St. Peter and St. Paul's RC Primary School

Science- Unit and Progression Overview

Holding God's hand,
we grow in faith together,
we dream, believe, achieve.
Following the footsteps of Jesus,
we act with love,
we care for one another
and our world.

Subject Long Term Plan

Nursery		
Communication and Language	**Personal, Social and Emotional Development**	**Understanding the World**
• Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"	• Make healthy choices about food, drink, activity and toothbrushing.	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the 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 different forces they can feel. • Talk about the differences between materials and changes they notice.
Reception		
Communication and Language	**Personal, Social and Emotional Development**	**Understanding the World**

• Learn new vocabulary.
• Ask questions to find out more and to check what has been said to them.
• Articulate their ideas and thoughts in well-formed sentences.
• Describe events in some detail.
• Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.
• Use new vocabulary in different contexts.
	• Know and talk about the different factors that support their overall health and wellbeing:
	  • Regular physical activity
	  • Toothbrushing
	  • Sensible amounts of 'screen time'
	  • Having a good sleep routine
	  • Being a safe pedestrian
		• Explore the natural world around them.
		• Describe what they see, hear and feel while they are outside.
		• 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.

Early Learning Goal: Listening, Attention and Understanding	**Early Learning Goal: Managing Self**	**Early Learning Goal: The Natural World**
• Make comments about what they have heard and ask questions to clarify their understanding.	• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.	• 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

Seasonal Changes	**Sensitive Bodies**	**Introduction to Plants**
Reflecting on their own experiences, children learn about the four seasons and the weather associated with each. Pupils explore how seasonal changes affect trees, daylight hours and our choices about outfits. They plan and carry out their own weather reports, considering the knowledge required for this job.	Familiarising themselves with the basic parts of the human body, children investigate their senses through stimulating experiences that highlight how we interact with the world around us. They work scientifically, using their senses to make observations, spot patterns and use data to answer questions. They develop an understanding of how science can support those who have lost sensory function and consider how firefighters use their senses at work	Venturing outside, children identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. They use magnifying glasses to observe and name plant parts and draw and label diagrams of flowers. Children closely observe leaves and sort them into groups based on their appearance. They use non-standard units to measure leaf length and record their observations in a table. Pupils investigate if beans need water for growth and identify edible plant parts.
Concepts Forces, Earth and space Working scientifically Science in action	**Concepts** Animals, including humans Working scientifically Science in action	**Concepts** Plants Working scientifically Science in action
National Curriculum **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • gathering and recording data to help in answering questions **Seasonal changes** Pupils should be taught to: • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Animals, including humans** Pupils should be taught to: • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **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

Skills

Posing questions

- Exploring the world around them and raising their own simple questions.

Predicting

- Suggesting what might happen, often justifying with personal experience.

Observing (qualitative data)

- Using their senses to describe, in simple terms, what they notice or what has changed.

Researching

- Gathering specific information from one simplified, specified source.

Recording (tables)

- Using a prepared table to record tally frequency.

Graphing

- Representing data using pictograms.

Analysing and drawing conclusions

- Using their results to answer simple questions.

Knowledge

To know:

- The name and order of the four seasons; spring, summer, autumn and winter.
- That it is unsafe to look directly at the Sun.
- The weather associated with the four seasons and how it changes (in the UK).
- That day length varies across the four seasons, with fewer daylight hours in the winter and more in the summer.

Science in action

To know:

- To know about a range of jobs and careers that use scientific knowledge and methods, e.g. weather reporter.

Sensitive Bodies

Skills

Posing questions

- Recognising there are different types of enquiry (ways to answer a question).

Observing (qualitative data)

- Using their senses to describe, in simple terms, what they notice or what has changed.

Measuring (quantitative data)

- Using non-standard units to measure and compare.

Recording (diagrams)

- Drawing and labelling simple diagrams.

Recording (tables)

- Using a prepared table to record results including numbers and simple observations.

Grouping and classifying

- Grouping based on visible characteristics.

Analysing and drawing conclusions

- Using their results to answer simple questions.

Knowledge

To know:

- The key parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth and teeth).
- The five main senses: sight, smell, hearing, taste and touch.
- The skin is used for touch, the tongue is used for taste, the nose is used for smell, the eyes are used for sight and the ears are used for hearing.

Science in action

To know:

- A range of jobs and careers that use scientific knowledge and methods.
- About the work of modern-day scientists.
- There are spiritual, moral, social and cultural links with Science.

Plants

Skills

Posing questions

- Exploring the world around them and raising their own simple questions.
- Recognising there are different types of enquiry (ways to answer a question).
- Responding to suggestions on how to answer questions.

Planning

- With support, deciding if suggested observations are suitable.
- Ordering a simple method.

Predicting

- Suggesting what might happen, often justifying with personal experience.

Observing (qualitative data)

- Using their senses to describe, in simple terms, what they notice or what has changed.

Measuring (quantitative data)

- Using non-standard units to measure and compare.

Researching

- Gathering specific information from one simplified, specified source.

Recording (diagrams)

- Drawing and labelling simple diagrams.

Recording (tables)

- Using a prepared table to record results including:
    - numbers;
    - simple observations.

Grouping and classifying

- Grouping based on visible characteristics.

Analysing and drawing conclusions

- Using their results to answer simple questions.
- Beginning to recognise when results or observations do not match their predictions.

Knowledge

To know:

- A variety of common plants and how they differ.
- That deciduous trees lose their leaves seasonally but evergreen trees do not.
- The basic structure, including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches and stem, of a variety of common plants, including flowering plants and trees.
- To begin to understand how plants grow and change over time.

Science in action

To know:

- About famous scientists throughout history.
- About the work of modern-day scientists.
- There are spiritual, moral, social and cultural links with Science.

Everyday Materials	**Comparing Animals**	**Making Connections- Investigating science through stories**
Identifying the difference between objects and materials, children explore their surroundings to find examples of each. They work scientifically by planning tests, making observations and recording data. Pupils use results to answer questions and sort and group materials based on their properties.	Studying both local and global animals, children recognise common characteristics and physical features. They use this information to make comparisons and classify animals. Pupils consider the most effective way to collect data about class pets and record their findings in a block chart. They develop their understanding of classification by comparing the dietary habits of different animals and role play as Jane Goodall carrying out research into chimpanzees in the wild.	Using picture books and hands-on outdoor activities, children broaden their understanding of plants and animals. They gather and record data to find out if taller trees have larger trunks and recap the features of different animal groups. They identify animals by closely observing footprints and construct waterproof animal homes with natural materials. Pupils sort birds according to their diet and seek patterns in their physical characteristics.
Concepts Materials Working scientifically	**Concepts** Animals, including humans Working scientifically Science in action	**Concepts** Plants Animals, including humans Forces, Earth and space Materials Working scientifically Science in action
National Curriculum **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Everyday Materials** Pupils should be taught to: • distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Animals, including humans** Pupils should be taught to: • 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)	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Making Connections** 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 • 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 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 • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies

Everyday Materials

Skills

Posing questions

- Responding to suggestions on how to answer questions.

Planning

- Beginning to recognise whether a planned test is fair.
- With support, deciding if suggested observations are suitable.

Predicting

- Suggesting what might happen, often justifying with personal experience.

Observing (qualitative data)

- Using their senses to describe, in simple terms, what they notice or what has changed.

Recording (tables)

- Using a prepared table to record results including simple observations.

Grouping and classifying

- Grouping based on visible characteristics.

Analysing and drawing conclusions

- Using their results to answer simple questions.
- Beginning to recognise when results or observations do not match their predictions.

Knowledge

To know:

- That objects are items or things.
- That a material is what an object is made from.
- A variety of everyday materials, including wood, plastic, glass, metal, water and rock.
- That property refers to how a material can be described.
- Materials can be grouped based on their physical properties.

Comparing Animals

Skills

Posing questions

- Recognising there are different types of enquiry (ways to answer a question).
- Responding to suggestions on how to answer questions.

Planning

- With support, deciding if suggested observations are suitable.

Observing (qualitative data)

- Using their senses to describe, in simple terms, what they notice or what has changed.

