SCIENCE

Long Term Planning

Our Curriculum Vision and Values

St. Andrew's Church of England Primary School is committed to providing a safe and caring Christian environment in which every individual is valued and encouraged to engage in lifelong learning. Our vision statement "With God all things are possible." (Matthew 19:26) is used to encourage individuals to be open to all possibilities and have a positive attitude.
Our vision reflects the Christian ethos of our school. As a school we ensure that everyone is valued and supported. The staff at St. Andrew's are extremely committed professionals who care deeply about the well-being of every child as well as having a determination for each child to reach their full learning potential.

This is articulated through our I Aspire values and threaded through our curriculum, in all subject areas, as outlined below.

I ASPIRE

Independence (children independently applying skills, challenging themselves and being curious)
Ambition (risk taking, to have raised ambitions of what they can achieve, do and be)
Self-control (controlling emotions in difficult situations, coping with disappointment)
Perseverance (building resilience and not giving up)
Integrity (doing the right thing when no-one is watching)
Responsibility (being a model citizen, contributing and understanding all actions have consequences)
Empathy (building caring relationships, understanding the views and beliefs of others)

A spiral curriculum

The scheme of work has been designed as a spiral curriculum with the following key principles in mind:

- ✓ **Cyclical**: Pupils return to the key knowledge and skills repeatedly during their time in primary school.
- ✓ **Increasing depth**: Each time a skill is revisited it is covered with greater complexity and in varying contexts. Progression includes:
  - studying a specific scientific concept in more detail;
  - studying further examples of a specific concept to broaden contextual knowledge;
  - studying a broader range of equipment and methods to test an hypothesis;
  - explaining concepts using models or ideas that can't be seen;
  - making and explaining links across areas in science;
  - engaging with increasingly complex ideas and ethical dilemmas.
- ✓ **Prior knowledge**: Prior knowledge is utilised so pupils can build upon previous foundations, rather than starting again.

CURRICULUM MAP

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
SCIENCE Aut 1	*See table below*	Seasonal Changes	Habitats	Move & Nutrition	Digestion & Food	Mixtures & Separation	Classifying Big & Small
Aut 2	*See table below*	Everyday Materials	Microhabitats	Forces & Magnets	Electricity & Circuits	Properties & Changes	Light & Reflection
SCIENCE SPR 1 SPR 2	*See table below*	Sensitive Bodies	Uses of Materials	Rocks & Soils	States of Matter	Earth & Space	Evolution & Inheritance
SPR 2	*See table below*	Comparing Animals	Life Cycles & Health	Light & Shadow	Sound Vibration	Life Cycles & Reproduction	Circuits, batteries & switches
SCIENCE SUM 1	*See table below*	Intro to Plants	Plant Growth	Plant Reproduction	Classification & Changing Habitats	Imbalanced Forces	Circulation and Exercise
SUM 2	*See table below*	Making Connections	Making Connections	Making Connections	Making Connections	Human Timeline & Making Connections	Making Connections

RECEPTION	**Understanding the world;** **Development matters and Early Learning Goals**
SCIENCE	Development Matters Explore the natural world around them. Describe what they see, hear and feel whilst outside. Understand the effect of changing seasons on the natural world around them. Early Learning Goals 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.

Key areas in Science

Pupils will develop **Scientific knowledge and understanding** in seven key areas. The learning in each area is summarised below:

Animals, including humans

Identifying animals, their basic structure and their eating habits, as well as their basic needs for survival. Children learn about the life cycles of animals and their place in food chains.

Naming parts of the human body and recognising the function of skeletons, muscles, teeth and the digestive and circulatory systems. Learning about the importance of hygiene and of the right type and amount of nutrition. Children learn about the impact of diet, drugs and exercise on the body and study the life cycles of humans.

This key area covers the Year 1, Year 2, Year 3, Year 4, Year 5 and Year 6 subject content titled 'Animals, including humans' from the National curriculum.

