer, Autumn and	waterproof season floating sinking absorb			Frog Can Float Oh Dear, Look What I Got Mr Gumpy's Outing The Goat and the Stoat and the Boat

	Recognise some similarities and differences between life in this country and life in other countries.	waterproof and best for its purpose. To give an explanation as to why something floats or sinks. To name and order the seasons. To talk about and explore changes in materials freezing and melting.	Why does your boat float?	Winter.				A Stroll through the Seasons
			Possible misconceptions: Children may think that all light objects float Children may think that all heavy objects sink					

Year 1

Working Scientifically	· 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

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 **Castles** Naming and identifying Materials Seasonal Changes	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. Seasonal Changes Pupils should be taught to observe changes across the four seasons and describe weather	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 Observe changes across the four seasons. Observe and describe weather associated with the seasons	<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 Carry out simple tests using nonstandard measurements when appropriate. <u>Recording</u>	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 the year are in winter.	Metal Attract Repel Wood Glass Magnetic Rough Smooth Bending Squashing Twisting Stretching Material	Skipton Castle Building castles using materials in the playground. Play out in snow. Gardening (outdoor learning) Create leaf monsters 50 things build a den 50 things: Build a snowman		The King who Banned the Dark Outstanding science Hamilton trust Science folder resources

	associated with the seasons and how day length varies.		Children will gather and record simple data. Sort objects and living things into groups based on simple properties. <u>Interpreting Results</u> Children will explain what they found out to an adult or a partner.	**Possible Misconceptions:** Seasonal changes 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. Fact: Day and night is caused by the rotation of the Earth about its axis Materials 1. Misconception: Confusion about hardness and strength 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.			
Oracy opportunities for Autumn term	End of topic discussion: Which material is the best to build a castle?							
Spring **Eco Warriors** Animals including Humans Seasonal Changes	Pupils should be taught to identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. They will identify and name a variety of common animals that are carnivores, herbivores and omnivores. Pupils will describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). 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.	Animals Including Humans Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise,	<u>Asking Questions</u> Children will ask simple questions about the differences between a variety of common animals. <u>Making Predictions</u> Children will predict and sort a variety of health and unhealthy foods <u>Observing and Measuring</u> Children will observe the differences between plant life during the different seasons <u>Recording</u> Children will record the changes photographically in seasonal change	What senses do humans have? How do humans change as they get older? What are the basic needs of humans? What do humans need to do to stay healthy? What happens to the environment in Spring?	The five senses are smell, touch, hear, feel and taste. Exercising is good for humans. Spring is the season when plants start to grow again.	Senses Amphibians Reptiles Mammals Carnivore Herbivore Omnivore Hygiene	Healthy Nutrition STEM visit Careers/ Aspirations/science week Rethink food indoor garden Gardening (outdoor learning) Spring Walk	Age: Dear Earth- Grandad and granddaughter Grandad was an explorer.	Dear Earth by Isabel Otter Now Press Play Outstanding science Hamilton trust Science folder resources
				Possible Misconceptions: Animals 1.Misconception: All ocean creatures are 'fish', e.g. whales, dolphins. Fact: Whales, dolphins, jellyfish and shellfish are not fish, but seahorses and sea dragons are. 2.Misconception: Humans are not animals. Fact: Humans are members of a large group of animals known as mammals. 3.Misconceptions: Amphibians and reptiles are the same. Fact: amphibians are very different from reptiles because they have an aquatic lifestyle as opposed to the terrestrial lifestyle of lizards and snakes for example. Amphibians also need water in order to breed, whilst most reptiles do not require it at all for reproduction purposes.				

	Seasonal Changes Pupils should be taught to ide observe changes across the four seasons and describe weather associated with the seasons and how day length varies.	eating the right amounts of different types of food, and hygiene. Seasonal Changes Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies							
Oracy opportunities for spring term	**Everyone's an expert**: How am I different from and elderly? (From the point of view of a child)								
Summer **Incredible India** Plants Seasonal Changes	Plants Pupils should be taught to: 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. Seasonal Changes Pupils should be taught to observe changes across the four seasons and describe weather associated with the seasons and how day length varies.	Plants Identify and describe the basic structure of a variety of common flowering plants, including trees. Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Seasonal Changes Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies	<u>Asking Questions</u> Children will ask questions about the features and structures of a variety of common plants. <u>Making Predictions</u> Children will make predictions of what will happen to plants placed in different areas such windowsill or closed cupboard. <u>Setting up tests</u> Children will verbally state what they are going to investigate Children will design an investigation for testing what will happen when plants are placed in different places. <u>Observing and Measuring</u> Children will observe the differences between plant life during the different seasons <u>Recording</u> Children will record the changes	What are the common, wild and garden plants and trees? What are the four seasons? How does the weather change in these four seasons? What are garden and wild plants? What is a flower made up of? What do plants need to grow?	The four seasons are Spring, Summer, Autumn and Winter. Flowers are made up of roots, stems leaves and flowers. Plants need water, nutrients and sunlight to grow. Summer usually is the hottest of the four seasons.	Wild Deciduous Evergreen **Possible Misconceptions:** Plants 1.Misconception: Trees are not plants. Fact: Trees are plants. 2.Misconception: Many flowering plants have been mistaken to be non-flowering plants due to inconspicuous flowers or infrequent flowering. Fact: Mosses and liverworts, ferns and conifers are non-flowering plants. Most other plants are flowering plants.	Now press play- seasonal changes. Planting and growing plants in classroom and outdoors. 50 things: Roll down a grassy hill 50 things: Make a daisy chain		Now Press Play- Habitats Outstanding science Hamilton trust Science folder resources

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

Year 2

Working Scientifically	• 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 Plants	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 right amounts of different types of food, and hygiene Plants	<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 right amounts of different types of food, and hygiene <u>Plants</u>	<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 happens to their heart rate when they exercise <u>Observing and Measuring</u> Children will use stop watches and	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 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 50 things: Look after a pet 50 things: Kick the Autumn leaves 50 things: Grow some daffodils	Age Pregnancy	Cherry Blossom and Paper Planes Kites Outstanding science Hamilton trust Science folder resources

	Pupils should be taught to: To observe and describe how seeds and bulbs grow into mature plants To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	stethoscopes to listen to and time heart rate Children will observe and describe how seeds and bulbs grow and mature <u>Recording</u> Children will record the changes in their heart rate <u>Interpreting Results</u> Children will explain how their body changed during exercise. <u>Evaluating</u> Children will evaluate how they could have improved their test.	**Possible Misconceptions:** Plants 1.Misconception: Minerals in the soil, water and carbon dioxide are food for plants. Fact: Plants make their own food. Minerals help in plant growth and health. Water and carbon dioxide are ingredients for photosynthesis. 2.Misconception: Roots are organs for feeding. Fact: Roots absorb minerals and water for the plants. Minerals and water are not food for plants. 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. Fact: Roots take in water. The main function of leaves is to carry out photosynthesis.				
Oracy opportunities for Autumn Term	<u>Just a minute</u>: Presenting one of the groups of animals (Amphibians, mammals, birds, reptiles) 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.								
Spring **My Country** **My City** Materials Plants	Materials 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. They will find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Plants Pupils should be taught to observe and describe how seeds and bulbs grow into mature plants. They should find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Materials Compare and group together a variety of everyday materials on the basis of their simple physical properties Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Plants	<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 simple predictions as to what will happen to a solid material when squashing, bending, twisting and stretching. <u>Setting up tests</u> Children will identify what they will change and keep the same. <u>Observing and Measuring</u> Children will observe closely different materials using simple equipment such as magnifying glasses.	What materials are strong? What materials are weak? How are bulbs different from seeds?	Seeds need to wait for conditions to be just right before they start to grow. Bulbs can sprout new growth.	Properties Sprout	Now Press Play- Materials Material hunt outside 50 things: Have a snowball fight STEM visit Careers/ Aspirations/science week Planting and growing plants in classroom and outdoors.		BBC Bitesize Outstanding science Hamilton trust Science folder resources