Researching

- Gathering specific information from one simplified, specified source.

Recording (diagrams)

- Drawing and labelling simple diagrams.

Grouping and classifying

- Grouping based on visible characteristics.

Graphing

- Representing data using pictograms and block charts.

Analysing and drawing conclusions

- Using their results to answer simple questions.

Knowledge

To know:

- A variety of common animals (including fish, amphibians, reptiles, birds and mammals).
- The main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns, tusks and shell).
- A carnivore is an animal that eats other animals and to give some examples.
- A herbivore is an animal that eats only plants and to give some examples.
- An omnivore is an animal that eats both animals and plants and to give some examples.

Science in action

To know:

- About famous scientists throughout history.

Making Connections- Investigating science through stories

Skills

Posing questions

- Exploring the world around them and raising their own simple questions.
- Recognising there are different types of enquiry (ways to answer a question).
- Responding to suggestions on how to answer questions.

Planning

- Beginning to recognise whether a planned test is fair.
- With support, deciding if suggested observations are suitable.

Predicting

- Suggesting what might happen, often justifying with personal experience.

Observing (qualitative data)

- Using their senses to describe, in simple terms, what they notice or what has changed.

Measuring (quantitative data)

- Beginning to use standard units and read simple scales to measure and compare.
- Beginning to use simple measuring equipment to make approximate measurements.

Researching

- Gathering specific information from one simplified, specified source.

Recording (tables)

- Using a prepared table to record results including:
    - numbers;
    - simple observations.

Grouping and classifying

- Grouping based on visible characteristics.

Analysing and drawing conclusions

- Using their results to answer simple questions.
- Beginning to recognise when results or observations do not match their predictions.

Knowledge

This unit revises the following key knowledge from the previous Year 1 units:

Plants

To know:

- The basic structure, including leaves, flowers (blossom), fruit, roots, bulb, seed, trunk, branches and stem, of a variety of common plants, including flowering plants and trees.
- How plants grow and change over time.

Animals, including humans

To know:

		• A variety of common animals (including fish, amphibians, reptiles, birds and mammals). • The main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks and shell). • The diets of carnivores, herbivores and omnivores and give examples. **Everyday materials** To know: • A variety of everyday materials, including wood, plastic, glass, metal, water and rock. • Property refers to how a material can be described. • The physical properties of a variety of everyday materials. **Seasonal changes** To know: • The name and order of the four seasons: spring, summer, autumn and winter. • The weather associated with the four seasons and how it changes (in the UK). **Science in action** • To know about a range of jobs and careers that use scientific knowledge and methods.

Year 2		
Habitats Considering the life processes that all living things have in common, pupils classify objects into alive, was once alive or has never been alive. Pupils explore global habitats, naming plants and animals that can be found there. They learn how a range of different living things depend on each other for food or shelter. Pupils explore this further by creating food chains to show the sequence that living things eat each other for energy to grow and stay healthy.	**Uses of Everyday Materials** Building on their knowledge of everyday materials and their properties, pupils recognise that materials are suited to specific purposes and explore how actions such as stretching and bending affect the shape of solid objects. They compare the suitability of materials; gather and record data in tables and block graphs and use their results to answer questions. Children learn about the harmful effects of plastic and explore eco-friendly alternatives.	**Plant Growth** Carrying out comparative tests, pupils identify the conditions required for seed germination and compare these to the survival needs of plants in later growth phases. Pupils use rulers to measure stem growth and record data in a table. They use their results to conclude that plants need water, light and a suitable temperature to grow and stay healthy. Children identify the stages in a plant's life cycle and discover how humans impact plants in the environment.
Concepts Living things and their habitats Working scientifically	**Concepts** Materials Working scientifically	**Concepts** Plants Working scientifically
National Curriculum **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • identifying and classifying • gathering and recording data to help in answering questions **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	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Uses of everyday materials** Pupils should be taught to:	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Plants** Pupils should be taught to:

• identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • identify and name a variety of plants and animals in their habitats, including microhabitats • 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	• identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	• 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

Habitats
Skills
Posing questions
• Exploring the world around them and raising their own simple questions.
• Recognising there are different types of enquiry (ways to answer a question).
Researching
• Gathering specific information from one simplified, specified source.
Recording (tables)
• Using a prepared table to record results including simple observations.
Grouping and classifying
• Grouping based on visible characteristics.
 	
Knowledge
• To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition.
• To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes.
• To know a variety of plants and animals and describe some differences.
• To name a variety of habitats, including woodland, ocean, rainforest and coastal.
• To know that a habitat is the environment where an animal or plant lives/grows because it provides what they need to survive.
• To know that living things depend upon each other (e.g. for food, shelter.)
• To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals.
	Uses of Everyday Materials
	Skills
	Posing questions
	• Recognising there are different types of enquiry (ways to answer a question).
	Measuring (quantitative)
	• Using non-standard units to measure and compare.
	Recording (tables)
	• Using a prepared table to record results including numbers.
	Grouping and classifying
	• Grouping based on visible characteristics.
	Graphing
	• Representing data using pictograms and block graphs.
	Analysing and drawing conclusions
	• Using their results to answer simple questions.
	
	Knowledge
	To know:
	• Objects are made from materials that suit their uses.
	• One material can be used for a range of purposes.
	• Different materials can be used for the same purpose.
	• A push or pull must be applied to change the shape of a solid object.
	• Solid objects can be stretched, twisted, bent or stretched.
	• Different solid objects may take different amounts of force to change shape.
	Science in action
	To know:
	• A range of jobs and careers that use scientific knowledge and methods.
	• Science in the news and recent discoveries.
	• Spiritual, moral, social and cultural links with Science.
		Plant Growth
		Skills
		Posing questions
		• Exploring the world around them and raising their own simple questions.
		• Recognising there are different types of enquiry (ways to answer a question).
		• Responding to suggestions on how to answer questions.
		Planning
		• Beginning to recognise whether a planned test is fair.
		• With support, deciding if suggested observations are suitable.
		Predicting
		• Suggesting what might happen, often justifying it with personal experience.
		Observing
		• Using their senses to describe, in simple terms, what they notice or what has changed.
		Measuring (quantitative data)
		• Beginning to use standard units and read simple scales to measure and compare.
		• Beginning to use simple measuring equipment to make approximate measurements.
		Recording (diagrams)
		• Drawing and labelling simple diagrams.
		Recording (tables)
		• Using a prepared table to record results including:
		  ○ numbers;
		  ○ simple observations.
		Analysing and drawing conclusions
		• Using their results to answer simple questions.
		• Beginning to recognise when results or observations do not match their predictions.
		Knowledge
		To know:
		• Seeds and bulbs grow into seedlings by producing roots and shoots.
		• Seedlings grow into mature plants by developing parts such as roots, stems, leaves and flowers.
		• Seeds need water and warmth to germinate.
		• Plants need water, light and a suitable temperature for growth and health.
		Science in action
		To know:

		• A range of jobs and careers that use scientific knowledge and methods.
Microhabitats Developing their understanding of scientific enquiry, pupils learn that scientists use a range of skills to answer questions. They discover that microhabitats provide what minibeasts need to survive and carry out a survey to find out where different minibeasts live in the school grounds. They practise asking scientific questions and follow a method to investigate which conditions woodlice prefer. Pupils explore the job role of a botanist by identifying flowering plants.	**Life cycles and Health** Studying the life cycles of various animals, children learn what animals need to survive and how they change over time. Pupils collect data that allows them to observe changes in their peers, while also developing their ability to take measurements and record data. They consider how scientific knowledge helps people to make healthy choices.	**Making Connections- Plant-based materials** Identifying ways to reduce, reuse and recycle, children draw on their knowledge of properties to invent creative uses for old objects. They discover some natural materials derived from plants and look at the processes involved in making paper. Using their observational skills, they conduct simple tests to choose the most suitable material for homemade plant pots, venturing outdoors to find natural materials to decorate them.
Concepts Living things and their habitats Working scientifically	**Concepts** Animals, including humans Working scientifically Science in action	**Concepts** Plants Animals, including humans Working scientifically
National Curriculum **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Living things and their habitats** Pupils should be taught to: • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • identify and name a variety of plants and animals in their habitats, including microhabitats	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Animals, including humans** Pupils should be taught to: • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions **Making Connections** Pupils should be taught to: • explore and compare the differences between things that are living, dead, and things that have never been alive. • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
Microhabitats **Skills** **Posing questions** • Exploring the world around them and raising their own simple questions. • Recognising that there are different types of enquiry (ways to answer a question). • Responding to suggestions on how to answer questions. **Planning** • With support, deciding if suggested observations are suitable. • Ordering a simple method. **Predicting**	**Life cycles and Health** **Skills** **Posing questions** • Recognising there are different types of enquiry (ways to answer a question). **Measuring (quantitative data)** • Beginning to use standard units and read simple scales to measure and compare. • Beginning to use simple measuring equipment to make approximate measurements. **Researching** • Gathering specific information from one simplified, specified source.	**Making Connections- Plant-based materials** **Skills** **Posing questions** • Exploring the world around them and raising their own simple questions. • Recognising there are different types of enquiry (ways to answer a question). • Responding to suggestions on how to answer questions. **Planning** • Beginning to recognise whether a planned test is fair. • With support, deciding if suggested observations are suitable. **Predicting**

• Suggesting what might happen, often justifying with personal experience.
Observing (qualitative data)
• Using their senses to describe, in simple terms, what they notice or what has changed
Researching
• Gathering specific information from one simplified, specified source.
Recording (tables)
• Recording results using simple observations and tally frequency.
Classification keys
• Organising questions to create a simple classification key.
Analysing and drawing conclusions
• Using results to answer simple questions.
• Beginning to recognise when results or observations do not match their predictions.
 	
Knowledge
To know:
• A variety of plants and animals and describe some differences.
• That a habitat is the environment where an animal or plant lives/grows, because it provides what they need to survive.
• That a microhabitat is a very small habitat (e.g. under stones, logs and leaf litter).
• That living things depend upon each other (e.g. for food, shelter).
	Recording (tables)
	• Using a prepared table to record results including numbers.
	Analysing and drawing conclusions
	• Using their results to answer simple questions.
	
	Knowledge
	To know:
	• That baby, toddler, child, teenager and adult are human life cycle stages.
	• There are differences in the life cycles of different animals.
	• Humans grow as they age.
	• The basic survival needs of animals are air, water and food.
	• Personal hygiene prevents the spread of germs.
	• Washing our hands and changing our clothes are ways to keep clean.
	• Exercise can improve performance and well-being.
	• The five food groups are carbohydrates, fruits and vegetables, dairy and alternatives, protein and oils and spreads.
	• Humans require a balanced diet to stay healthy.
		• Suggesting what might happen, often justifying it with personal experience.
		Observing (qualitative data)
		• Using their senses to describe, in simple terms, what they notice or what has changed.
		Researching
		• Gathering specific information from one simplified, specified source.
		Recording (tables)
		• Using a prepared table to record results including:
		  ○ numbers;
		  ○ simple observations.
		Grouping and classifying
		• Grouping based on visible characteristics.
		Analysing and drawing conclusions
		• Using their results to answer simple questions.
		• Beginning to recognise when results or observations do not match their predictions.
		
		Knowledge
		Plants
		To know:
		• Seeds and bulbs grow into seedlings by producing roots and shoots.
		• Seeds need water and warmth to germinate.
		• Plants need water, light and a suitable temperature for growth and health.
		Living things and their habitats
		To know:
		• Some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition.

Year 3		
<u>Movement and Nutrition</u> Studying the human skeleton, children identify key bones and compare them to other animals explaining the role within the body. Pupils explore how changes in muscles result in movement and the implications these discoveries have in the scientific development of prosthetic limbs. They study how energy is used by the body, what constitutes a balanced diet in humans and how research contributes to nutritionist expertise.	**<u>Rocks and Soils</u>** Studying rocks and their properties, children learn how to classify rocks and identify how they were formed. They look at the work of paleontologists to learn about fossil formation and use models to explore how fossils tell us about the past. Pupils investigate the physical properties of rocks and link these to their particular uses. Pupils also explore soil formation, separate soil using a sedimentation jar and test soil drainage.	**<u>Plant Reproduction</u>** Building on their prior knowledge of plant structures, children describe the functions of named parts and use evidence to explain their significance in plant development. Pupils investigate factors that may affect plant growth and how water is transported. They explore how seeds vary and create models to show seed dispersal methods.
<u>Concepts</u> Animals, including humans Working scientifically Science in action	**<u>Concepts</u>** Materials Working scientifically	**<u>Concepts</u>** Plants Working scientifically

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National Curriculum

Working Scientifically:

Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Animals, including humans

Pupils should be taught to:

- 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

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National Curriculum

Working Scientifically:

Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- using straightforward scientific evidence to answer questions or to support their findings.

Rocks

Pupils should be taught to:

- 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

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National Curriculum

Working Scientifically:

Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

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- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Plants

Pupils should be taught to:

- 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

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Movement and Nutrition

Skills

Measuring

- Using standard units to measure and compare.
- Using measuring equipment with increasing accuracy.
- Reading scales with unmarked intervals between numbers.

Recording

- Using a prepared table to record results including more detailed observations.

Analysing

- Writing a conclusion to summarise findings using simple scientific vocabulary.

Evaluating

- Beginning to identify new questions that would further the enquiry.

Knowledge

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Rocks and Soils

Skills

Observing

- Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.

Researching

- Gathering specific information from a source.

Recording

Beginning to draw more scientific diagrams by:

- Drawing in 2D to produce simple line diagrams.
- Labelling with more scientific vocabulary.

Grouping and classifying

- Grouping based on visible characteristics and measurable properties.

Graphing

- Representing data using bar charts.

Analysing and drawing conclusions

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Plant Reproduction

Skills

Posing questions

- Beginning to raise further questions during the enquiry process.
- Considering what makes a testable question.
- Beginning to recognise that there are different types of enquiry and that they are suitable for different questions.
- Beginning to make suggestions about how different questions could be answered.

Planning

- Beginning to suggest what observations to make and how long to make them for.
- Making predictions about what they think will happen by using scientific knowledge and/or personal experience to explain their prediction.

Observing

- Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.

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To know:

- Animals can be grouped based on the presence of a skeleton.
- The skeleton in humans and some animals is used for movement, protection and support.
- The muscular system in humans and some animals works with the skeleton for movement.
- The main bones in the body.
- Animals, including humans, need the right types and amount of nutrition.
- Humans cannot make their own food and, therefore, eat to get the nutrition needed.
- There are nutrient groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) with their own functions in the body.
- A balanced diet should include all nutrient groups.
- Animals have different diets.

Science in action

To know:

- There are famous scientists throughout history.
- There are a range of jobs and careers that use scientific knowledge and methods.
- Scientific work is taking place with modern-day scientists.
- There are science events in the news and recent discoveries.
- There are methods and equipment used by scientists throughout history that have led to modern methods.
- Scientific knowledge has changed over time, leading to the current understanding of Science.
- There is current scientific research taking place with aims for the future.

- Beginning to suggest how one variable may have affected another.
- Beginning to quote results as evidence of relationships.
- Beginning to use identified patterns to predict new values or trends.

Knowledge

To know:

- That rocks can be grouped based on their appearance or properties (e.g. colour, texture, hardness and permeability).
- That rocks may contain grains, crystals or fossils.
- That grains and crystals appear differently and can be used to classify rocks.
- That soils are made from rocks and dead matter.
- The relationship between the properties of rocks and their uses.
- That fossils can form from the remains of living things.
- That rocks can change over time (e.g. erosion and weathering).

Measuring

- Using standard units to measure and compare.
- Using measuring equipment with increasing accuracy.
- Reading scales with unmarked intervals between numbers.

Recording

- Using a prepared table to record results including more detailed observations.
- Using tables with more than two columns.
- Identifying and adding headings to tables.
- Beginning to design simple results tables.

Grouping and classifying

- Grouping based on visible characteristics and measurable properties.

Graphing

- Reading the value of bars with greater accuracy.

Analysing and drawing conclusions

- Writing a conclusion to summarise findings using simple scientific vocabulary.
- Beginning to suggest how one variable may have affected another.
- Beginning to quote results as evidence of relationships.
- Identifying data that does not fit a pattern (anomalous data).
- Recognising when results or observations do not match their predictions.
- Beginning to use identified patterns to predict new values or trends.

Evaluating

- Beginning to identify steps in the method that need changing and suggest improvements.
- Beginning to identify which variables were difficult to control and suggesting how to better control them.

Knowledge

To know:

- The functions of the basic parts of a plant and the relationship between structure and function.
- Water is transported within a plant from the root, through the stem, to the leaves.
- Plants need water, light, air, nutrients and a suitable temperature for growth and health.
- The needs for growth and health vary from plant to plant.
- The life cycle of a plant from seed to mature plant.
- Flowers are the reproductive organs of a plant.
- Pollination is the transfer of pollen to the female (part of the) flower.
- The process of seed formation is the growth of a seed after pollination.
- Different methods of seed dispersal and the benefits of each

Forces and Magnets	**Light and Shadows**	**Making Connections- Does hand span affect grip and strength?**
Investigating the movement of vehicles on different surfaces, children learn about the impact of friction and compare uses and drawbacks. They broaden their experience in writing scientific methods and recording data as they investigate contact and non-contact forces. Pupils explore the properties of different magnets and use this to understand their uses.	Identifying examples of light sources, children learn that light is needed to see and how its absence causes darkness. Children investigate reflection and shadow formation, including how different factors affect shadows. They explore how shadows can be used to entertain in the arts and create shadow puppets to recount how different people work or experiment with light.	Experimenting, analysing data and drawing conclusions allows children to explore the relationship between hand span and grip strength. They test different gloves to improve grip strength and applying their newfound knowledge to design friction gloves, fostering scientific inquiry and problem-solving skills.
Concepts Forces, Earth And space Working scientifically Science in action	**Concepts** Energy Working scientifically Science in action	**Concepts** Plants Animals, including humans Materials Energy Forces, Earth and space Working scientifically
National Curriculum **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. **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	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. **Light** Pupils should be taught to:	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • using straightforward scientific evidence to answer questions or to support their findings. **Making Connections** Pupils should be taught to: • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • 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.

• compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing	• 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	• compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • compare how things move on different surfaces. • notice that some forces need contact between two objects, but magnetic forces can act at a distance.
Forces and Magnets **Skills** **Planning** • Beginning to select from options which variables will be changed, measured and controlled. • Suggesting what observations to make and how long to make them for. • Planning a simple method, verbally and in writing. **Researching** • Gathering specific information from a variety of sources. **Recording** • Beginning to draw more scientific diagrams by labelling with more scientific vocabulary and using arrows. • Representing data using bar charts. **Analysing** • Writing a conclusion to summarise findings using simple scientific vocabulary. • Beginning to suggest how one variable may have affected another. • Beginning to quote results as evidence of relationships. **Science in action** • Exploring the uses of friction and magnets in everyday life and industry. **Knowledge** To know: • Examples of contact and non-contact forces. • Some forces are a result of contact between two surfaces but some forces can act at a distance (e.g. magnetism). • Magnets have a north and south pole. • Some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other. • Some different examples of magnets, including bar, horseshoe, button and ring. • Some uses of magnets. • Friction is a contact force that acts between two surfaces to slow an object down. • Magnetism is a non-contact force that affects objects containing magnetic metal.	**Light and Shadows** **Skills** **Posing questions** • Beginning to raise further questions during the enquiry process. • Considering what makes a testable question. • Beginning to recognise that there are different types of enquiry and that they are suitable for different questions. • Beginning to make suggestions about how different questions could be answered. **Planning** • Making predictions about what they think will happen by using scientific knowledge and/or personal experience to explain their prediction. **Observing** • Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed. **Measuring** • Using standard units to measure and compare. • Using measuring equipment with increasing accuracy. • Reading scales with unmarked intervals between numbers. **Recording** • Using a prepared table to record results including more detailed observations. • Using tables with more than two columns. • Identifying and adding headings to tables. • Beginning to design simple results tables. **Grouping and classifying** • Grouping based on visible characteristics and measurable properties. **Graphing** • Reading the value of bars with greater accuracy. **Analysing and drawing conclusions** • Writing a conclusion to summarise findings using simple scientific vocabulary. • Beginning to suggest how one variable may have affected another. • Beginning to quote results as evidence of relationships. • Identifying data that does not fit a pattern (anomalous data).	**Making Connections- Does hand span affect grip and strength?** **Skills** This unit revisits the working scientifically skills covered in Year 3, including: • Posing questions. • Planning. • Predicting. • Observing. • Measuring. • Recording. • Graphing. • Analysing and drawing conclusions. • Evaluating. **Knowledge** **Movement and nutrition** To know: • The muscular system in humans and some animals works with the skeleton for movement. • The main food groups (carbohydrates, protein, fats and oils, fibre, vitamins, minerals and water) and their simple functions. **Forces and magnets** To know: • Friction is a contact force that acts between two surfaces to slow an object down. • Rougher surfaces have more friction between them than smoother surfaces. **Rocks and soil** • To understand the relationship between the properties of rocks and their uses. **Light and shadows** • To know that shadows are formed when the light from a light source is blocked by an opaque object. **Plant reproduction** To know: • Flowers are the reproductive organs of a plant. • The process of pollination is the transfer of pollen to the female (part of the) flower. • The process of seed formation is the growth of a seed after pollination.

• The opposite poles of a magnet attract one another and like poles repel one another. • Rougher surfaces have more friction between them than smoother surfaces. • The strength of different magnets may vary.	• Recognising when results or observations do not match their predictions. • Beginning to use identified patterns to predict new values or trends. **Evaluating** • Beginning to identify steps in the method that need changing and suggest improvements • Beginning to identify which variables were difficult to control and suggesting how to better control them. • Beginning to identify new questions that would further the enquiry. **Knowledge** To know: • Light travels from a source (e.g. the Sun, light bulbs and torches). • Light is needed to see things and that dark is the absence of light. • Light from the Sun can be dangerous and how to protect their eyes. • All materials reflect light. • Shadows form when the light from a light source is blocked by an opaque object. • Shadows change as a result of changing the position of the light source and changing the distances between the light source, object and surface. • Shadows change position and length throughout the day as the Sun changes position in the sky. **Science in action** To know: • Famous scientists throughout history. • A range of jobs and careers use scientific knowledge and methods. • There are spiritual, moral, social and cultural links with Science. • Methods and equipment used by scientists throughout history and how these have led to modern methods. • Scientific knowledge has changed over time, leading to the current understanding of Science. • Collaboration and peer reviewing are essential for effective scientific progress	

Year 4		
<u>Digestion and Food</u> Using models, children describe the function of key organs in the digestive system. Pupils identify the types of human teeth to create their own model and investigate factors that impact our dental health. They compare human teeth to other	**<u>States of Matter</u>** Investigating the properties of solids, liquids and gases, children learn about the different states of matter. They explore changes of state using relatable examples and use this to explain changes to water through the water cycle.	**<u>Classification and Changing Habitats</u>** Identifying different ways to group living things, children make classification keys to explore which grouping methods are most effective. Pupils study ways habitats change over time and understand that humans can have both positive and

animals' and consider this in the light of prior knowledge about predators, prey and food chains. Children take on the role of a naturalist investigating animal faeces for clues about diet, digestion and dentition.	Pupils investigate the relationship between temperature and rate of evaporation while broadening their experience of working scientifically.	negative effects on their surroundings. They play the role of conservationists and design conservation pamphlets.
Concepts Animals, including humans Working scientifically	**Concepts** Materials Working scientifically	**Concepts** Living things and their habitats Working scientifically
National Curriculum **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. **Living things and their habitats** Pupils should be taught to: • recognise that living things can be grouped in a variety of ways **Animals, including humans** Pupils should be taught to: • 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	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • using straightforward scientific evidence to answer questions or to support their findings. **States of matter** Pupils should be taught to: • 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	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. **Living things and their habitats** Pupils should be taught to: • 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 **Animals, including humans** Pupils should be taught to: • construct and interpret a variety of food chains, identifying producers, predators and prey.
Digestion and Food **Skills** **Planning** • Beginning to select from options which variables will be changed, measured and controlled. **Recording** • Beginning to design simple results tables.	**States of Matter** **Skills** **Posing questions** • Considering what makes a testable question. **Measuring** • Using standard units to measure and compare. • Using measuring equipment with increasing accuracy.	**Classification and Changing Habitats** **Skills** **Observing** • Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed. **Recording** • Recording data in Carroll and Venn diagrams.