Living things and their habitats

Identifying something as living and how it is grouped based on its characteristics, similarities and differences.

Naming different types of habitats, learning what they provide for life and the impact of habitats changing. Children learn about the life cycles and reproduction of animals and plants, and how this affects the variation of living things around us, past and present.

This key area covers the Year 2, Year 4, Year 5 and Year 6 subject content titled 'Living things and their habitats' and 'Evolution and inheritance' from the National curriculum.

Plants

Identifying different plants and their key structures, growing seeds and plants and understanding their requirements for growth. Recognising the function of different plant structures and understanding how plants reproduce.

This key area covers the Year 1, Year 2 and Year 3 subject content titled 'Plants' from the National curriculum.

Materials

Naming materials, describing their properties and understanding why materials have specific uses. Identifying how materials may change and the factors that may contribute to this, including changes of state within the water cycle. Children learn about different mixtures and how they can be separated based on their properties.

Identifying different types of rocks and their physical properties, and understanding how fossils and soil are formed.

This key area covers the Year 1, Year 2, Year 3, Year 4 and Year 5 subject content titled 'Everyday materials', 'Uses of everyday materials', 'Rocks', 'States of matter' and 'Properties and changes of materials' from the National curriculum.

Energy

Learning about light and its properties, how it enables us to see and how shadows are formed. Identifying the relationship between sounds, volume, pitch and vibrations, and how sound travels to the ear.

Recognising electrical appliances and the components that make up different circuits. Building electrical circuits and identifying factors that affect the output.

This key area covers the Year 3, Year 4 and Year 6 subject content titled 'Light', 'Electricity' and 'Sound' from the National curriculum.

Key areas in Science

Pupils will develop **Scientific knowledge and understanding** in seven key areas. The learning in each area is summarised below:

Forces, Earth and space

Identifying changes across the seasons, and the weather and day length associated with each.

Recognising different types of forces and understanding their effect on objects, including the role of pulleys, levers and gears. Children learn about magnetic materials and that magnets attract and repel.

Learning about the movements of planets and moons within the solar system and how this relates to our day and night.

This key area covers the Year 1, Year 3 and Year 5 subject content titled 'Seasonal changes', 'Forces and magnets', 'Earth and space' and 'Forces' from the National curriculum.

Making connections

Finding the optimum: the science subject report (Ofsted, 2023) states that schools should ensure that teachers

'regularly connect new learning to what pupils have already learned. This includes showing pupils how knowledge from different areas of the curriculum connects.'

One of the ways in which we do this is through our Making connections units, which give pupils opportunities, beyond the National curriculum programme of study, to make connections between their science learning.

	Year 1		
Autumn 1	**Forces, Earth and space** Seasonal changes **(6 lessons)** 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.	Autumn 2	**Materials** Everyday materials **(6 lessons)** 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 by their properties.
Spring 1	**Animals, including humans** **Sensitive bodies (6 lessons)** 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 develop an understanding of the importance of our senses and how science can support those who have lost sensory function.	Spring 2	**Animals, including humans** **Comparing animals (6 lessons)** Studying both local and global animals, children recognise common features and use this information to make comparisons and begin to classify animals. Pupils collect data by surveying class pets, to then explore ways in which this information can be recorded. They develop their understanding of classification by comparing the dietary habits of different animals and use their knowledge and imaginations to take on therole of a zookeeper.
Summer 1	**Plants** **Introduction to plants (6 lessons)** Identifying the key features of a plant, children describe important structures and make comparisons between different plants. Pupils use investigative skills to record the growth of a plant over time and begin to reflect on factors that will affect its development. They begin to explore how plants are used by humans and grow their own herb garden.	Summer 2	**Making connections** Bringing together pupils' learning from multiple Science units, helpingthem to make connections between the key concepts and skills.

