St. Paul's Long-Term Plan

Science - National Curriculum Overview

EYFS – Understanding the World, The Natural World ELG

Children will:

- 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.

KS1 – Working Scientifically

During years 1 and 2, pupils will 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.

Lower KS2 – Working Scientifically

During years 3 and 4, pupils will 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.

Upper KS2 – Working Scientifically

During years 5 and 6, pupils will 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 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.

EYFS Understanding the World	KS1 Science	KS2 Science
ELG: Understanding the world	**Plants** **Animals (including humans)** **Uses of everyday materials** **Living things and their habitats** **Seasonal changes**	**Plants** **Animals (including humans)** **Properties and changes of materials.** **Living things and their habitats** **Rocks** **Light** **Forces and magnets** **States of Matter** **Sound** **Electricity** **Earth and space.** **Evolution and inheritance.**

We are being ambitious because we introduce Year 1 objectives in Reception.

Green objectives are newly introduced, Black are being mastered

KEY THEMES/CONCEPTS – Biology, Chemistry, Physics and Working Scientifically.

Intent

Here at St. Paul's Church of England Primary school, we strongly believe that high quality Science education and teaching offers the foundations for understanding the world around us. Science at St. Paul's focuses upon developing student's thinking and scientific practices that enable them to make sense of the world in which they live. We achieve this by implementing an ambitious and well-structured curriculum that identifies the most important concepts for our pupils to learn. The concepts that run through the curriculum are Biology, Chemistry and Physics. A key element of our quality first teaching is that new Scientific knowledge builds on previous Scientific knowledge and concepts that can be added to and developed each year to allow our students to advance their rational thinking skills in addition to developing a sense of curiosity and excitement about science. Alongside the teaching of new knowledge, retrieval practice is also built into lessons to prevent the children from forgetting what they have previously learned. High quality practical work has a clear purpose as activities are chosen to match particular intent and new knowledge gets systematically integrated into pre-existing knowledge. In addition, all students at St. Paul's are constantly exposed and immersed in key scientific vocabulary as we know that when the children understand the language then they can unlock the knowledge. We test their understanding of new vocabulary, teach the meanings, put it into context and revisit it to ensure it has been learned.

Embedded alongside the Science programmes of study our Science curriculum is also linked to our 'Whole School Golden Threads, Reading, Emotional well-being and Caring for *all* Creation'. Language development is strongly associated with achievement in science. Therefore, we provide further opportunities to learn the language of science through stories, texts, songs, rhymes and poems. To support this each topic has specifically bought books across each Key Stage which are displayed alongside the key vocabulary and key concepts, we subscribe to Whizz Pop Bang which provide differentiated comprehensions for both K.S. 1 and K.S.2 and all the current units of work give the children opportunities to independently research and find facts.

We support the development of emotional well-being through some of the Biology topics for example, Year 2 learn how to keep themselves healthy, Year 3 learn humans need the right types and amounts of nutrition, Year 4 learn how to look after their teeth and Year 6 recognise the impact of diet and exercise on the way their bodies function. In addition, we have purchased some of the 'Little People, Big Dreams' books to help inspire the children.

Opportunities are given to encourage 'caring for *all* creation' across the school for example, Year 1 observe seasonal change and begin to understand why this happens, Year 2 identify how habitats provide the basic needs of different kinds of animals and plants and how animals obtain their food from plants and other animals, and they find out what plants need to stay healthy and describe the basic needs of animals, Year 4 recognise that environments can change and that this can pose dangers to living things.

The St. Paul's curriculum has been designed with cross- curricular links aiming to use and apply skills taught in English and Maths to their Science learning. Our cross-curricular writing plan has a set of purposefully chosen science related books which the children use to write and maths data handling and measuring skills are used to record and analyse findings.

Fundamentally, science in our school is about developing our student's ideas and scientific thinking by allowing them to investigate and study the environment and world around them, regardless of their gender, ethnicity or ability which we achieve with a balanced and broad science programme of study.

	Autumn		Spring		Summer	
Nursery	**ELG: Understanding the world.** Who lives in my house? 0-3years • Explore materials with different properties • Explore natural materials, indoors and outside. • Explore and respond to different natural phenomena in their setting and on trips. • Make connections between the features of their family and other families. • Notice differences between people. 3-4 Years • Explore the natural world around them • Talk about members of their immediate family and community.	**ELG: Understanding the world** Where does light go at night? 0-3years • Explore materials with different properties. • Explore natural materials, indoors and outside. • Explore and respond to different natural phenomena in their setting and on trips. 3-4 Years • Explore the natural world around them • 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.	**ELG: Understanding the world** What colours can you see? 0-3years • Explore materials with different properties. • Explore natural materials, indoors and outside. • Explore and respond to different natural phenomena in their setting and on trips 3-4 Years • Explore the natural world around them • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary.	**ELG: Understanding the world** What would you find at the farm? 0-3years • Explore materials with different properties. • Explore natural materials, indoors and outside. • Explore and respond to different natural phenomena in their setting and on trips. 3-4 Years • Explore the natural world around them • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Explore how things work. • Understand the key features of the life cycle of a plant and an animal.	**ELG: Understanding the world** What will you find at the bottom of the garden? 0-3years • Explore materials with different properties. • Explore natural materials, indoors and outside. • Explore and respond to different natural phenomena in their setting and on trips. 3-4 Years • Explore the natural world around them • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. Talk about the differences	**ELG: Understanding the world** What will you find in the sea? 0-3years • Explore natural materials, indoors and outside. • Explore and respond to different natural phenomena in their setting and on trips. • 3-4 Years • Explore and talk about different forces they can feel. • They make observations of animals and plants and explain why some things occur, and talk about changes. • Begin to understand the need to respect and care for the natural environment and all living things.