Grouping and classifying • Grouping based on visible characteristics and measurable properties. **Analysing and drawing conclusions** • Beginning to suggest how one variable may have affected another. • Beginning to use identified patterns to predict new values or trends. **Evaluating** • Beginning to identify steps in the method that need changing and suggest improvements. • Beginning to identify which variables were difficult to control and suggesting how to better control them. • Commenting on the degree of trust by reflecting on the quality of results (accurate measurements and maintaining control variables). **Knowledge** • To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions. • To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions. • To know that teeth can be damaged, including the effect of sugary and acidic food. • To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly. • To describe the teeth of carnivores and herbivores, and understand why they are different. • To know that predators hunt for their food and prey are the animals being hunted. • To know that producers make their own food. • To know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on	**Recording** • Drawing in 2D to produce simple line diagrams. • Labelling diagrams with more scientific vocabulary. **Researching** • Gathering specific information from a variety of sources. **Analysing and drawing conclusions** • Beginning to use identified patterns to predict new values or trends. • Writing a conclusion to summarise findings using simple scientific vocabulary. **Knowledge** To know • That all substances around us can exist as solids, liquids and gases. • That a property of a solid is that it keeps its shape unless a force is applied to it. • That a property of a liquid is that it can flow freely and take on the shape of a container. • That a property of a gas is that it does not have a fixed shape and can escape from an unsealed container. • That heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating). • That cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing). • That water can exist as a solid, a liquid or a gas. • That the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius. • That water flows around the world in a continuous process called the water cycle. • That in the water cycle, evaporation is when bodies of water are heated and turn into water vapour. • That in the water cycle, condensation is the process of water vapour cooling to form water droplets in clouds, which can result in precipitation. • That the rate of evaporation increases as temperature rises.	• Using a prepared table to record results, including more detailed observations. • Using tables with more than two columns. **Grouping and classifying** • Grouping based on visible characteristics and measurable properties. • Populating a pre-prepared branching and number key. • Choosing appropriate questions for classification keys. **Researching** • Gathering specific information from a variety of sources. **Knowledge** To know: • Living things can be grouped in different ways. • A classification key can be used to group and identify plants and animals. • Vertebrates are animals that have a backbone and invertebrates are animals that do not have a backbone. • Plants can be grouped into flowering or non-flowering varieties. • Flowering plants include grasses and non-flowering plants include ferns and mosses. • There are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish. • Invertebrate groups include snails, slugs, worms, spiders and insects. • Habitats can change throughout the year, which can be dangerous for living things. • Humans can have both a positive and negative impact on the environment.
Electricity and Circuits Exploring appliances that use electricity in their setting, children learn how to work with electricity safely and build circuits. Pupils investigate electrical conductors and insulators and explore the relationship between the number of bulbs and bulb brightness. Real scenarios and historical discoveries inform children about scientific progression and home safety.	**Sound and Vibration** Exploring different ways of producing sounds, children learn about the relationship between vibrations and what they hear. They study dolphins and whales to develop their understanding of how sound travels between objects and investigate the role of insulation to protect our ears. Pupils explore how pitch and volume can be altered and make their own musical instruments to demonstrate these principles.	**Making Connections-How does the flow of liquids compare?** Revising the states of matter, children consider methods for measuring how liquids flow differently from each other. They plan and execute an enquiry, considering different ways of representing data to support a conclusion. Revisiting the digestive system, the children explore how the flow of different liquids should be considered when producing different medicines.

Concepts Energy Working scientifically	**Concepts** Energy Working scientifically	**Concepts** Animals, including humans Living things and their habitats Materials Energy Working scientifically
National Curriculum **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. **Electricity** Pupils should be taught to: • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. **Sound** Pupils should be taught to: • 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	**National Curriculum** **Working Scientifically:** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings. **Making Connections** Pupils should be taught to: • describe the simple functions of the basic parts of the digestive system in humans. • compare and group materials together, according to whether they are solids, liquids or gases. • recognise that vibrations from sounds travel through a medium to the ear.
Electricity and Circuits **Skills** **Posing questions** • Considering what makes a testable question. • Beginning to recognise that there are different types of enquiry and that they are suitable for different questions.	**Sound and Vibration** **Skills** **Planning** • To suggest what observations to make and how long to make them for**.** **Observing** • To observe closely how different instruments create a sound. **Researching**	**Making Connections-How does the flow of liquids compare?** **Skills** This unit revisits the working scientifically skills covered in Year 4, including: • Posing questions. • Planning.

- Beginning to make suggestions about how different questions could be answered.

Planning

- Planning a simple method, verbally and in writing.
- Beginning to write a simple method in numbered steps.
- Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.

Predicting

- Making predictions about what they think will happen by predicting a trend by considering how the changing variable will affect the measured variable.

Observing

- Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.

Recording

- Beginning to draw scientific diagrams that are in 2D and simple line diagrams.
- Using a prepared table to record results including more detailed observations.
- Using tables with more than two columns.
- Identifying and adding headings to tables.
- Beginning to design simple results tables.

Grouping and classifying

- Grouping based on visible characteristics and measurable properties.

Analysing and drawing conclusions

- Writing a conclusion to summarise findings using simple scientific vocabulary.
- Beginning to suggest how one variable may have affected another.
- Beginning to use identified patterns to predict new values or trends.

Knowledge

To know:

- That all electrical appliances need a power source, including batteries or mains electricity.
- That an electrical circuit needs a complete path for the electrical charge to flow through.
- The main components in a series circuit.
- The precautions for working safely with electricity.
- That some materials allow electric charge to pass through them quickly and these are known as electrical conductors (e.g. metals).
- That some materials do not allow electrical charge to pass through them easily and these are known as electrical insulators (e.g wood and plastic).

- To research how cetaceans communicate underwater.

Recording

- To present results using a bar chart.
- To design simple results tables.

Analysing and drawing conclusions

- To identify when results or observations do not match predictions.

Knowledge

To know:

- Sound is a result of vibrations.
- Vibrations from sounds travel through mediums to the ear.
- An insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds.
- Different materials provide different amounts of insulation against sound.
- A variety of ways to change the pitch or volume of a sound.
- Quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds.
- Stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds.
- Sounds get fainter as the distance from the sound source increases.

- Predicting.
- Observing.
- Measuring.
- Recording.
- Graphing.
- Analysing and drawing conclusions.
- Evaluating.

Knowledge

<u>States of matter</u>

To know:

- How to compare and group materials together, according to whether they are solids, liquids or gases.
- The part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Classification and changing habitats

To know:

- And use classification keys to help group, identify and name a variety of living things in their local and wider environment.
- Environments can change and that this can sometimes pose dangers to living things.

Electricity and circuits

To know:

- A switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
- Some common conductors and insulators, and associate metals with being good conductors.

Sound and vibrations

To know:

- How sounds are made, associating some of them with something vibrating.
- Vibrations from sounds travel through a medium to the ear.

Digestion and food

- To know the simple functions of the basic parts of the digestive system in humans.

• That metals are used for cables and wires because they are good conductors of electricity. • That plastic is used to cover cables and wires because it is a good insulator. • That an open switch breaks a series circuit so the components will be off. • That a closed switch completes a series circuit so the components will be on. • The relationship between bulb brightness and the number of bulbs in a circuit.		