	Year 2		
Autumn 1	**Living things and their habitats** **Habitats (6 lessons)** Considering the life processes that all living things have in common,pupils classify objects into alive, was once alive or has never beenalive. Pupils explore global habitats, naming plants and animals thatcan be found there. They learn how a range of different living thingsdepend on each other for food or shelter. Pupils explore this furtherby creating food chains to show the sequence that living things eat each other for energy to grow and stay healthy.	**Autumn 2**	**Microhabitats (6 lessons)** Developing their understanding of scientific enquiry, pupils learn that scientists use a range of skills to answer questions. They discover thatmicrohabitats 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 roleof a botanist by identifying flowering plants.
Spring 1	**Materials** **Uses of everyday materials (6 lessons)** Reflecting on their knowledge of different materials, children beginto explain why materials are used in certain contexts. They develop enquiry skills to investigate the properties of materials and explorethe science of inventing new ones.	**Spring 2**	**Animals, including humans** **Life cycles and health (6 lessons)** Studying the life cycles of various animals, children learn what animals need to survive and how they change over time. Pupils collect data thatallows them to observe changes in their peers, while also developing theirability to take measurements and record data. They consider the role ofexpert scientific knowledge in careers that inform people to make healthychoices.
Summer 1	**Plants** **Plant growth (6 lessons)** Using their prior knowledge of important plant structures, children explain what factors are needed for successful growth and compare how those needs vary across different plants. They grow plants from seeds and bulbs to ascertain the needs for initial development and compare this to the survival needs of plants in later growth phases. Pupils take their own measurements and reflect on historical examples to understand how conclusions can be drawn.	**Summer 2**	**Making connections** Bringing together pupils' learning from multiple Science units, helpingthem to make connections between the key concepts and skills.

	Year 3		
Autumn 1	**Animals, including humans** Movement and nutrition **(6 lessons)** 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 contributesto nutritionist expertise.	Autumn 2	**Forces, Earth and space** Forces and magnets **(6 lessons)** Investigating the movement of vehicles on different surfaces, children learn about the impact of friction and compare uses and drawbacks. Theybroaden their experience in writing scientific methods and recording dataas they investigate contact and non-contact forces. Pupils explore the properties of different magnets and use this to understand their uses.
Spring 1	**Materials** **Rocks and soil (6 lessons)** Studying rocks and their properties, children learn that rock properties support classification and tell us about how rocks were formed. Pupils look at the work of paleontologists to learn about howfossils form and use models to explain the rock cycle. They plan aninvestigation to test rocks for particular uses and form conclusions about which soil type is most suitable for UK farmers.	Spring 2	**Energy** **Light and shadows (6 lessons)** Identifying examples of luminous objects, children learn about how light travels around us and how that enables us to see. Children investigate reflection and shadow formation, creating their own shadow puppets andexploring how shadows can be used to entertain in the arts. They look at examples of pivotal scientific discoveries and the scientific methods that led to those successes.
Summer 1	**Plants** **Plant reproduction (6 lessons)** Building on their prior knowledge of plant structures, children describe the functions of named parts and use evidence to explaintheir significance in plant development. Pupils investigate further factors that may affect the growth of plants and compete with their peers to disperse seeds in a variety of ways. They explore how seedsvary and define the type of plant they are studying, as well as lookingat how seed shapes have inspired modern technologies.	Summer 2	**Making connections** Bringing together pupils' learning from multiple Science units, helpingthem to make connections between the key concepts and skills.