		Observe and describe how seeds and bulbs grow into mature plant. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Perform simple tests using standard units when appropriate. Observe and describe how seeds and bulbs grow into mature plants. <u>Recording</u> Children will gather and record data to help in answering questions. <u>Interpreting Results</u> Children will use their observations and ideas to suggest answers to questions. <u>Evaluating</u> Children will talk about what they have found out and how they found it out.	**Possible Misconceptions:** Plants 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. 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.			
Oracy opportunities for spring Term	Which material is the best to build a stage and why?							
Summer **The Great British Seaside** Living things and their habitats Plants	Living things and their Habitats Pupils should be taught to explore and compare the differences between things that are living, dead, and things that have never been alive. 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 animals and plants, and how they depend on each other. Pupils will identify and name a variety of plants and animals in their habitats, including microhabitats. They will describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify	<u>Living things and their Habitats</u> 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 micro-habitats	<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 simple predictions based on a question <u>Setting up tests</u> Children will identify what they will change and keep the same. <u>Observing and Measuring</u> Children will observe closely, using simple equipment such as magnifying glasses.	What types of habitats are there? How do animals adapt to certain habitats? How do animals depend on each other? What is a food chain? What is a food source? How do plants obtain the food?	A habitat must provide food, shelter, water and space. Different animals will need different things from their habitat. Habitats can change in many ways. A food chain shows how animals depend on plants and other animals for their food and survival. A food chain can tell you about what animals eat.	Habitat Shelter Deforestation Food Chain Producers Consumer Reproduction	Seaside Trip Filey Now Press Play Habitats-year 2 50 things: Walk in the sand barefoot 50 things: Paddle in the sea Sum 2: Re Think food Hydroponics Planting and growing plants in classroom and outdoors.	Age: David Attenborough (our environment linked to habitats)	Outstanding science Hamilton trust Science folder resources BBC Bitesize
				Possible Misconceptions: Plants 1. Misconception: Plants do not respire, or they only respire in the dark.				

	and name different sources of food. Plants Pupils should be taught to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. They will identify and describe the basic structure of a variety of common flowering plants, including trees. 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.	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 <u>Plants</u> Identify and describe the basic structure of a variety of common flowering plants, including trees. Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Perform simple tests using standard units when appropriate. Observe and describe how seeds and bulbs grow into mature plants. <u>Recording</u> Children will gather and record data to help in answering questions. Identifying and classifying animals by their habitats and physical features <u>Interpreting Results</u> Children will use their observations and ideas to suggest answers to questions. <u>Evaluating</u> Children will talk about what they have found out and how they found it out.	Fact: Plants respire all the time. 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.			
Oracy opportunities for summer Term	Discussion: How do people change habitats?						

Year 3

Working Scientifically	• 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 **Who First Lived in Britain?** **Plants** **Rocks**	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 plan 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 Recognise that soils are made from rocks and organic matter	Plants Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 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 Recognise that soils are made from rocks and organic matter	<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 about the characteristics of various types of rocks. <u>Setting up tests</u> Children will identify what they will change, observe and keep the same. With support, set up simple practical enquiries. <u>Observing and Measuring</u> Children will investigate the way in which water is transported within plants Begin to use scientific equipment to make observations. Carry out tests and simple experiments and take 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>	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 **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.	Aut 2 RE Think food indoor garden project Planting and growing plants in classroom and outdoors. Aspirations – Mary Anning Cliffe Castle Visit Now Press Play Planting and growing plants in classroom and outdoors.	Mary Anning – sex & age	Outstanding science Hamilton trust Science folder resources Meadow Song Stone Girl, Bone Girl Hamilton Trust

