

SCIENCE

SUBJECT OVERVIEW AND PURPOSE

WHY IS SCIENCE IMPORTANT?

At Southbank schools, we recognise that Science is a topic through which children can foster a sense of curiosity about the world.

We aim to prepare children for their adult life by ensuring they understand the importance of Science in today's world and to inspire them to develop aspirational goals for future careers. Learning Science encourages children to use problem solving skills to explain their thoughts, describe phenomena and, perhaps most importantly, change their minds.

These skills are applicable across many aspects of their lives, both as children and adults. Science is not limited to the classroom.

HOW IS SCIENCE TAUGHT?

Our Science curriculum is based on the National Curriculum and implemented using two main strands: working scientifically (disciplinary knowledge) and factual content (substantive knowledge). Teaching ensures that practical discovery and skills for Science are embedded throughout the Science curriculum and the context of Science is relevant to pupils. The curriculum becomes purposeful and enriching through lessons.

- Children will receive a broad and balanced curriculum, revisiting and building on current understanding and prior learning.
- They are taught the skills of working scientifically through different enquiry types in a range of lessons.
- They are taught factual content through different strands, linked to biology,

chemistry and physics, connected in a careful, progressive sequence.

- Children can confidently use a range of scientific vocabulary.

SCIENCE AND BEYOND

Through Science lessons, children will:

- Improve their own Science Capital through gaining an understanding of how Science applies to both everyday life and future careers.

Children apply scientific knowledge to solve problems using a range of enquiry skills:

- Using comparative and fair testing to answer questions.
- Using secondary sources of information to research.
- Observing changes that occur over a period of time, ranging from minutes to months.

- Identifying patterns and looking for relationships.
- Grouping and classifying while explaining their reasoning.

Through study of significant scientists of the past and individuals working today, children are introduced to a diverse range of scientists and people who work in science-related jobs.


This range of skills and experiences opens up opportunities for careers using scientific skills: from doctors to chemical engineers; climate scientists to marine biologists; robotics engineers to physiotherapists.

Ultimately, our goal is to inspire pupils to develop a curiosity about the world around them which they maintain into their adult lives.

“The important thing is not to stop questioning. Curiosity has its own reason for existence.”

Albert Einstein

EYFS

WORKING SCIENTIFICALLY	PHYSICAL DEVELOPMENT	COMMUNICATION AND LANGUAGE	UNDERSTANDING THE WORLD	
<ul style="list-style-type: none"> ■ Begin to ask 'why' questions about their experiences ■ Answer how and why questions about their experiences ■ Find ways to solve problems and test their ideas ■ Use senses to explore the world around them 	<ul style="list-style-type: none"> ■ Make healthy choices about food, drink, activity and teeth brushing at home and at snack time. ■ Know and talk about the different factors that support their overall health and wellbeing. ■ Make healthy choices more independently and know that some foods are bad if too much is eaten. ■ Understand why looking after our oral health is important and know some things to help us do this. ■ Know how exercise makes us hot and hearts beat fast. 	<ul style="list-style-type: none"> ■ Know how to respond to 'why' questions such as <i>Why</i> do caterpillars get so fat? ■ 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 work out problems and organise thinking and activities. ■ Explain how things work and why they might happen. ■ Use new vocabulary in different contexts. 	<ul style="list-style-type: none"> ■ Use all their senses in hands-on exploration of natural materials. ■ Explore collections of materials with similar and/or different properties. ■ Talk about the differences between materials and changes they notice. ■ 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. ■ 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. 	