Year 5		
Mixtures and Separation Pupils explore different types of mixtures and the different methods that can be used to separate them. They dissolve a range of substances, identify different solutions and investigate how temperature affects the time taken to dissolve. They design and create a water filter, sieve soil and evaporate solutions.	**Earth & Space** Exploring some of the key celestial bodies in our Solar System, children learn their names and compare their movements. Pupils discover the relationship between the Earth's rotation and daylight, making models to represent their knowledge. They make their own sundials and consider how and why humans' ideas about the universe have changed over time.	**Unbalanced Forces** Building on their knowledge of forces, children explore gravity, air resistance and water resistance in more depth and consider the effect of these forces being unbalanced. They demonstrate key principles in the classroom and plan investigations to further their understanding of the effects of these forces. Pupils test their ideas using models and compete to build the most effective pulley system.
Concepts Materials Working scientifically	**Concepts** Forces, Earth and space Working scientifically Science in action	**Concepts** Forces, Earth and space Working scientifically Science in action
National Curriculum **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations **Properties and changes of materials** Pupils should be taught to:	**National Curriculum** **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • identifying scientific evidence that has been used to support or refute ideas or arguments **Earth and space** Pupils should be taught to: • 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	**National Curriculum** **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments

- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- demonstrate that dissolving, mixing and changes of state are reversible changes

Forces

Pupils should be taught to:

- 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

Mixtures and Separation

Skills

Researching

- Gathering answers to open-ended questions from a variety of sources.

Recording (diagrams)

- Labelling with a broader range of scientific vocabulary.
- Annotating diagrams to explain concepts and convey opinions.

Posing questions

- Selecting the most appropriate enquiry method to answer questions and give justification.

Observing (qualitative data)

- Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.

Planning

- Suggesting which variables will be changed, measured and controlled.
- Making and explaining decisions about what observations to make and how long to make them for.

Knowledge

To know:

- Some substances will dissolve in a liquid to form a solution.
- The factors that affect the time taken to dissolve, including temperature and stirring.
- Some liquids and solids can be separated using sieving, filtering and evaporation and to describe these processes.

Earth & Space

Skills

Posing questions

- Raising questions throughout the enquiry process.
- Identifying testable questions.
- Selecting the most appropriate enquiry method to answer questions and give justification.

Recording

- Drawing scientific diagrams by:
  - Using a wider range of standard symbols.
  - Drawing with increasing accuracy.
  - Labelling with a broader range of scientific vocabulary.
  - Annotating diagrams to explain concepts and convey opinions.
- Suggesting headings to tables, including units.
- Designing results tables with increasing independence with consideration of variables where applicable.

Analysing and drawing conclusions

- Using identified patterns to predict new values or trends.

Knowledge

To know

- The Sun is a star at the centre of our Solar System.
- The Sun, Earth and Moon are approximately spherical bodies.
- The names, order and relative positions of the planets and other main celestial bodies.
- A moon is a celestial body that orbits a planet and give examples of moons that orbit other planets.
- The Earth and other planets orbit around the Sun.
- The tilt of the Earth and its orbit around the Sun causes the seasons.
- The Moon orbits around the Earth.
- How the Earth's rotation causes day and night and the apparent movement of the Sun across the sky.

Science in action

To know

- To know about famous scientists throughout history.

Unbalanced Forces

Skills

Planning

- Suggesting which variables will be changed, measured and controlled.
- Making and explaining decisions about what observations to make and how long to make them for.
- Writing a method that includes details about how to ensure control variables are kept the same.
- Writing a method that considers reliability by planning repeated readings.
- Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.

Measuring

- Using standard units to measure and compare with increasing precision (decimals).
- Reading a wider variety of scales with unmarked intervals between numbers.

Recording

- Drawing scientific diagrams by:
  - using a wider range of standard symbols;
  - drawing with increasing accuracy;
  - labelling with a broader range of scientific vocabulary;
  - annotating diagrams to explain concepts and convey opinions.
- Using tables with columns that allow for repeat readings.
- Suggesting headings to tables, including units.
- Designing results tables with increasing independence with consideration of variables where applicable.
- Calculating the mean average.

Graphing

- Representing data by using line graphs and scatter graphs.
- Plotting points with greater accuracy.
- Reading the value of plotted points with greater accuracy.

Analysing and drawing conclusions

- Writing a conclusion to summarise findings using increasingly complex scientific vocabulary.

	• To know how scientific knowledge has changed over time, leading to the current understanding of Science. • To know that mistakes can lead to new discoveries. • To know about the work of modern day scientists. • To know about science in the news and recent discoveries • To know about the methods and equipment used by scientists throughout history and how these have led to modern methods. • To know about current scientific research and what it aims to achieve in the future. • To know that collaboration and peer reviewing is essential for effective scientific progress.	• Suggesting with increasing independence how one variable may have affected another. • Quoting relevant data as evidence of relationships. • Identifying anomalies in repeat data and excluding results where appropriate. • Comparing individual, class and/or model data to the prediction and recognising when they do not match. • Using identified patterns to predict new values or trends. **Evaluating** • Identifying steps in the method that need changing and suggesting improvements. • Identifying which variables were difficult to control and suggesting how to control them better. • Commenting on the degree of trust by also reflecting on: ○ accuracy (human error with equipment); ○ reliability (repeating results); ○ sources of information (e.g. websites, books). • Deciding what data to collect to test direct relationships further. **Knowledge** To know: • Gravity is a non-contact force that pulls objects together. • Air resistance and water resistance are both types of friction. • Unsupported objects fall towards the Earth because of gravity. • Friction, air resistance and water resistance act in the opposite direction of a moving object. • When forces are unbalanced, the speed, shape or direction of an object changes. • When forces are balanced, the speed, shape or direction of an object stays the same. • Some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. • Rougher surfaces have more friction between them than smoother surfaces and how that may affect movement. • The larger the surface area of an object, the greater the air or water resistance it creates. **Science in action** To know: • About famous scientists throughout history.
<u>Properties and Changes</u> Broadening their experience of the properties of materials, children investigate hardness, transparency and conductivity and consider how these properties influence the uses of materials. They explore reversible changes, including	**<u>Life Cycles and Reproduction</u>** Studying animal life cycles, children learn about the significance of reproduction for a species' survival. Pupils compare asexual and sexual reproduction in plants and grow cuttings to measure and plot root growth over time.	**<u>Human Timeline</u>** Studying human development and changes, children identify key stages and consider what data may help determine if a child is growing normally. They describe how puberty affects girls and boys and produce graphs to compare how gestation periods vary across different mammals, including humans.

dissolving and changes of state. Children compare these to irreversible changes, including rusting, burning and mixing vinegar and bicarbonate of soda.	Children compare the life cycles of mammals, birds, amphibians and insects identifying key differences. They analyse secondary data to investigate how the amphibian life cycle is affected by predators and climate change.	**Making Connections: Does the size of an asteroid affect its impact strength?** Experimenting, analysing data and drawing conclusions to explore the relationship between the size of model asteroids and the size of the impact crater they create. They apply their understanding of gravity, air resistance and the Earth and space to make predictions and plan and carry out an enquiry.
Concepts Materials Working scientifically	**Concepts** Plants Living things and their habitats Working scientifically Science in action	**Human timeline Concepts** Animals, including humans Working scientifically Science in action **Making connections concepts** Living things and their habitats Materials Forces, Earth and space Working scientifically
National Curriculum **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations **Properties and changes of materials** Pupils should be taught to: • 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 • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • 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	**National Curriculum** **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • using test results to make predictions to set up further comparative and fair tests **Living things and their habitats** Pupils should be taught to: • 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	**National Curriculum** **Human Timeline** **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations **Living things and their habitats** Pupils should be taught to: • 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 **Animals, including humans** Pupils should be taught to: • describe the changes as humans develop to old age **Making Connections: Does the size of an asteroid affect its impact strength?** **Making Connections** Pupils should be taught to: • 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

