St. Paul's Dorking
Church of England (Aided) Primary School

Science Overview

At St Paul's C of E Primary School, our vision is to give children a science curriculum which enables them to **explore** and **discover** the world around them, confidently, so that they have a deeper understanding of the world we live in.

We realise that young children are **naturally curious** and **passionate** about learning; we provide a **stimulating** science curriculum that **nurtures** children's natural curiosity and their on-going intellectual development. Through the **enjoyment** of a hands-on, enquiry-based curriculum, children will **explore** and **investigate** in order to help them secure and extend their scientific knowledge and vocabulary.

We believe that these opportunities will ensure that our children are confident, life-long learners who will explore the world around them.

Intent

We intend for children to:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- be equipped with the scientific skills required to understand the uses and implications of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this

At St Paul's, we encourage children to be **inquisitive** throughout their time at the school and beyond. We promote our school values by fostering a healthy curiosity in children about our universe and promoting **respect** for each other and living and non-living things, showing **compassion** when working together and **persevering** in order to succeed. We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. Throughout the programmes of study, the children will acquire and develop the key

knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills. We ensure that the **Working Scientifically** skills are built-on and developed throughout children's time at school so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments and explaining concepts confidently and continue to ask questions and be curious about their surroundings.

Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;

- A cycle of lessons for each subject, which carefully plans for progression and depth;
- Through our planning, we involve problem solving opportunities that allow children to find out for themselves. Children are encouraged to **ask their own questions** and be given opportunities to **use their scientific skills** and research to discover the answers. This **curiosity** is celebrated within the classroom. Planning involves teachers **creating engaging** and **inspiring lessons.** Teachers use precise questioning in class to test conceptual knowledge and skills, and assess children regularly to identify those children with gaps in learning, so that all children keep up;
- We **build upon the learning** and skill development of the previous years. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence;
- **Working Scientifically** skills are embedded into lessons to ensure these skills are being developed throughout the children's school career and new vocabulary and challenging concepts are introduced through direct teaching.
- Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to **embed** scientific understanding. Teachers find opportunities to **develop** children's understanding of their surroundings by **accessing outdoor** learning whenever possible;

- Children are **offered extra - curricular visits and trips** to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class;

Impact

Our Science Curriculum is **high quality, well thought out** and is planned to **demonstrate progression**. If children are keeping up with the curriculum, they are deemed to be making good or better progress. In addition, we measure the impact of our curriculum through the following methods:

- Tracking of knowledge through knowledge grids and end of topic tests.
- Assessing working scientifically skills through observations made when investigating.
- Pupil discussions about their learning
- Most importantly children's **enthusiasm** for the subject and understanding how Science impacts them and their world.