	Year 4		
Autumn 1	**Animals, including humans** **Digestion and food (6 lessons)** 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 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.	Autumn 2	**Energy** **Electricity and circuits (6 lessons)** 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 betweenthe number of bulbs and bulb brightness. Real scenarios and historical discoveries inform children about scientific progression and home safety.
Spring 1	**Materials** **States of matter (6 lessons)** 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. Pupils investigate the relationship between temperature and rate of evaporation while broadening their experience of working scientifically.	Spring 2	**Energy** **Sound and vibrations (6 lessons)** Exploring different ways of producing sounds, children learn about the relationship between vibrations and what they hear. They use examples ofecholocation 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 ownmusical instruments to demonstrate these principles.
Summer 1	**Living things and their habitats** **Classification and changing habitats (6 lessons)** Identifying different ways living things can be grouped, children make classification keys to explore which grouping methods are most effective. Pupils study ways that habitats may change over time and understand that humans can have both positive and negative effects on their surroundings. They play the role of naturalists and review the impact of conservation programmes.	Summer 2	**Making connections** Bringing together pupils' learning from multiple Science units, helpingthem to make connections between the key concepts and skills.

Year 5

Materials

Autumn 1

Mixtures and separation (6 lessons)

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 thetime taken to dissolve. They design and create a water filter, sieve soil and evaporate solutions.

Autumn 2

Properties and changes (6 lessons)

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 dissolving and changes of state. Childrencompare these to irreversible changes, including rusting, burning and mixing vinegar and bicarbonate of soda.

Spring 1

Forces, Earth and space

Earth and space (6 lessons)
Exploring some of the key celestial bodies in our solar system, children learn the names and compare their movements.
Pupils discover the relationship between the Earth's rotation and day and night, making models to represent their knowledge. They make their own sundials and consider how and why our ideas about the universe have changed so much over history.

Spring 2

Living things and their habitats

Life cycles and reproduction (6 lessons)
Studying different animals' life cycles, children learn about the significance of reproduction for aspecies' survival. Pupils calculate the probability of male and female turtles hatching and grow plants to compare asexual and sexual reproduction. Pupils compare fertilisation across differentanimals and explore the needs of a fetus. Children narrate their own documentary in the style ofan inspirational naturalist.

Summer 1

Forces, Earth and space

Imbalanced forces (6 lessons)
Building on their knowledge of contact forces, children explore gravity,air resistance and water resistance in more depth and consider the effect of these forces being imbalanced. 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.

Summer 2

Animals, including humans

Human timeline (3 lessons)
Studying human development and changes, children identify key stages and consider what datamay help determine if a child is growing normally. They describe how puberty affects girls and boys and produce graphs to record how gestation periods vary across different animals.

Making connections

Bringing together pupils' learning from multiple Science units, helping them tomake connections between the key concepts and skills.

	Year 6		
Autumn 1	**Living things and their habitats** Classifying big and small **(6 lessons)** 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 identifyorganisms.	**Autumn 2**	**Energy** Light and reflection **(6 lessons)** Proving that light travels in a straight line, children use this information toexplain 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 exploringreal-life uses of mirrors.
Spring 1	**Living things and their habitats** **Evolution and inheritance (6 lessons)** Studying patterns through families, 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. Through modelling the variation and natural selection ofDarwin's finches, they begin to explain how species evolve over timeand incorporate fossil evidence that supports this theory.	**Spring 2**	**Energy** **Circuits, batteries and switches (6 lessons)** Using their prior knowledge of electrical circuits, children learn to drawconventional circuit diagrams and use models to explain current and voltage. They make their own batteries, relate this to their knowledge ofvoltage and explore how battery research has impacted other scientificprogress. Pupils investigate the use of switches and fuses and apply theirelectrical knowledge to design and produce their own electrical device.
Summer 1	**Animals, including humans** **Circulation and exercise (6 lessons)** Studying the human circulatory system, children learn about the roleof the heart, blood and blood vessels and use models to demonstratetheir function. They play the role of healthcare professionals to diagnose patients and play games to explore how lifestyle choices affect our health. Pupils devise their own investigation to look at the relationship between exercise and heart and breathing rates, applying their knowledge of variables.	**Summer 2**	**Making connections** Bringing together pupils' learning from multiple Science units, helpingthem to make connections between the key concepts and skills.