			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** **Plants**	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, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	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 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	<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. With support, set up simple practical enquiries <u>Observing and Measuring</u> Begin to use scientific equipment to make observations. Carry out tests and simple experiments and take measurements using standard units.	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 flowing water to transport their seeds. Sometimes animals can move seeds.	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 Science folder resources Meadow Song
				Possible Misconceptions: Plants 1. Misconception: Respiration in plants occurs only in the cells of leaves, since only leaves have gas exchange pores. Fact: Respiration takes place in all plant cells. Animals including humans 1.Misconceptions: The food you eat becomes “poo” and the drink becomes “wee”. Fact: Urine is produced by a filtration process in the kidneys; the feces are what remains of food that has passed through the alimentary tract, where it was broken down and where nutrients were extracted from it.					

		transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	<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 spring term	**Discussion: Consider life without plants**							
Summer **Forces and Magnets**	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	Compare how things move on different surfaces Notice that some forces need contact between two objects, but magnetic forces can act at a distance Compare and group together a variety of everyday materials Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that	<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 based on their scientific understanding as to whether a material is magnetic or not. <u>Setting up tests</u> Children will identify what they will change, observe and keep the	What is a force? Do things move differently on different surfaces? What materials are magnetic? Which magnetics poles attract and which repel? What is light? Which materials reflect light?	Forces are the things that allow the movement of all objects around us. Magnets have two poles; north and south. Light is a form of energy that enables us to see the world around us. Light comes from different sources. Our main source of natural light is the Sun.	Force Newtons Shadows Reflect Transparent Translucent Opaque	Planting and growing plants in classroom and outdoors. 50 things - Shadow puppets		Outstanding science Hamilton trust Science folder resources

Light	predict whether 2 magnets will attract or repel each other, depending on which poles are facing 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 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	there are ways to protect eyes Recognise that light from the sun can be dangerous and that there are ways to protect eyes Find patterns in the way that the size of shadows change	same. Whilst testing different materials With support, set up simple practical enquiries. <u>Observing and Measuring</u> Begin to use scientific equipment to make observations. Carry out tests and simple experiments and take 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.	**Possible Misconceptions:** Light 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 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. Magnets and Forces 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 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. 3.Misconception: All metals are magnetic Fact: Some metals such as Aluminium are not magnetic.			Outstanding science Hamilton trust Science folder resources
Oracy opportunities for summer term	**Discussion: Imagine you had magnets for fingers, would it be good?**						

Year 4

Working Scientifically	• 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**	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	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 differences, similarities or changes related to simple scientific ideas and processes Use straightforward scientific evidence to answer questions or to support his/her findings Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	<u>Asking Questions</u> Children will ask relevant questions and use different types of scientific enquiry to answer them. <u>Making Predictions</u> Children will make predictions based on simple scientific knowledge <u>Setting up tests</u> Children will identify what they will change, observe or measure and keep the same. Set up simple practical enquiries, comparative and fair tests. <u>Observing and Measuring</u> Children will make systematic and careful observations. Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <u>Recording</u>	What are the different states of matter? How does a material change from one state to another? How are clouds in the sky formed? What temperature does water evaporate?	Matter is another word for the stuff things are made of. Everything falls into one of three categories; solid, liquid or gas. Materials can change from one state of matter to another through freezing and melting. The water cycle converts water into all three different states; liquid, solid (ice) and gas (vapour). Clouds are formed after water from the earth is evaporated by the sun. Vapour that has turned into liquid can be released by clouds in the form of rain or snow.	States of Matter Solid Liquid Gas Reversible Irreversible Precipitation Evaporation Condensation Filtering	Outdoor learning – physically making solids, liquids and gases Planting and growing plants in classroom and outdoors. 50 things: Toast marshmallows		Outstanding science Hamilton trust Science folder resources The Rhythm of the Rain Yorkshire Water

			Children will gather, record and classify 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. <u>Interpreting Results</u> Children will use straightforward scientific evidence to answer questions or to support their findings. Use results to draw simple conclusions. Begin to identify differences, similarities or changes related to simple ideas or processes. <u>Evaluating</u> Children will begin to make predictions for new values, suggest improvements and raise further questions.						
				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 the 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.					
Oracy opportunities for Autumn Term	Debate: Solid, liquid, Gas – which one is most important?								
Spring **17th Century Britain** **Electricity**	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	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	<u>Asking Questions</u> Children will ask relevant questions and use different types of scientific enquiry to answer them. <u>Making Predictions</u> Children will make predictions based on simple scientific knowledge <u>Setting up tests</u> Children will identify what they will change,	What are the key components of a circuit? Which materials conduct electricity? Does the number of batteries affect the brightness of a bulb?	Electricity is an energy. This energy can be used to power electrical items. Electricity can only travel if there is a complete circuit. A complete circuit is made up of different components -batteries (or cell), wires and bulbs, buzzers and motors.	Circuit Cell Crocodile clip Switch Bulb Conductor Insulator Component Classification Characteristic Organism Amphibians	STEM visit Careers/ Aspirations/science week Planting and growing plants in classroom and outdoors.		Outstanding science Hamilton trust Science folder resources Lux app

Living things and their habitats	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 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	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 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 and have an impact on living things	observe or measure and keep the same. Set up simple practical enquiries, comparative and fair tests. <u>Observing and Measuring</u> Children will make systematic and careful observations. Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <u>Recording</u> Children will gather, record and classify 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. <u>Interpreting Results</u> Children will Use straightforward scientific evidence to answer questions or to support their findings. Use results to draw simple conclusions. Begin to identify differences, similarities or changes related to simple ideas or processes. <u>Evaluating</u> Children will begin to make predictions for new values, suggest improvements and	How can we group different living things? What is a classification key?	An organism is an individual animal, plant, or single-celled life form. A classification key is a series of questions that determine an organism's physical characteristics to help identify an unknown organism.	**Possible Misconceptions:** Electricity 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. 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. 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. 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).			Outstanding science Hamilton trust Science folder resources Seek app by iNaturalist

			raise further questions.					
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** **Sound**	describe the simple functions of the basic parts of the digestive system in humans identify the different types of teeth in humans and their simple functions construct and interpret a variety of food chains, identifying producers, predators and prey identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sounds travel through a medium to the ear 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	Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions Construct and interpret a variety of food chains, identifying producers, predators and prey Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sounds travel through a medium to the ear 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	<u>Asking Questions</u> Children will ask relevant questions and use different types of scientific enquiry to answer them. <u>Making Predictions</u> Children will make predictions based on simple scientific knowledge <u>Setting up tests</u> Children will identify what they will change, observe or measure and keep the same. Set up simple practical enquiries, comparative and fair tests. <u>Observing and Measuring</u> Children will make systematic and careful observations. Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. <u>Recording</u> Children will gather, record and classify 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.	How many types of teeth do humans have? What are the roles of the different types of teeth? What happens to the food we eat? How is sound created? How does sound travel? Does the size of an object affect the pitch of the sound it produces?	We have three types of teeth - incisors, canines and molars. The large intestine is around 5ft long and the small intestine is around 16ft long. Sound comes from vibrations. These vibrations create sound waves which move through air and water before reaching our ears. The pitch of a sound is how high or low the sound is.	Canines Molars teeth Incisors teeth Oesophagus Pharynx Intestines Saliva Vibrations Particles High pitched Low pitched Frequency Volume	Healthy Lifestyles – looking after teeth Planting and growing plants in classroom and outdoors. Sum 1 Rethink food indoor garden		Outstanding science Hamilton trust Science folder resources
				Possible Misconceptions: Sound 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 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. Animals including Humans 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.				

			<u>Interpreting Results</u> Children will Use straightforward scientific evidence to answer questions or to support their findings. Use results to draw simple conclusions. Begin to identify differences, similarities or changes related to simple ideas or processes. <u>Evaluating</u> Children will begin to make predictions for new values, suggest improvements and raise further questions.	excess water is absorbed back into the body in the large intestine. any undigested food passes out of the anus as faeces. 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.			
Oracy opportunities for summer Term	**Debate: The tongue is more important than teeth**						

Year 5

Working Scientifically	Plan different types of scientific enquiries to answer 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 • 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.	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	<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>	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	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	Solar system Orbit Planet Mercury Venus Mars Jupiter Saturn Uranus Neptune Pluto Rotate	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	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

	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 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	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. <u>Interpreting results</u> Children will use scientific evidence to answer questions. Make conclusions based on scientific evidence and from their own testing and findings. <u>Evaluating</u> Children will make predictions for new values, suggest improvements and raise further questions.	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?	about one-quarter the size of Earth. The Moon weighs about 80 times less than Earth. Saturn is the lightest planet.	Axis	classroom and outdoors.		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. 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. 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.				
Oracy opportunities for Autumn term	Debate – is there life on other planets?								

Spring **Beautiful Britain** Forces Animals Including Humans	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 gears allow a smaller force to have a greater effect. <u>Animals Including Humans</u> Describe the changes as humans develop to old age.	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 gears, allow a smaller force to have a greater effect <u>Animals Including Humans</u> Describe the changes as humans develop to old age	<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. <u>Interpreting results</u> Identify differences, similarities or changes related to simple ideas or processes. evidence to answer questions. Make conclusions based on scientific evidence and from their own testing and findings. <u>Evaluating</u>	What is the effect of gravity on unsupported objects? How does air resistance affect moving objects? How can you minimise the effect of water resistance on objects? What is the purpose of a lever? <u>Animals Including Humans</u> What are the 6 different stages of human development, in order? What are the main changes that occur during puberty? What are the main changes that take place during old age?	Gravity keeps the Earth and all the planets in our solar system in orbit around the Sun. A ship floats on water because the force from the water pushing it up is equal to the force pulling it down. Forces are measured in newtons (N) using a newton meter, named after Sir Isaac Newton. <u>Animals Including Humans</u> Human beings always grow more brain cells than they need. This enables mental development in old age to continue. Some animals go through metamorphosis where they change into a very different animal.	Gravity Air resistance Water resistance Buoyancy Friction Lever Gear Cog Pulley Puberty Foetus Fertilisation Adolescence	STEM visit Careers/ Aspirations/science week Planting and growing plants in classroom and outdoors. Spring 2 – Rethink Food 50 things: Make snow angels		Outstanding science Hamilton trust
				Possible Misconceptions: Forces 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. 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. 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.				

			Children will make predictions for new values, suggest improvements and raise further questions.					
Oracy opportunities for spring term								
Summer **The Industrial Revolution** Properties and changes of materials Living things and habitats	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. Recognise 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 to group them. 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 reversable, including changes associated with burning and the action of acid on bicarbonate of soda. 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.	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 Recognise 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 comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic 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	<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> Children will take accurate measurements using a range of scientific equipment. Start to take repeat	How categories can we use to classify materials, based on their properties? What is the difference between melting and dissolving? What is the difference between sexual and asexual reproduction? What are the three different types of mammals?	The most common example of filtering is making a cup of tea. The material with the highest known melting temperature is a metal called tungsten which melts at 3387 degrees Celsius. Burning is an irreversible chemical change. The ostrich lays the biggest eggs of any land animal. A small number of animals are asexual which means they can self-fertilise. Elephants have the longest gestation period of all mammals, carrying their babies for almost two years (22 months).	Dissolve Insoluble Chemical Solution Permeable Soluble Resistance Filter Sieve a device Gestation period Asexual Cell Embryo	Planting and growing plants in classroom and outdoors.		Outstanding science Hamilton trust Science folder resources
				Possible Misconceptions: Living things 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 2. Misconceptions: Mammals don't lay eggs. Fact: Only two mammals lay eggs: the platypus and the echidna.					

		kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda 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	readings when appropriate. Gather, record and classify data with increasing complexity to help in answering questions. <u>Interpreting results</u> Children will use scientific evidence to answer questions. Make conclusions based on scientific evidence and from their own testing and findings. Identify differences, similarities or changes related to simple ideas or processes. evidence to answer questions. Make conclusions based on scientific evidence and from their own testing and findings. Identify differences, similarities or changes related to simple ideas or processes. <u>Evaluating</u> Children will make predictions for new values, suggest improvements and raise further questions.				
Oracy opportunities for summer term	Debate: the heart is the most important organ in the body.						

Year 6

Working Scientifically	• 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**	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.	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	<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 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. <u>Recording</u> Children will record data and results of Increasing complexity using scientific diagrams and labels, classification keys,	How does light travel? How do we see things? What do mirrors do to light? How do we see colours? Why do shadows have the same shape as the object that casts them? What is the circulatory system? How does diet effect growth? Are all drugs bad for you? How is water used within the body? What is blood made of? What are the main organs within the human body? What are the main systems of the human body?	Light travels slower through different materials like water and glass. We see different colours because each colour has its own wavelength. InfraRed rays are invisible to humans. Light travels nearly 900,000 times faster than sound. A prism splits a beam of light into the colours of the visible spectrum. The heart beats 2.5 billion times during the life of a 75-year-old. Blood is a mixture of fluid, plasma, white and red blood cells. Red blood cells transport oxygen to every cell and remove carbon dioxide.	Absorb Refract Prism Lens Ray Beam Focal point Blood vessel Circulatory system Plasma Platelets	Optician visit Planting and growing plants in classroom and outdoors. Cooking Lessons Healthy Nutrition Planting and growing plants in classroom and outdoors. 50 things: Go on a night time walk (residential) 50 things: Climb a tree (residential)		Outstanding science Hamilton trust
Animals Including Humans	Pupils should be taught to: 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 within animals, including humans	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 within animals, including humans	tables, scatter graphs, bar and line graphs. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <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. 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. <u>Evaluating</u> Children will use test results to make predictions to set up further comparative and fair tests. Suggest investigation improvements including accuracy of results. Provide some simple examples of how to extend the investigation.	**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.			

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**	Pupils should be taught to: 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	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	<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 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. <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. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	How has electricity changed over time? What are the different symbols on an electrical circuit? What are the effects of differing voltages in a circuit? What happens if you increase or decrease the voltage on differing parts of the circuit?	Lightning is caused by the discharge of electricity in the atmosphere. Electricity was first discovered in 600BC by the Ancient Greeks. Kilowatt is a unit used for measuring electrical power.	Alternating Direct current Battery Motor Buzzer Voltage	Engineering/Problem solving STEM visit Careers/ Aspirations/science week Spring 1 Re Think Food indoor garden project Planting and growing plants in classroom and outdoors.		Outstanding science Hamilton trust
				Possible Misconceptions: 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. 2.Misconceptions: Current gets less as it passes through components. 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. 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.				

			<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. 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. <u>Evaluating</u> Children will use test results to make predictions to set up further comparative and fair tests. 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** **Living Things and Their Habitats**	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. 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	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 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>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 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. <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. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. <u>Interpreting Results</u> Children will use scientific evidence to answer questions	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
				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. 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. 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.				

			Identify scientific evidence that has been used to support or refute ideas or arguments. 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. <u>Evaluating</u> Children will use test results to make predictions to set up further comparative and fair tests. Suggest investigation improvements including accuracy of results. Provide some simple examples of how to extend the investigation.				
Oracy opportunities for summer Term	Hot seating: asking Darwin questions about evolution and inheritance.						