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Curriculum Overview

	Autumn		Spring		Summer	
Reception Understanding the World	Changes in state: Making bread Making soup Our bodies – observing changes over time What is 'Harvest' and why is it celebrated? Understanding the world: The World Range 6 • Looks closely at similarities, differences, patterns and change in nature Statutory ELG: The Natural World Children at the expected level of development will: - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Autumn- looks closely at signs of season change. Observes animals Nocturnal animals Light and dark and shadows Understanding the world: The World Range 6 • Looks closely at similarities, differences, patterns and change in nature • Knows about similarities and differences in relation to places, objects, materials and living things • Talks about the features of their own immediate environment and how environments might vary from one another • Makes observations of animals and plants and explains why some things occur, and talks about changes	Winter Comments on natural world Chinese new year changings in materials: Making noodles Understanding the world: The World Range 6 • Looks closely at similarities, differences, patterns and change in nature • Knows about similarities and differences in relation to places, objects, materials and living things • Talks about the features of their own immediate environment and how environments might vary from one another • Makes observations of animals and plants and explains why some things occur, and talks about changes Statutory ELG: The Natural World Children at the expected level of development will: -	Spring- Look at growth – I was a baby, now I am four Observes animals Animal life cycles – frog, butterflies and chicks (new life) Looking a farm animals and farm visit. Growing Changing state of materials: Making pancakes Understanding the world: The World Range 6 • Looks closely at similarities, differences, patterns and change in nature • Knows about similarities and differences in relation to places, objects, materials and living things • Talks about the features of their own immediate environment and how environments might vary from one another • Makes observations of animals and plants and explains why some things occur, and talks about changes Statutory ELG: The Natural World Children at the expected level of development will: - Explore the natural world around them, making observations and drawing pictures of animals and plants;	Talks about similarities/differences in how things grow. Understanding the world: The World Range 6 • Looks closely at similarities, differences, patterns and change in nature • Knows about similarities and differences in relation to places, objects, materials and living things • Talks about the features of their own immediate environment and how environments might vary from one another • Makes observations of animals and plants and explains why some things occur, and talks about changes	Floating/sinking Comparing what you find at the seaside/countryside. Understanding the world: The World Range 6 • Looks closely at similarities, differences, patterns and change in nature • Knows about similarities and differences in relation to places, objects, materials and living things • Talks about the features of their own immediate environment and how environments might vary from one another • Makes observations of animals and plants and explains why some things occur, and talks about changes Statutory ELG: The Natural World Children at the expected level of development will: - Explore the natural world around them,

			Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	- 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.	Statutory ELG: The Natural World Children at the expected level of development 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.	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.

Continuous provision	Any topics covered will include displays and interactive activities on the investigation table. Seasons are covered termly and include a display which is made with the children. Other topics such as 'On the Farm' involve a display and books and pictures on the investigation table. Floating and sinking topics would be available for independent learning in the outdoor area in the water trays and the mud kitchen.					
Year 1	Investigating the senses. The seasons and weather	Seasonal changes	Materials: Sorting and grouping; properties; sorting and naming; comparing uses around the world; generating questions and making predictions; recording results in different ways	Identifying animals and sorting into groups - comparing body parts of humans and animals.	Plants Identifying parts of plants Naming common flowers and trees What part of the plant we eat? Growing and observing Plants growing **Purely observe plant growth do not investigate conditions for growth diary- observing changes**	Seasonal changes - naming flowers and trees - shadows – temperature **You do not need to investigate shadows purely talk about how the day length varies**
Working Scientifically (CHILD FRIENDLY I CAN STATEMENTS USED IN SC) (KS1 skills)	PLAN: I can ask a few simple questions DO: I can observe closely DO: I can begin to use simple equipment DO: I can begin to carry out simple tests DO: I can begin to compare things and sort them into groups RECORD: I am beginning to gather and record simple data through the use of photographs and drawings REVIEW: I can talk about what I have found out					
Seasonal change	*Observe changes across the four seasons.* *Observe and describe the weather associated with the seasons and how day length varies.*					
Materials	*Distinguish between and object and the material from which it is made* *Identify and name everyday materials* *Describe properties of everyday materials*					

	Compare and group materials based on their properties					
Animals including humans	*Identify and name a variety of common animals inc mammals, fish, amphibians, reptiles, birds* *Identify common animals that are carnivores, omnivores and herbivores* *Describe and compare the structure of common animals (including pets)* *Identify and draw parts of the body and say which part of the body is associated with which sense.*					
Plants	*Identify and name a variety of common garden and wild plants including deciduous and evergreen trees* *Identify the basic structure of a variety of common flowering plants including trees*					
Year 2	Animals inc. humans What do all humans and animals need to live? Basic needs of animals. Understanding that offspring grow into adults. The importance of food for humans and what makes a balanced meal. The importance of exercise and hygiene.		Use of everyday materials: Identifying different materials. Properties of materials. Investigating suitability of materials for different jobs	Plants: Plant parts, planting seeds and investigating conditions for growth, signs of growth around school grounds. Growing Plants	Living things and their habitats: What do living things need? Mini beasts and their habitats. Food chains. Comparing habitats of other animals. (link to Australia topic)	Living things and their habitats: What do living things need? Mini beasts and their habitats. Food chains. Comparing habitats of other animals. (link to Australia topic)
Working Scientifically (CHILD FRIENDLY I CAN STATEMENTS USED IN SC) (KS1 skills)	PLAN: I can ask simple questions PLAN: I recognise that questions can be answered in different ways DO: I can observe closely DO: I can use simple equipment DO: I can carry out simple tests DO: I can compare things and sort them into groups REVIEW: I can gather and record simple data in different ways using labelled diagrams and drawings REVIEW: I talk about what I have found out REVIEW: I can use simple scientific language					
Materials	*Identify and compare the use of everyday materials for particular uses.* *Find out how the shapes of some objects can be changed through squashing, bending, twisting and stretching.*					
Animals including humans	*Notice that animals including humans have offspring that grow into adults* *Find out about the basic needs of humans and animals for survival – air/water/food* *Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene*					
Plants	*Observe how seeds and bulbs grow into mature plants* *Find out and describe how plants needs water, light and a suitable temperature in order to grow healthily*					
Living things and their habitats	*Explore the difference between things that are living, dead and 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 animals and plants* *Identify and name a variety of plants and animals in their habitats inc microhabitats*					

	Describe how animals obtain their food from other animals and plants using the idea of a food chain					
Year 3	Animals including Humans	Skeleton and muscles	Rocks and Soils Identifying the properties of different rocks. How soil is formed and the properties of different soils. The effect of weathering on rock. How fossils are formed.	Light	Power of plants	Forces and Magnets
Working Scientifically (CHILD FRIENDLY I CAN STATEMENTS USED IN SC (Lower KS2 skills)	PLAN: I can ask some of my own questions and begin to use different ways to answer them DO: I can set up my own simple test DO: I can make predictions DO: I use relevant scientific language DO: I can make careful observations DO: I can use different equipment to measure accurately RECORD: I can gather, record and present data in different ways including drawings, labelled diagrams and tables REVIEW: I explain what I have found out using speaking and writing REVIEW: I can begin to draw simple conclusions REVIEW: I can suggest improvements and begin to raise further questions					
Animals including humans	*Animals needs the right types and amount of nutrition – they cannot make their own food* *Identify that animals including humans have skeletons for support, protection and movement* *Describe different teeth in humans and their function*					
Plants	*Identify and describe function of different parts of flowering plants* *Explore requirements for plants to grow – air,water,light, nutriets, room to grow and how they vary from plant to plant* *Investigate how water is transported in plants* *Investigate part flowers play in lifecycle of flowering plant including pollination, seed formation and dispersal*					
Rocks and Soils	*Compare and group together different kinds of rocks based on their appearance and simple physical properties* *Describe how fossils are formed in rock* *Recognise that rocks are made from soils and organic matter*					
Light	*They need light in order to see things. Dark is the absence of light* *Light is reflected from surfaces* *Light from the sun can be dangerous* *Understand how shadows are formed* *Find patterns in the way shadows change size*					

