

Our Lady's Bishop Eton Primary School



SCIENCE HANDBOOK

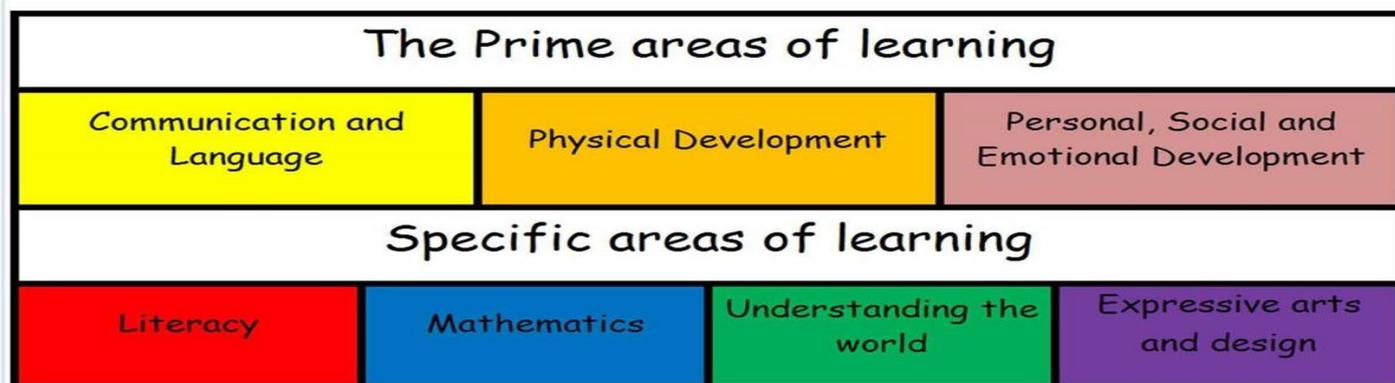
INTENT: SCIENCE CURRICULUM

Science education is one of the most important subjects in school due to its relevance to our children's lives and the universally applicable problem-solving and critical thinking skills it uses and develops. These are lifelong skills that allow students to generate ideas, weigh decisions intelligently and even understand the evidence behind public policy-making. Teaching technological literacy, critical thinking and problem-solving through science education gives students the skills and knowledge they need to succeed in school and beyond.

Effective teaching of Science offers pupils with the opportunity to access a wealth of knowledge and information which contributes to a secure understanding of how and why things work the way they do. Science explains the mechanics and reasoning behind the daily function of complex systems, including the human body. Through secure teaching, pupils will use this knowledge to aid their understanding of new concepts, make well-informed decisions and pursue new interests.

Our Science curriculum is full of awe and wonder – we push the boundaries in order to nurture thinking minds. Pupils develop an evidence based way of understanding the world. Through our teaching, we cultivate curiosity as children develop the joy of discovery and the need to explore further; a successful Science education enables them to become resilient, reflective and resourceful learners.

RECEPTION: In Reception we work within the EYFS 0 - 5 Curriculum which has its own distinct identity. This sets out the developmental stages leading to the Early Learning Goals within a play based curriculum. Practitioners teach children by ensuring challenging, playful opportunities across the prime and specific areas of learning and development. The three prime areas are particularly crucial for igniting children's curiosity and enthusiasm for learning. As children develop, the prime areas will help them to progress their skills in the 4 specific areas.



Our children's early Science development comes through the specific area of Understanding the World. Our Reception Curriculum is built around providing every child with opportunities to learn and develop through planned, purposeful play, exploration and problem solving; in order to develop the characteristics of effective learning and the skills required for learning as they continue to explore the Citizen of the World Curriculum. All areas are delivered through a balance of adult-led and child-initiated activities. Knowledge, skills and key vocabulary are taught through a mixture of cross-curricular Literacy topics and enhanced continuous provision. A great emphasis is put on experiential learning and learning through discovery, led by the child him/herself where possible. Understanding the world will include exploring, investigating, using computers, discovering the living world, people and nature around them, experiencing other cultures and beliefs and thinking about different life events. Children love to ask "why?" as they begin to work out the reasons for things changing, seasons, weather and animal behaviour. They are working out connections and differences between people and the environment and how they fit into it. Children enjoy finding out about their own family history and how their family celebrates. This encourages their natural sense of wonder and curiosity about the world around us.

We have designed our curriculum to ensure that in **Y1 and Y2** our children have opportunities to:

- Ask simple questions and recognise that they can be answered in different ways
- Observe closely, using simple equipment
- Perform simple tests
- Identify and classify
- Gather and record data to help in answering questions
- Use their observations and ideas to suggest answers to questions.

In **Y3 and Y4** our curriculum is designed to ensure our children have further opportunities to develop the following processes and skills:

- 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.

In Y5 and Y6, our curriculum is designed to support our children to:

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Use test results to make predictions to set up further comparative and fair tests
- Report and present 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
- Identify scientific evidence that has been used to support or refute ideas or arguments.

IMPLEMENTATION: NATIONAL CURRICULUM

Our school follows the National Curriculum which defines: the subjects taught, the knowledge, skills and understanding required in each subject and the structures required to ensure teaching and learning are balanced and consistent.

Our curriculum ensures all pupils:

- 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
- are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

IMPLEMENTATION: PLANNING

Our long term planning ensures coverage of the National Curriculum and is responsive to the interests and needs of our children. In order to widen and deepen their essential knowledge, skills, understanding and behaviours our children continuously return to key concepts and skills in order to gain a deeper and more insightful understanding.

	EYFS	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Science You may see science through...	Understanding the world EYFS: the world Physical Development: Health and Self care Expressive Arts and Design: Exploring and Using Media and Materials	All about me: How am I special? Where I live Comparing myself to when I was a baby and now (growth) Learn about the physical development of our bodies from when we were babies to now: What Can I do by myself now? (Hold a pencil, use scissors, drawing etc) Exploring the different textures of media – natural / found objects and other craft media.	Changes in the world around us Exploring the world around us and comparing environments: home, school and Calderstones Park Observing the effects of physical activity on our bodies: Looking at how our breathing changes and feeling our heartbeat.	Comparing Winter / Autumn – what changes can we see? (investigating frost / ice and water) Light / Dark And Electricity PE - Gym Why is exercise important? Tasting different foods. Creating a menu of variety.	Why do we get so many new flowers in spring? Comparing Spring to Autumn / Winter (patterns and change) Flower colour changing investigation. New life: investigating new animals coming out of hibernation in different environments. Floating and Sinking	Animal / Minibeast Life cycles Why are insects helpful for our garden? Monitoring the effects of exercise on our bodies.	Comparing Summer to the other seasons – temperature, weather, growth. How can I make a plant grow? Planting seeds and growing Plants Healthy / Unhealthy Food & Looking after our bodies.
Understanding the World: The World 30-50mths • Comment and ask questions about aspects of their familiar world, such as the place where they live or the natural world. • Talk about some of the things they have observed, such as plants, animals, natural and found objects. • Talk about why things happen and how things work. • Develop an understanding of growth, decay and changes over time. • Show care and concern for living things and the environment. 40-60mths Look closely at similarities, differences, patterns and change. ELG • 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 might vary from one another.		Physical Development: Health and Self Care 30-50mths Observe the effects of physical activity on their bodies. 40-60mths Eat a healthy range of foodstuffs and understand a need for variety in food. • Show some understanding that good practices with regard to exercise, eating, sleeping and hygiene can contribute to Good health. ELG Know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe.				Expressive Arts and Design: Exploring using media and materials 30-50mths • Begin to be interested in and describe the texture of things.	

Our Lady's Bishop Eton Long Term Map – Science

	Autumn	Spring	Summer
Year 1	Everyday Materials Humans (senses) Seasonal Changes	Animals Everyday Materials Seasonal Changes	Plants Animals Seasonal Changes
Year 2	Living Things and Their Habitats Use of Everyday Materials	Use of Everyday Materials Plants	Animals, including Humans Plants
Year 3	Animals, including Humans Light	Forces and Magnets Plants	Plants Rocks
Year 4	Animals, including Humans Sound	States of Matter Electricity	Living Things and Their Habitats Animals, including Humans States of Matter
Year 5	Earth and Space Properties and Changes of Materials	Forces Living Things and Their Habitats	Living Things and Their Habitats Animals, including humans Properties and Changes of Materials
Year 6	Evolution and Inheritance Light	Animals, including Humans Electricity	Living Things and Their Habitats Animals, including Humans

Biology; Chemistry; Physics

IMPLEMENTATION: PROGRESSION KNOWLEDGE & SKILLS

Progression in Knowledge Y1

Plants	Animals, including humans	Everyday Materials	Seasonal Changes
Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals (including pets)	Distinguish between an object and the material from which it is made	Observe changes across the four seasons
Identify and describe the basic structure of a variety of common flowering plants, including trees	Identify and name a variety of common animals that are carnivores, herbivores and omnivores	Compare and group together a variety of everyday materials on the basis of their simple physical properties	Observe and describe weather associated with the seasons and how day length varies
	Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)	Describe the simple physical properties of a variety of everyday materials	
	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses	

Progression in Knowledge Y2

Living things and their habitats	Plants	Animals, including humans	Uses of everyday materials
Explore and compare the differences between things that are living, dead, and things that have never been alive	Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Notice that animals, including humans, have offspring which grow into adults	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
Identify and name a variety of plants and animals in their habitats, including micro-habitats	Observe and describe how seeds and bulbs grow into mature plants	Find out about and describe the basic needs of animals, including humans, for survival (water, food, air)	Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
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 the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	
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			

Progression in Knowledge Y3

Plants	Animals, including humans	Rocks	Light	Forces and Magnets
Identify and describe the functions of different parts of flowering plants: roots, stem/trunk leaves and flowers	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	Compare and group together different kinds of rocks on the basis of their simple physical properties	Recognise that they need light in order to see things and that dark is the absence of light	Compare how things move on different surfaces
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	Identify that humans and some other animals have skeletons and muscles for support, protection and movement	Recognise that soils are made from rocks and organic matter	Notice that light is reflected from surfaces	Notice that some forces need contact between two objects but magnetic forces act at a distance
Investigate the way in which water is transported within plants		Describe in simple terms how fossils are formed when things that have lived are trapped within rock	Recognise that shadows are formed when a light source is blocked by a solid object	Observe how magnets attract or repel each other and attract some materials and not others
Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			Find patterns in the way that the size of shadows change	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
			Recognise that light from the Sun can be dangerous and that there are ways to protect our eyes	Describe magnets as having two poles
				Predict whether two magnets will attract or repel each other, depending on which poles are facing

Progression in Knowledge Y4

Living things and their habitats	Animals, including humans	States of matter	Sound	Electricity
Recognise that living things can be grouped in a variety of ways	Describe the simple functions of the basic parts of the digestive system in humans	Compare and group materials together, according to whether they are solids, liquids or gases	Identify how sounds are made, associating some of them with something vibrating	Identify common appliances that run on electricity
Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	Identify the different types of teeth in humans and their simple functions	Observe that some materials change state when they are heated or cooled, and measure or research the temperature at	Recognise that vibrations from sound travel through a medium to the ear	Construct a simple series electrical circuit identifying and naming the basic parts of a simple electrical circuit, including

Recognise that environments can change constantly changing and that this can sometimes pose dangers to specific habitats	Construct and interpret a variety of food chains, identifying producers, predators and prey	<p>which this happens in degrees Celsius (°C)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>Recognise that sounds get fainter as the distance from the sound source increases</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it.</p>	<p>cells, wires, bulbs, switches and buzzers</p> <p>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</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors</p>
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Progression in Knowledge Y5

Living things and their habitats	Animals, including humans	Properties and changes of materials	Earth and space	Forces
<p>Describe the difference in the life cycles of a mammal, an amphibian an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals</p>	Describe the changes as humans develop to old age	<p>Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, include changes associated with burning and the action of acid on bicarbonate of soda</p>	<p>Describe the movement of the Earth, and other planets relative to the Sun in the solar system</p> <p>Describe the movement of the Moon relative to the Earth</p> <p>Describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p>	<p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effect of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p>

Progression in Knowledge Y6

Living things and their habitats	Animals, including humans	Evolution and Inheritance	Light	Electricity
<p>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</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p>	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (including the pulse and clotting).</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans</p>	<p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>	<p>Recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>Use the idea that light travels in straight lines to explain why</p>	<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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</p> <p>Use recognised symbols when representing a simple circuit in a diagram</p>

			shadows have the same shape as the objects that cast them	
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IMPLEMENTATION: PROGRESSION WORKING SCIENTIFICALLY

KS 1	WS Towards NS KS1 children	WS NS KS1 children	WS Beyond NS KS1 children can		
LKS 2		WS Towards NS LKS2 children	WS NS LKS2 children	WS Beyond NS LKS2 children	
UKS 2			WS Towards NS UKS2 children	WS NS UKS2 children	WS Beyond NS UKS2 children
Plan		asking simple questions and recognising that they can be answered in different ways	ask relevant questions and using different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests	plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary use test results to make predictions to set up further comparative and fair tests	ask questions and develop a line of enquiry based on observations of the real world alongside prior knowledge and experience make predictions using scientific knowledge and understanding
Do	Know about similarities and differences in relation to places, objects, materials and living things. They make observations of animals and plants	observe closely, using simple equipment perform simple tests identify and classify	make systematic and careful observations and , where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	select, plan and carry out the most appropriate types of scientific enquiries to test predictions
Record		gather and recording data to help in answering questions	gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements present observations and data using appropriate methods, including tables and graphs
Review	They talk about the features of their own immediate environment and how environments might vary from one another. They explain why some things occur, and talk about changes.	use their observations and ideas to suggest answers to questions	report on findings from enquiries, include oral and written explanations, displays or presentations of results and conclusions use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identify differences, similarities or changes related to simple scientific ideas and processes. Use straightforward scientific evidence to answer questions or to support their findings.	report and present findings from enquiries, including conclusions, causal relationships and explanations results, explanations of and degree of trust in results, in oral and written forms such as displays and other presentations identify scientific evidence that has been used to support or refute ideas or arguments.	interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions present reasoned explanations, including data in relation to predictions and hypotheses evaluate data, showing awareness of potential sources of error identify further questions arising from results

IMPLEMENTATION: PROGRESSION VOCABULARY

Y1

Plants	Animals, including humans	Everyday Materials	Seasonal Changes
Leaves, flowers, blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem	Fish, amphibian, reptile, bird, mammal	Wood, plastic, glass, metal, water, rock, brick, paper, card, rubber, fur, fleece, cotton, wool, polyester, cotton wool	Spring, summer, autumn, winter
Names of plants in their local environment, for example: Grass, Clover, Daisy, Buttercup, Dandelion, Oak, Holly, Daffodil, Tulip etc. and plants they grow to eat such as lettuce, tomatoes, cucumber, radish, herb etc.	Common names of Fish, amphibians, reptiles, birds, mammals, including pets and those found in the local environment	Names of common objects made from these materials e.g. door, building block, window, pencil sharpener, teddy etc.	Day, night, light, dark, sunrise, sunset
	Common structure of animals including humans: Head, face, ears, hair, eyes, nose, mouth, teeth, cheek, chin, neck, body, arms, hands, fingers, paws, fins, wings, legs, feet, toes, tail, skin, scales, fur, feathers	Soft, hard, rough, smooth, stretchy, stiff, shiny, dull, rough, smooth, flexible, waterproof, absorbent, opaque, transparent, translucent	Sun, rain, snow, hail, precipitation, wind, cloud, cloud cover
	Herbivore, carnivore, omnivore See, look, hear, listen, touch, feel, taste, smell		Deciduous, evergreen tree

Y2

Living things and their habitats	Plants	Animals, including humans	Uses of everyday materials
Living, dead, non-living	Seeds, bulbs, grow, healthy, water, light, temperature, soil, nutrients	Reproduce, offspring, grow, adults (Fish, amphibian, reptile, bird, mammal, humans)	Wood, plastic, glass, metal, water, rock, brick, paper, card, rubber, fur, fleece, cotton, wool, polyester, cotton wool
Habitat, micro habitat, food chain	Leaves, flowers, blossom, petals, fruit, roots, trunk, branches, stem	Survival, water, food, air, shelter	Words to describe why certain materials are suitable for particular uses e.g. soft, hard, rough, smooth, stretchy, stiff, shiny, dull, rough, smooth, flexible, waterproof, absorbent, opaque, transparent, translucent
Field, Hedgerow, pond, woodland, seashore, ocean, rainforest, arctic, desert	Names of plants in their local environment, for example: grass, Clover, Daisy, Buttercup, Dandelion, Oak, Holly, Daffodil, Tulip etc. and plants they grow to eat such as lettuce, tomatoes, cucumber, radish, herb etc.	Exercise, fit, healthy, food, fruit, vegetables, meat, fish, eggs, nuts, pulses, beans, milk, cheese, bread, pasta, rice, butter, vegetable oil, olive oil	Squash, bend, twist, stretch
Air, food, water, shelter, heat, warmth, sun		Common names of Fish, amphibians, reptiles, birds, mammals including pets and those found in the local environment	
		Common structure of animals including humans: Head, face, ears, hair, eyes, nose, mouth, teeth, cheek, chin, neck, body, arms, hands, fingers, paws, fins, wings, legs, feet, toes, tail, skin, scales, fur, feathers	
		Herbivore, carnivore, omnivore	

Y3

Plants	Animals, including humans	Rocks	Light	Forces and Magnets
Leaves, flowers, blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem, stigma, style, anther	Humans, food, feeding, balanced, diet, meat, fish, eggs, nuts, pulses, beans, cereal, fruit, vegetables, dairy products, milk, cheese, butter, potatoes, bread, rice, pasta, vitamins, minerals	Rocks, granite, limestone, sandstone, fossil, soil, sandy, peat, decay, compost	See, eyes, light, dark, absence	Force, contact, non-contact
Air, light, water, nutrients, soil, transport, seed, seedling, bulb, compost, decay, die, fruit, moisture, ovary ovule	Fish, amphibian, reptile, bird, mammal	Soft, hard, rough, smooth, stiff, shiny, dull, rough, waterproof, absorbent, opaque, transparent, translucent, texture	Light sources, Sun, dangerous, lamp, flame, torch, light bulb	Move, surface, material, carpet, tiles, wood, lino, bubble wrap, sandpaper, fleece, polythene, towel
Pollen, pollination, seed formation, dispersal, reproduce	Skeleton, skull, ribs, spine (backbone), joints, support, muscles		Day, night, light, dark, dim, sunrise, sunset, dusk	Magnet, magnetic, magnetic field, bar, horseshoe, ring, strength, strong, weak, metal, coated, attract, repel, poles, north, south
			Reflect, reflection, reflected, shadows, size, shape, pattern	

Y4

Living things and their habitats	Animals, including humans	States of matter	Sound	Electricity
Classify, classification, animal, vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, snails, slugs, worms, spiders, insects, flowering plants, non-flowering plants, ferns, mosses, fungi	Digestion, mouth, teeth, tongue, saliva, oesophagus, stomach, gastric juices, enzyme, small intestine, bile, pancreatic juice, large intestine, rectum	Solids, liquids, gases	Sound, sources, vibrating, medium, ear, eardrum, instruments, pitch, high, low, volume, loudness, loud, soft, quiet, insulation, sound proof, distance, fainter	Electrical appliances, mains, battery, television, computer, tablet, mobile phone, light, lamp, cooker, microwave, toaster, radio
Environment, habitat, micro habitat, adaption, human impact, ecological, ecosystem, nature reserves, parks, ponds, pollution, litter, deforestation, field, hedgerow, pond, woodland, seashore, ocean, rainforest, arctic, desert, nest, burrow, air, food, water, shelter, heat, warmth, sun, camouflage	Incisors, cut, slice, canines, grip, pierce, premolars, molars, crush, grind, dental, dentist, disclosing tablets	Change state melt, freeze, heated, cooled, temperature, Celsius, chocolate, butter, ice, water, steam, water vapour		Component, bulb, buzzer, battery, cell, wire, motor, switch, open, closes, circuit, series, complete loop, bright, brightness, current
	Food chain, producers, predators, prey, herbivore, carnivore, omnivore	Water cycle, evaporation, condensation, rate, precipitation, rain, rain fall, snow, sleet		Electrical insulator, plastic, fabric, electrical conductor, metals, water

Y5

Living things and their habitats	Animals, including humans	Properties and changes of materials	Earth and space	Forces
<p>Life cycle, reproduction, asexual, sexual, animal, vertebrates, amphibians, reptiles, birds, mammals, invertebrates, insect, babies, young, grow, adult, metamorphosis, egg, caterpillar, larva, chrysalis, pupa, head, abdomen, thorax, wings, fur, feathers, scales</p> <p>Plants, seeds, stem, root cuttings, tubers, bulbs, pollen, leaves, flowers, blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem, stigma, style, anther, ovary, ovule, seed formation, seed dispersal</p>	<p>Humans, gestation, baby, child, teenager, adult, geriatric, puberty, hormones, muscles, testicles, pubic hair, voice, acne, breasts, hips, period, ovulation</p>	<p>Soft, hard, rough, smooth, stiff, shiny, dull, rough, waterproof, absorbent, opaque, transparent, translucent, texture, conduct, insulate, electrical, thermal, magnetic, viscous, elastic, flexible, brittle, permeable, impermeable, break down, brittle, fragile, metal, durable, plastic, wood, ceramic, concrete</p> <p>Solids, liquids, gases, dissolve, solution, substance, separated, filtering, sieving, evaporating, reversible, irreversible state, burning, oxygen, acid, bicarbonate of soda, carbon dioxide</p> <p>Change state melt, melting, freeze, heated, cooled, temperature, Celsius, butter, ice, water, steam, water vapour, water cycle, evaporation, condensation, rate, precipitation, rain</p>	<p>Day, night, light, dark, dim, sunrise, sunset, dusk, Earth, moon, moons, reflect, sun, star, spherical, rotation, Earth's axis, solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune (Pluto as a dwarf planet), astronomical clock, crescent, gibbous, orbit, Full Moon, illuminate, lunar month, reflect, waning, waxing</p>	<p>Force, contact, non-contact, gravity, falling, weight, mass, friction, smooth, rough, air resistance, water resistance, floating, ripples, streamlined, surface area, sink, pull, newton, drag, levers, pulleys, gears, inclined plane, rollers, pivot move, surface, material, carpet, tiles, wood</p>

Y6

Living things and their habitats	Animals, including humans	Evolution and Inheritance	Light	Electricity
<p>Vertebrates, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, head, abdomen, thorax, wings, fur, feathers, scales, plants, micro-organisms, kingdom, species</p>	<p>Blood, heart, heart rate, circulation, oxygen, lungs, veins, arteries, cells, pulse rate, healthy diet, exercise, drugs, nutrients, water</p>	<p>Fossils, evolution, evolve, inherit, inheritance, offspring, vary, variation, species, adapted, environment, climate, habitat, suited</p>	<p>See, eyes, light, straight lines, reflect, reflected, reflection, light sources, shadows, size, shape, pattern, mirrors, (possibly extend to include rainbows, colour, colour filters, water, refraction)</p>	<p>Component, bulb, buzzer, battery, cell, wire, motor, switch, open, closes, circuit, series, complete loop, bright, brightness, current, volume, volts, voltage, symbols, circuit diagram</p>

IMPLEMENTATION: PERSONAL, SOCIAL, HEALTH AND ECONOMIC EDUCATION

Science contributes to the **SPIRITUAL, MORAL, EMOTIONAL, INTELLECTUAL, SOCIAL AND PHYSICAL** development of our children.