KEY STAGE 1

KEY STAGE 2

WORKING SCIENTIFICALLY: TAUGHT THROUGH DIFFERENT ENQUIRY TYPES: ■ comparative/fair testing ■ research ■ observation over time ■ pattern seeking ■ identifying, grouping and classifying

<ul style="list-style-type: none"> ■ Use everyday language/begin to use simple scientific words to ask or answer a scientific question. ■ Follow instructions to complete a simple test. ■ Observe objects materials and living things and describe what they see. ■ Sort and group objects, materials and living things with help, according to simple observational features. ■ Talk about their findings and explain what they have found out. 	<ul style="list-style-type: none"> ■ Suggest ideas, ask simple questions and know that they can be answered/ investigated in different ways . ■ Begin to recognise when things are 'unfair' during an investigation. ■ Observe something closely and describe changes over time. ■ Decide, with help, how to group materials, living things and objects, noticing changes over time and beginning to see patterns. ■ Gather data, record and talk about their findings in a range of ways using simple scientific vocabulary. 	<ul style="list-style-type: none"> ■ Use ideas to pose questions, independently about the world around them. ■ Discuss investigation methods and describe simple fair tests. Complete fair tests by following instructions. ■ Make decisions about what to observe during an investigate. ■ Talk about criteria for grouping, sorting and categorising, beginning to see patterns and relationships. ■ Record their findings using scientific language and present in note form, writing frame, diagrams, tables and charts. 	<ul style="list-style-type: none"> ■ Suggest relevant questions and know that they could be answered in a variety of ways. ■ Set up simple practical fair tests with some independence. With support, choose a variable to test and start to recognise what else must be kept the same. ■ Make systematic and careful observations. ■ Identify similarities/differences/ changes when talking about scientific processes. Use and begin to create simple keys. ■ Record their findings using scientific language and present in note form, writing work, more independent diagrams, tables and charts. 	<ul style="list-style-type: none"> ■ Raise different types of scientific questions and hypotheses. ■ Make decisions about different enquiries including recognising when a fair test is necessary and begin to identify variables. ■ Plan and carry out comparative and fair tests making systematic and careful observations. ■ Use and develop keys to identify classify and describe living things and materials. ■ Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and model. 	<ul style="list-style-type: none"> ■ Make decisions about what questions to investigate and how best to investigate them. ■ Select and plan the most suitable test to answer a particular question, including which variables need to be controlled and why. ■ Make their own decisions about which observations to make using test results and observations to make predictions or set up further comparative or fair tests. ■ Use and develop keys to identify classify and describe living things and materials. ■ Choose appropriate ways to record and present information, findings and conclusions for different audiences e.g. displays, oral or written explanations.
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KEY STAGE 1		KEY STAGE 2			
FORCES					
		<ul style="list-style-type: none"> ■ compare how things move on different surfaces ■ notice that some forces need contact between 2 objects, but magnetic forces can act at a distance ■ observe how magnets attract or repel each other and attract some materials and not others ■ compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials ■ describe magnets as having 2 poles ■ predict whether 2 magnets will attract or repel each other, depending on which poles are facing 		<ul style="list-style-type: none"> ■ 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 	
ELECTRICITY					
			<ul style="list-style-type: none"> ■ 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 		<ul style="list-style-type: none"> ■ 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
EARTH AND SPACE					
				<ul style="list-style-type: none"> ■ 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 	

KEY STAGE 1		KEY STAGE 2			
LIGHT					
		<ul style="list-style-type: none"> ■ 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 			<ul style="list-style-type: none"> ■ 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
SOUND					
			<ul style="list-style-type: none"> ■ 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 		
SEASONAL CHANGES					
<ul style="list-style-type: none"> ■ Observe changes across the four seasons. ■ Observe and describe weather associated with the seasons and how day length varies. 					

KEY STAGE 1		KEY STAGE 2			
MATERIALS					
<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 	
PLANTS					
<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 			

KEY STAGE 1		KEY STAGE 2			
LIVING THINGS AND THEIR HABITATS					
	<ul style="list-style-type: none"> ■ Explore and compare the differences between things that are living, dead, and things that have never been alive. ■ Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. ■ Identify and name a variety of plants and animals in their habitats, including 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. 		<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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					
<ul style="list-style-type: none"> ■ Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. ■ Identify and name a variety of common animals that are carnivores, herbivores and omnivores. ■ Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). ■ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 	<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ 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. 	<ul style="list-style-type: none"> ■ Describe the changes as humans develop to old age. 	<ul style="list-style-type: none"> ■ 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.
EVOLUTION AND INHERITANCE					
					<ul style="list-style-type: none"> ■ 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.