	• 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 understand the need to respect and care for the natural environment and all living things. • Talk about the differences between materials and changes they notice.	• Explore how things work. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice		• Begin to understand the need to respect and care for the natural environment and all living things.	between materials and changes they notice. • Explore how things work. • 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. • Plant seeds and care for growing plants.	
Reception	**ELG: Understanding the world** Me Vs Aliens • Talk about members of their immediate family and community. • Name and describe people who are familiar to them. • Explore the natural world around them. • Use all their senses in hands-on exploration	**ELG: Understanding the world** Wonderful Winter • 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	**ELG: Understanding the world** That's not my fairy tale! • 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.	**ELG: Understanding the world** Minibeasts • 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. • They make observations of animals and plants and explain why some things occur,	**ELG: Understanding the world** Thank you all! • know about similarities and differences in relation to places, objects, materials and living things. • They talk about the features of their own immediate environment and how environments	**ELG: Understanding the world** Our beautiful world

	of natural materials. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them.			and talk about changes	might vary from one another. • They make observations of animals and plants and explain why some things occur, and talk about changes.	
Year 1	What questions would you ask a zoo keeper? **Animals (including humans)** • •Identify and name a variety of common animals that are carnivores, herbivores and omnivores • •Identify, name and draw the basic parts of the human body (head, neck, arm, elbow, leg, knee, face, ear, eye, hair, mouth, teeth) and can say which part of the body matches each sense. • •Identify and name a variety of common animals, including fish, amphibians, reptiles, bird and mammals • •Describe and compare the structures of a variety of common animals.		What materials could we use the make Callum's house? Everyday materials • distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties	Why does it go dark earlier in the winter? **Seasonal changes** • Observe changes across the 4 seasons • Observe and describe weather associated with the seasons and how day length varies	Which plants would Little Red Riding Hood find in our school? **Plants** • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees	
Year 2	What is your school made of? **Uses of everyday materials** • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses		How can we look after this? **Living things and their habitats** • explore and compare the differences between things	How does everything in my garden? **Plants** • observe and describe how seeds and bulbs grow into mature plants	How do I keep myself healthy? **Animals (including humans)** • notice that animals, including humans, have offspring which grow into adults	

	• find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching		that are living, dead, and things that have never been alive • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • identify and name a variety of plants and animals in their habitats, including microhabitats • 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	• find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	• 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
Year 3	What do rocks tell us about the way the Earth was formed? **Rocks** • compare and group together different kinds of rocks on the basis of their appearance and	Are you attractive? **Forces and magnets** • compare how things move on different surfaces • notice that some forces need contact between 2 objects, but magnetic	How can Usain Bolt move so quickly? **Animals (including humans)** • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food;	How did that blossom become an apple? **Plants** • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants	How far can you throw your shadow? **Light** • 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

	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	forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing	they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement	explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	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.
Year 4	How would we survive without water? **States of Matter** • compare and group materials together, according to whether they are solids, liquids or gases • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)	What happens to the food we eat? **Animals, including humans.** 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	Why is the sound of pop music enjoyed by so any? **Sound** • 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	Which wild animals and plants thrive in your locality? **Living things and their habitats** 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	How could we cope without electricity for one day? **Electricity.** identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is

	• identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature		• 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		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
Year 5	Can you feel the force? **Forces and magnets** • 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	How different will you be when you are as old as your grandparents? **Animals, including humans.** • describe the changes as humans develop to old age	Could you be the next chemistry inventor? **Properties and changes of materials.** • compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda	Do all plants and animals start life as an egg? **Living things and their habitats.** • 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	Will we ever send another human to the moon? **Earth and space.** • describe the movement of the Earth and other planets relative to the sun in the solar system • describe the movement of the moon relative to the Earth • describe the sun, Earth and moon as approximately spherical bodies • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky
Year 6	How can you light up your life? **Light**	What would a journey through the body look like? **Animals, including humans.**	How do electrical circuits work? **Electricity**	What is classification? **Living things and their habitats.**	Have we always looked like this? **Evolution and inheritance.**

	• 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	• 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	• 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	• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics	• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution