



Science Long term



Vision statement

The aim of Science education at St. Anne's is to encourage all children to explore, engage and experiment with the world around them. We equip children with the knowledge and skills to discover the wonders of the natural world. Children hypothesise and through scientific enquiry and real life experiences, they make discoveries and apply knowledge to construct conclusions about the world for themselves taking them beyond the experiences of their daily lives. Science raises children's aspirations and gives them an understanding of how to make healthy lifestyle choices for themselves and for the good of our environment. We aim to help all children to develop a love of learning in Science and equip them with the skills to become the scientists that improve our future.

Domains of knowledge

- Health
- Living things and their Environment
- Material Properties and Changes
- Energy
- Forces
- Earth and Space
- Reproduction, inheritance and evolution
- Working Scientifically

Key Concepts

Particles- tiny bits of matter that make up everything in the universe.

Cells- The basic building blocks of all living things.

Organisms need energy- Living organisms must take in energy via food, nutrients, or sunlight in order to carry out cellular processes.

Forces- A force is a push or pull that causes a change in speed, direction or shape. All forces come in pairs, no force exists by itself.

Evolution- The way that living things change over time.

Inheritance -When living things reproduce they pass on characteristics to their offspring.

The Earth's axis- The Earth spins on an axis. It takes a year to orbit the Sun and it is the tilt which creates the seasons. It takes 24 hours for the Earth to rotate creating day and night.

The solar system - The collection of eight planets and their moons in orbit round the sun, together with smaller bodies in the form of asteroids, meteoroids, and comets.

Key stage 1

	Topic	Essential 1	Essential 2	Knowledge 3
A U T U M N	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 	<ul style="list-style-type: none"> 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 notice that animals, including humans, have offspring which grow into adults 	<p>Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat.</p> <p>they should understand how to take care of animals taken from their local environment and the need to return them safely after study.</p> <p>Pupils might work scientifically by: observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.</p>

		<i>associated with each sense</i>		
<i>S P R I N G</i>	<i>Materials</i>	<ul style="list-style-type: none"> <i>• distinguish between an object and the material from which it is made</i> <i>• identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</i> <i>• describe the simple physical properties of a variety of everyday materials</i> <i>• compare and group together a variety of everyday materials on the basis of their simple physical properties.</i> 	<ul style="list-style-type: none"> <i>▪ identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</i> <i>▪ find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</i> <i>▪</i> 	
<i>S U M M E R</i>	<i>Plants</i>	<ul style="list-style-type: none"> <i>• identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</i> <i>• identify and describe the basic structure of a variety of common</i> 	<ul style="list-style-type: none"> <i>▪ observe and describe how seeds and bulbs grow into mature plants</i> <i>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</i> <i>▪</i> 	

		flowering plants, including trees		
	Living things and their habitats	<ul style="list-style-type: none"> Identify and name a variety of plants and animals in their habitats, including micro-habitats. Explore and compare the differences between things that are living, dead, and things that have never been alive. 	<ul style="list-style-type: none"> 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. 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. . 	
O N G O I N G	Seasonal changes	<ul style="list-style-type: none"> observe changes across the 4 seasons (Autumn focus) 	<ul style="list-style-type: none"> observe and describe weather associated with the seasons and how day length varies (Autumn focus) 	

Lower Key Stage 2

	Topic	Essential 1	Essential 2	Knowledge 3
A U T U M N	Rocks	<ul style="list-style-type: none"> ▪ To identify different kinds of rocks including igneous, sedimentary and metamorphic. ▪ recognise that soils are made from rocks and organic matter. ▪ Understand what a fossil is. 	<p>Explore different soils and identify similarities and differences between them.</p> <ul style="list-style-type: none"> ▪ describe in simple terms how fossils are formed when things that have lived are trapped within rock. 	<p>Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment.</p> <p>Pupils might work scientifically by: observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.</p> <p>Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed.</p>

				<p>Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water.</p> <p>Children can raise and answer questions about the way soils are formed</p>
	<p>Light</p>	<ul style="list-style-type: none"> • recognise that they need light in order to see things and that dark is the absence of light. • recognise that light from the sun can be dangerous and that there are ways to protect their eyes 	<ul style="list-style-type: none"> • 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 	<p>Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves.</p> <p>They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.</p>

			<ul style="list-style-type: none"> • notice that light is reflected from surfaces 	<p>Pupils might work scientifically by: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.</p>
	<p>Forces</p>	<ul style="list-style-type: none"> • compare how things move on different surfaces. • 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. 	<ul style="list-style-type: none"> • observe how magnets attract or repel each other and attract some materials and not others. • describe magnets as having 2 poles. • notice that some forces need contact between 2 objects, but magnetic forces 	<p>Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).</p> <p>Pupils might work scientifically by: comparing how different things move and grouping them; raising</p>

can act at a distance.

- predict whether 2 magnets will attract or repel each other, depending on which poles are facing

questions and carrying out tests to find out how far things move on different surfaces, and gathering and recording data to find answers to their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

S P R I N G	Living things and their habitats	<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 	<ul style="list-style-type: none"> • recognise that environments can change and that this can sometimes pose dangers to living things 	
	Plants	<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. 	<ul style="list-style-type: none"> • 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 	

	States of matter	<ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases 	<ul style="list-style-type: none"> 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 ($^{\circ}\text{C}$) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature 	
S U M M E R	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, 	<ul style="list-style-type: none"> 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 	Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.

		<p>switches and buzzers.</p>	<p>closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</p> <ul style="list-style-type: none">• recognise some common conductors and insulators, and associate metals with being good conductors.	<p>Pupils might work scientifically by: observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.</p>
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Upper Key Stage 2

	Topic	Essential 1	Essential 2	Knowledge 3
A U T U M N	Properties and changes of materials	<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. 	<ul style="list-style-type: none"> give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. 	<p>Pupils might work scientifically by: carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit.</p>
		<ul style="list-style-type: none"> use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating 	<ul style="list-style-type: none"> know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution 	<p>They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials</p>

		<ul style="list-style-type: none"> demonstrate that dissolving, mixing and changes of state are reversible changes 	<ul style="list-style-type: none"> 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 	<p>Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton</p>
	<p>Electricity</p>	<ul style="list-style-type: none"> 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 	<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 	<p>Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols.</p> <p>Note: pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the</p>

				<p>necessary precautions for working safely with electricity.</p> <p>Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.</p>
	<p>Forces</p>	<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. • 	<ul style="list-style-type: none"> • 	
		<ul style="list-style-type: none"> • recognise that some mechanisms including levers, pulleys and gears allow a 	<ul style="list-style-type: none"> • 	

		<i>smaller force to have a greater effect.</i>		
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