BY THE END OF PRIMARY SCHOOL PUPILS SHOULD KNOW:
FAMILIES AND PEOPLE WHO CARE FOR ME
<p>The characteristics of healthy family life, commitment to each other, including in times of difficulty, protection and care for children and other family members, the importance of spending time together and sharing each other's lives.</p> <p>That others' families, either in school or in the wider world, sometimes look different from their family, but that they should respect those differences and know that other children's families are also characterised by love and care.</p>
CARING FRIENDSHIPS: PUPILS SHOULD KNOW
<p>That healthy friendships are positive and welcoming towards others, and do not make others feel lonely or excluded.</p>
RESPECTFUL RELATIONSHIPS: PUPILS SHOULD KNOW:
<p>The importance of respecting others, even when they are very different from them (for example, physically, in character, personality or backgrounds), or make different choices or have different preferences or beliefs.</p> <p>Practical steps they can take in a range of different contexts to improve or support respectful relationships.</p> <p>That in school and in wider society they can expect to be treated with respect by others, and that in turn they should show due respect to others, including those in positions of authority.</p> <p>What a stereotype is, and how stereotypes can be unfair, negative or destructive.</p> <p>The importance of permission-seeking and giving in relationships with friends, peers and adults.</p>
ONLINE RELATIONSHIPS: PUPILS SHOULD KNOW
<p>How to critically consider their online friendships and sources of information including awareness of the risks associated with people they have never met.</p> <p>How information and data is shared and used online.</p>
BEING SAFE PUPILS SHOULD KNOW
<p>What sorts of boundaries are appropriate in friendships with peers and others (including in a digital context).</p> <p>That each person's body belongs to them, and the differences between appropriate and inappropriate or unsafe physical, and other, contact.</p> <p>How to respond safely and appropriately to adults they may encounter (in all contexts, including online) whom they do not know.</p>

IMPLEMENTATION: SPIRITUAL MORAL SOCIAL AND CULTURAL DEVELOPMENT

Our Science Curriculum is also key in developing our children's ability to:

Spiritual Development	Moral Development	Social Development	Cultural Development
<p>Collaborate in teams showing cooperation and respect for others</p> <p>Celebrate the achievement of others</p> <p>Appreciate the rights and responsibilities of individuals within the wider social setting</p> <p>Exercise responsibility</p> <p>Resolve conflict</p> <p>Adjust to a range of social contexts by appropriate and sensitive behaviour</p> <p>Challenge, when necessary and in appropriate ways, the values of a group or wider community</p> <p>Share values and opinions with others and works towards consensus</p> <p>Reflect on their own contribution to society</p> <p>Relate well to other peoples' social skills and personal qualities</p> <p>Understand the notion of interdependence in an increasingly complex society</p>	<p>Distinguish right from wrong</p> <p>Have an awareness of and respect for others' needs, feelings and interests</p> <p>Celebrate the achievement of others</p> <p>Act consistently in accordance with their own principles</p> <p>Explore their own and others' views</p> <p>Commit to personal values in areas which are considered right by some and wrong by others</p> <p>Make responsible and reasoned judgements on moral dilemmas</p> <p>Think through consequences of their own and others' actions</p> <p>Live a considerate style of life</p> <p>Understand of the need to review and reassess their values, codes and principles in the light of experience</p>	<p>Develop a spiritual awareness of the body, its beauty and potential through activity and observation.</p> <p>Develop inner determination to do one's best and recognise and develop one's inner potential and strength.</p> <p>Respect themselves and others</p> <p>Reflect</p> <p>Express empathy, Concern & Compassion</p> <p>Understand their own and others beliefs</p> <p>Think in terms of the whole</p> <p>Challenge all that would constrain the human spirit: poverty of aspiration, lack of self-confidence and belief, indifference, force, aggression, injustice, self-interest, sexism and racism</p> <p>Be courageous and consistent in the defence of their aims, values, principles and beliefs</p> <p>Respect insight as well as knowledge and reason</p>	<p>Recognise and understand their own cultural assumptions and values</p> <p>Have regard for the rights of human achievement in all cultures and societies</p> <p>Be open to new ideas and a willingness to modify cultural values in the light of experience</p>

IMPLEMENTATION: ASSESSMENT

We have high expectations of our learners and pupils are assessed regularly during lessons and following a unit of work. There is an expectation that all of our children will achieve the expected standard at the end of each year group. Our more able children are extended through Working Scientifically skills so they can become more independent.