Forces and Magnets	*Compare how things move on different surfaces* *Magnetic forces can act at a distance but some need contact between two objects* *Observe how magnets attract and repel* *Compare and group together everyday materials based on whether they are attracted to a magnet* *Describe magnets as having two poles* *Predict whether two magnets will attract or repel based on whether poles are facing*					
Year 4	Grouping materials by their properties - Liquids, solids and gases - how they behave and their properties.	Electricity	Water Cycle	Sound Investigating: · Vibrations · How sound travels through solid objects · Pitch and loudness	Digestion	Habitats and food chains
Working Scientifically (CHILD FRIENDLY I CAN STATEMENTS USED IN SC) (Lower KS2 skills)	PLAN: I ask relevant questions and use different types of scientific enquiries to answer them. DO: I can set up simple practical enquiries, comparative or fair tests. DO: I decide what observations and measurements to make and what equipment to use DO: I use a range of equipment DO: I make systematic and careful observations and take accurate measurements using standard units. DO: I can use information sources provided to find things out. RECORD: I can gather, record and classify data in a variety of ways to help me answer my questions. RECORD: I can record and present my findings using simple scientific language, tables, labelled diagrams, Venn diagrams or bar charts. REVIEW: I use my results to draw simple conclusions and I make predictions for new values. REVIEW: I communicate what I have found out using straightforward scientific ideas and I report my findings using oral and written explanations and displays REVIEW: I suggest improvements to the way I carried out the enquiry. REVIEW: I suggest further questions to investigate.					
Animals including humans	*Describe the basic parts of the digestive system in humans* *Construct and interpret a variety of food chains* *Producers/predators/prey*					
Living things and their habitats	*Understand living things can be grouped in a variety of different ways* *Explore and use classification keys* *Recognise that environments can change and this can cause danger to living things Describe the difference in lifecycles of mammal, amphibian, insect and bird*					
States of matter	*Compare and group materials whether they are solid, liquid, gas* *Observe that some materials change state when they are heated/cooled – measure the temp this happens at in Celsius* *Investigate the part played by evaporation and condensation in water cycle – associate evaporation with temp*					
Sound	*Identify how sounds are made showing association with something vibrating* *Understand that vibrations from sound travel through a medium to the ear* *Find patterns between pitch of sound and features of the object that produced it* *Find patterns between volume of sound and strength of vibrations that produced it* *Recognise sound gets fainter as you move away from the source*					

Electricity	*Identify appliances that run on electricity* *Construct a simple series electrical circuit naming basic parts* *Identify whether a lamp will light based on* *whether or not it is part of a simple loop with a battery* *Recognise that a switch opens and closes a circuit and associate this with a lamp lighting* *Recognise common insulators and conductors and associate metals with being a good conductor*				
Year 5	Forces	Earth and Space	Animals including humans *Link to PSHE (RSE content)* Why do I change as I get older?	Living things and their habitats	Properties of Materials
Working Scientifically (CHILD FRIENDLY I CAN STATEMENTS USED IN SC) (Upper KS2 skills)	PLAN: I am beginning to ask different kinds of questions PLAN: I am beginning to plan different types of scientific enquiries to answer questions. DO: I am beginning to decide which variables to use. DO: I am beginning to explain which variables need to be controlled and why. DO: I can sometimes set up a range of comparative and fair tests. DO: I can use results to make predictions for further tests DO: I decide what observations and measurements to make. DO: I use different scientific equipment to measure with precision. DO: I take repeat readings when appropriate RECORD: I can decide how to record data and results RECORD: I can use scientific labelled diagrams, tables and bar and line graphs to record my data and results REVIEW: I can report and present my findings using speaking and writing REVIEW: I use relevant scientific language and illustrations				
Animals including humans	Pupils should be taught to describe the changes as humans develop to old age.				
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				
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				
Forces	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					
Materials and their properties	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					
Year 6	Living things and their habitats	Animals including humans	Light	Evolution and inheritance	Electricity	
Working Scientifically (CHILD FRIENDLY I CAN STATEMENTS USED IN SC) (Upper KS2 skills)	PLAN: I can ask different kinds of questions PLAN: I can plan different types of scientific enquiries to answer questions. DO: I can decide which variables to control and why DO: I can use results to make predictions for further tests DO: I can decide what observations and measurements to make DO: I can use different scientific equipment to measure with precision. DO: I take repeat readings when appropriate RECORD: I can decide how to record data and results RECORD: I can use scientific labelled diagrams, tables, scatter, bar and line graphs, classification and keys to record my data and results REVIEW: I can report and present my findings using speaking and writing REVIEW: I use relevant scientific language and illustrations					
Living things and their habitats	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics					
Animals including humans	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans					

Light	Recognise that light appears to travel in straight lines Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
Evolution and inheritance	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
Electricity	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