		• use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • describe the Sun, Earth and Moon as approximately spherical bodies • 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
Properties and Changes **Skills** **Planning** • Writing a method including detail about how to ensure control variables are kept the same. **Predicting** • Making increasingly scientific predictions by: ○ using previous scientific knowledge and evidence to inform their predictions; ○ using scientific language to describe a potential outcome or explain why they think something will happen; ○ making links between topics to evidence a prediction. **Measuring (quantitative data)** • Using standard units to measure and compare with increasing precision (decimals). **Recording (tables)** • Suggesting headings to tables, including units. • Designing results tables with increasing independence with consideration of variables where applicable. **Analysing and drawing conclusions** • Writing a conclusion to summarise findings using increasingly complex scientific vocabulary. **Evaluating** • Identifying which variables were difficult to control and suggesting how to better control them. • Commenting on the degree of trust by also reflecting on: ○ accuracy (human error with equipment); ○ reliability (repeating results). **Knowledge** • To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets. To know: • Dissolving, mixing and changes of state are reversible changes. • Some changes result in the formation of new materials, which are usually irreversible (e.g. burning, rusting, the action of acid on bicarbonate of soda).	**Life Cycles and Reproduction** **Skills** **Posing questions** • Raising questions throughout the enquiry process. • Identifying testable questions. **Planning** • Suggesting which variables will be changed, measured and controlled. • Making and explaining decisions about what observations to make and how long to make them for. **Observing** • Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed. **Measuring** • Using standard units to measure and compare with increasing precision (decimals). **Researching** • Gathering answers to open-ended questions from a variety of sources. **Recording** • Representing data by using line graphs and scatter graphs. • Plotting points with greater accuracy. • Reading the value of plotted points with greater accuracy. **Analysing and drawing conclusions** • Suggesting with increasing independence how one variable may have affected another. • Quoting relevant data as evidence of relationships. • Using identified patterns to predict new values or trends. **Knowledge** To know: • A life cycle shows the changes an animal or plant goes through until the reproduction of a new generation when the cycle starts again. • All living things must reproduce for the species to survive.	**Human Timeline** **Skills** **Graphing** • Representing data by using line graphs and scatter graphs. • Plotting points with greater accuracy. • Reading the value of plotted points with greater accuracy. **Analysing and drawing conclusions** • Writing a conclusion to summarise findings using increasingly complex scientific vocabulary. • Suggesting with increasing independence how one variable may have affected another. • Quoting relevant data as evidence of relationships. • Using identified patterns to predict new values or trends. **Evaluating** • Commenting on the degree of trust by also reflecting on the sources of information (e.g. websites, books). • Deciding what data to collect to further test direct relationships. **Knowledge** To know: • How to describe the human life cycle, including the stages of growth and development (baby, toddler, child, teenager, adult, elderly). • How to describe changes that occur during puberty (in boys and girls). • Gestation periods vary across mammals. **Science in action:** To know: • A range of jobs and careers that use scientific knowledge and methods. • The methods and equipment used by scientists throughout history and how these have led to modern methods. **Making Connections: Does the size of an asteroid affect its impact strength?** **Skills**

	• Sexual reproduction requires two parents whereas asexual reproduction only requires one parent. • There are different processes plants and animals use to reproduce (asexual and sexual reproduction). **Science in action** To know: • There are a range of jobs and careers that use scientific knowledge and methods. • There is current scientific research taking place with aims for achievement in the future. • Scientific evidence is used to support or refute ideas or arguments	This unit revisits the working scientifically skills covered in Year 5, including: • Posing questions. • Planning. • Predicting. • Observing. • Measuring. • Recording. • Graphing. • Analysing and drawing conclusions. • Evaluating. **Knowledge** **Earth and space** To know: • The movement of the Earth, and other planets, relative to the Sun in the solar system. • The Sun, Earth and Moon are approximately spherical bodies. **Life cycles and reproduction** • To know the differences in the life cycles of a mammal, an amphibian, an insect and a bird. **Properties and changes** • To understand how to 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. **Unbalanced forces** To know: • Unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • The effects of air resistance, water resistance and friction, that act between moving surfaces. **Mixtures and separation** • To understand how to use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.

Year 6

Classifying big and small	**Evolution and Inheritance**	**Circulation and Health**
Children broaden their knowledge of how vertebrates, invertebrates, plants and micro-organisms are grouped using shared characteristics. They discover how Carl Linnaeus developed the Linnaean and binomial systems for classifying and naming living things. Pupils use and produce classification keys to sort and identify organisms.	Studying patterns in humans and other species, children learn about characteristics that are inherited from parents and those that are environmental. Through the eyes of Darwin and Wallace, pupils understand how observations lead to theories and explore natural selection. By modelling the variation and natural selection of Darwin's finches, they begin to explain how species evolve over time and the role of fossil evidence that supports this theory.	Studying the human circulatory system, children learn about the role of the heart, blood and blood vessels and use models to demonstrate their function. They explore how lifestyle choices affect our health and use secondary sources to advise patients. Pupils devise their own investigation to look at the relationship between exercise and heart rate, applying their knowledge of variables and then analysing secondary data to understand fitness better.
Concepts Living things and their habitats Working scientifically Science in action	**Concepts** Animals, including humans Working scientifically Science in action	**Concepts** Animals, including humans Working scientifically Science in action
National Curriculum **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • identifying scientific evidence that has been used to support or refute ideas or arguments **Living things and their habitats** Pupils should be taught to: • 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	**National Curriculum** **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments **Evolution and inheritance** Pupils should be taught to: • 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	**National Curriculum** **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments **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

Classifying big and small **Skills** **Grouping and classifying** • Grouping in a broader range of contexts. • Organising the layout of number and branching keys. • Formulating appropriate questions for classification keys. **Knowledge** • To know that 'organism' is a term used to refer to an individual living thing. • To know that micro-organisms are incredibly small and cannot usually be seen by the naked eye. • To know the characteristics of the different groups of vertebrates and commonly found invertebrates. **Science in action** • To know about famous scientists throughout history.	**Evolution and Inheritance** **Skills** **Posing questions** • Raising questions throughout the enquiry process. • Selecting the most appropriate enquiry method to answer questions and give justification. **Planning** • Suggesting which variables will be changed, measured and controlled. **Observing** • Using senses to describe, in detail and with a broader range of scientific vocabulary, what is noticed or what has changed. **Recording** • Using tables with columns that allow for repeat readings. • Calculating the mean average. **Grouping and classifying** • Grouping in a broader range of contexts. **Analysing and drawing conclusions** • Suggesting with increasing independence how one variable may have affected another. • Quoting relevant data as evidence of relationships. • Identifying anomalies in repeat data and excluding results where appropriate. • Comparing individual, class and/or model data to the prediction and recognising when they do not match. **Evaluating** • Identifying steps in the method that need changing and suggesting improvements. • Identifying which variables were difficult to control and suggesting how to control them better. • Commenting on the degree of trust by reflecting on accuracy (human error with equipment) and reliability (repeating results). • Posing new questions in response to the data that would extend the enquiry. **Knowledge** To know: • Living things have changed over time. • Fossils provide information about living things that inhabited the Earth millions of years ago. • Characteristics are passed from parents to their offspring, but all offspring vary from their parents. • Over time, variation in offspring can affect animals' chances of survival in particular environments.	**Circulation and Health** **Skills** **Planning** • Suggesting which variables will be changed, measured and controlled. • Making and explaining decisions about what observations to make and how long to make them for. • Writing a method including detail about how to ensure control variables are kept the same. • Writing a method that considers reliability by planning repeated readings. • Suggesting the most appropriate equipment to make observations and measurements and justifying their choices. **Predicting** • Making increasingly scientific predictions by using previous scientific knowledge and evidence to inform their predictions, using scientific language to describe a potential outcome or explain why they think something will happen and making links between topics to evidence a prediction. **Observing** • Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed. **Measuring** • Using standard units to measure and compare with increasing precision (decimals). • Reading a wider variety of scales with unmarked intervals between numbers. **Researching** • Gathering answers to questions from a variety of sources. **Recording (tables)** • Using tables with columns that allow for repeat readings. • Suggesting headings to tables, including units. • Designing results tables with increasing independence with consideration of variables where applicable. • Calculating the mean average. **Graphing** • Representing data by using line graphs and scatter graphs. • Plotting points with greater accuracy. • Reading the value of plotted points with greater accuracy. **Analysing and drawing conclusions** • Recognise the following across a broader range of contexts and in more complexity: naturally occurring patterns and relationships, changes over time and relevant secondary data. • Writing a conclusion to summarise findings using increasingly complex scientific vocabulary.

	• Animals and plants have adapted to suit their environment over many millions of years and this process can be called evolution. **Science in action** To know: • Famous scientists throughout history. • A range of jobs and careers use scientific knowledge and methods. • The work of modern-day scientists. • There are spiritual, moral, social and cultural links with Science. • Methods and equipment used by scientists throughout history and how these have led to modern methods. • Scientific knowledge has changed over time, leading to the current understanding of Science. • Collaboration and peer reviewing are essential for effective scientific progress. • Scientific evidence is used to support or refute ideas or arguments.	• Suggesting with increasing independence how one variable may have affected another. • Quoting relevant data as evidence of relationships. • Identifying anomalies in repeat data and excluding results where appropriate. • Comparing individual, class and/or model data to the prediction and recognising when they do not match. • Using identified patterns to predict new values or trends. **Evaluating** • Commenting on the degree of trust by also reflecting on the reliability (repeating results) and sources of information (e.g. websites, books). **Knowledge** To know: • The main parts of the human circulatory system (heart, blood vessels and blood). • The heart pumps blood around the body. • Blood vessels transport blood around the body. • Blood transports vital substances around the body, including oxygen and nutrients. • The relationships between different organ systems. • The impact of diet, exercise, drugs and lifestyle on the way a body functions. • The heart rate is the number of beats per minute. • Exercise increases heart rate. **Science in action** To know: • There are famous scientists throughout history. • There are a range of jobs and careers that use scientific knowledge and methods. • Science is in the news with recent discoveries. • There are spiritual, moral, social and cultural links with Science. • There were methods and equipment used by scientists throughout history and these have led to modern methods. • Scientific knowledge has changed over time, leading to the current understanding of Science. • Current scientific research is taking place with specific aims for the future.
Light and Reflection Proving that light travels in a straight line, children use this information to explain observations of reflection and shadows. They explore how our eyes allow us to see and how mirrors can be used in a variety of ways. Pupils investigate factors affecting the size of shadows and the laws of reflection. Children apply what they have learned about light by exploring real-life uses of mirrors.	**Circuits, Batteries and Switches** Using their prior knowledge of electrical circuits, children learn to draw conventional circuit diagrams and use models to explain current, resistance and voltage. They compare different batteries and consider the effect on bulb brightness. Pupils apply their knowledge of switches and electrical circuits to design and produce their own practical devices.	**Making Connections- Are some sunglasses safer than others?** Exploring sun safety, children investigate the efficacy of different sunglasses. They devise enquiries to test light and UV transmission of the lenses to form a conclusion about which sunglasses are best, applying their knowledge of electrical circuits to provide a light source in the experiment. The children summarise their findings through presentations and advertisements.

Concepts Energy Working scientifically	**Concepts** Energy Working scientifically Science in action	**Concepts** Living things and their habitats Animals, including humans Energy Working scientifically Science in action
National Curriculum **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments **Light** Pupils should be taught to: • 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	**National Curriculum** **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments **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	**National Curriculum** **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments **Making Connections** Pupils should be taught to: • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. • give reasons for classifying plants and animals based on specific characteristics. • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution • 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. • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • use recognised symbols when representing a simple circuit in a diagram.

Light and Reflection

Skills

Posing questions

- Identifying testable questions.
- Selecting the most appropriate enquiry method to answer questions and give justification.

Planning

- Suggesting which variables will be changed, measured and controlled.
- Writing a method including detail about how to ensure control variables are kept the same.

Observing

- Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.

Measuring

- Using standard units to measure and compare with increasing precision (decimals).
- Reading a wider variety of scales with unmarked intervals between numbers.

Recording

- Drawing scientific diagrams with increasing accuracy, labelling with a broader range of scientific vocabulary and annotating diagrams to explain concepts and convey opinions.
- Using tables with columns that allow for repeat readings.
- Calculating the mean average.

Graphing

- Representing data by using line graphs and scatter graphs.
- Plotting points with greater accuracy.
- Reading the value of plotted points with greater accuracy.

Analysing and drawing conclusions

- Writing a conclusion to summarise findings using increasingly complex scientific vocabulary.
- Suggesting with increasing independence how one variable may have affected another.
- Identifying anomalies in repeat data and excluding results where appropriate.
- Using identified patterns to predict new values or trends.

Evaluating

- Identifying steps in the method that need changing and suggesting improvements.
- Identifying which variables were difficult to control and suggesting how to control them better.
- Commenting on the degree of trust by reflecting on accuracy (human error with equipment) and reliability (repeating results).

Knowledge

Circuits, Batteries and Switches

Skills

Planning

- Suggesting which variables will be changed, measured and controlled.
- Writing a method including details about ensuring control variables are kept the same.
- Writing a method that considers reliability by planning repeated readings.
- Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.

Predicting

- Using previous scientific knowledge and evidence to inform their predictions.
- Using scientific language to describe a potential outcome or explain why they think something will happen.

Observing and measuring

- Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.
- Using standard units to measure and compare with increasing precision (decimals).
- Reading a wider variety of scales with unmarked intervals between numbers.

Recording

- Drawing scientific diagrams by using a wider range of standard symbols and drawing with increasing accuracy.
- Using tables with columns that allow for repeat readings.
- Suggesting headings to tables, including units.
- Designing results tables with increasing independence with consideration of variables where applicable.
- Calculating the mean average.

Analysing and drawing conclusions

- Writing a conclusion to summarise findings using increasingly complex scientific vocabulary.
- Suggesting with increasing independence how one variable may have affected another.
- Quoting relevant data as evidence of relationships.
- Identifying anomalies in repeat data and excluding results where appropriate.
- Comparing individual, class and/or model data to the prediction and recognising when they do not match.
- Using identified patterns to predict new values or trends.

Evaluating

- Identifying steps in the method that need changing and suggesting improvements.

Making Connections- Are some sunglasses safer than others?

Skills

This unit revisits the working scientifically skills covered in Year 6, including:

- Posing questions.
- Planning.
- Predicting.
- Observing.
- Measuring.
- Recording.
- Graphing.
- Analysing and drawing conclusions.
- Evaluating.

Knowledge

Classifying big and small

- To know the characteristics of the different groups of vertebrates and commonly found invertebrates.

- **Light and reflection**

To know:

- When light is reflected off a surface, its direction changes.
- Luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye.

Evolution and inheritance

To know:

- Characteristics are passed from parents to their offspring, but all offspring vary from their parents.
- Animals and plants have adapted to suit their environment over many millions of years and this process can be called evolution.
- Over time, variation in offspring can affect animals' chances of survival in particular environments.

Circuits, batteries and switches

To know:

- A variety of components in a series circuit (including buzzer and motor).
- Conventions are used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.

Circulation and health

- To know the impact of diet, exercise, drugs and lifestyle on the way a body functions.

Science in action

To know:

To know: • Light travels in a straight line from a light source. • Luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye. • Shiny surfaces reflect light uniformly. • When light is reflected off a surface, its direction changes. • Mirrors and periscopes work using reflection of light on smooth surfaces. • Shadows have the same shape as the objects that cast them as a result of light travelling in straight lines. • There are relationships between light sources, objects and shadows. • The distance between the object and the screen affects the size of the shadow. • The angle of a reflected ray is affected by the angle of the incoming ray on a smooth surface	• Identifying which variables were difficult to control and suggesting how to control them better. **Knowledge** **To know:** • A variety of components in a series circuit (including buzzer and motor). • Conventions are used to draw circuit diagrams, including the recognised symbols for common components and using straight lines. • The voltage of a circuit can be changed and this affects bulb brightness (or buzzer volume). **Science in action** To know: • A range of jobs and careers that use scientific knowledge and methods. • How scientific evidence is used to support or refute ideas or arguments.	• There are spiritual, moral, social and cultural links with Science. • A range of jobs and careers use scientific knowledge and methods. • The work of modern-day scientists. • Scientific evidence is used to support or refute ideas or arguments. • Current scientific research is taking place with specific aims for the future.