Y1	Curriculum content	Pupils performing below ARE (Y1).
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 	
Animals including humans	<ul style="list-style-type: none"> identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals (including pets) 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 	
Everyday materials	<ul style="list-style-type: none"> distinguish between an object and the material from which it is made compare and group together a variety of everyday materials on the basis of their simple physical properties describe the simple physical properties of a variety of everyday materials identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses 	
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 	
Pupils performing below and beyond expectation in National Curriculum Science 'Working Scientifically' knowledge content (KS1) in Y1		
Plan	<ul style="list-style-type: none"> asking simple questions and recognising that they can be answered in different ways 	
Do	<ul style="list-style-type: none"> observe closely, using simple equipment perform simple tests identify and classify 	
Record	<ul style="list-style-type: none"> gather and recording data to help in answering questions 	
Review	<ul style="list-style-type: none"> use their observations and ideas to suggest answers to questions. 	

Y2	Curriculum content	Pupils performing below ARE Y2
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 and name a variety of plants and animals in their habitats, including micro-habitats 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 	

Plants	<ul style="list-style-type: none"> find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. observe and describe how seeds and bulbs grow into mature plants 	
Animals including humans	<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, air) describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	
Uses of everyday materials	<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 	
Pupils performing below and beyond expectation in National Curriculum Science 'Working Scientifically' knowledge content (KS1) in Y2		
Plan	<ul style="list-style-type: none"> asking simple questions and recognising that they can be answered in different ways 	
Do	<ul style="list-style-type: none"> observe closely, using simple equipment perform simple tests identify and classify 	
Record	<ul style="list-style-type: none"> gather and recording data to help in answering questions 	
Review	<ul style="list-style-type: none"> use their observations and ideas to suggest answers to questions. 	

Y3	Curriculum content	Pupils performing below ARE Y3
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 investigate the way in which water is transported within plants explore the part of flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	
Animals including humans	<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 	
Rocks	<ul style="list-style-type: none"> compare and group together different kinds of rocks on the basis of their simple physical properties recognise that soils are made from rocks and organic matter describe in simple terms how fossils are formed when things that have lived are trapped within rock 	
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 a light source is blocked by a solid object find patterns in the way the size of shadows change 	
Forces and magnets	<ul style="list-style-type: none"> compare how things move on different surfaces notice that some forces need contact between two 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 two poles predict whether two magnets will attract or repel each other, depending on which poles are facing 	
Pupils performing below and beyond expectation in National Curriculum Science 'Working Scientifically' knowledge content (LKS2) in Y3		
Plan	<ul style="list-style-type: none"> ask relevant questions and using different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests 	
Do	<ul style="list-style-type: none"> make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers 	
Record	<ul style="list-style-type: none"> gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 	
Review	<ul style="list-style-type: none"> report on findings from enquiries, include oral and written explanations, displays or presentations of results and conclusions use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identify differences, similarities or changes related to simple scientific ideas and processes use straightforward scientific evidence to answer questions or to support their findings. 	

Y4	Curriculum content	Pupils performing below ARE Y4	
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 recognise that environments can change constantly changing and that this can sometimes pose dangers to specific habitats. 		
Animals including humans	<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 		
States of 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 		
Sound	<ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating recognise that vibrations from sound travel through a medium to the ear recognise that sounds get fainter as the distance from the sound source increases 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 		
Electricity	<ul style="list-style-type: none"> identify common appliances that run on electricity construct a simple series electrical circuit identifying and naming the basic parts of a simple electrical circuit, 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 		
Pupils performing below and beyond expectation in National Curriculum Science 'Working Scientifically' knowledge content (LKS2) in Y4		Pupils below expectation	Pupils beyond expectation
Plan	<ul style="list-style-type: none"> ask relevant questions and using different types of scientific enquiries to answer them set up simple practical enquiries, comparative and fair tests 		
Do	<ul style="list-style-type: none"> make systematic and careful observations and , where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers 		
Record	<ul style="list-style-type: none"> gather, record, classify and present data in a variety of ways to help in answering questions record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 		
Review	<ul style="list-style-type: none"> report on findings from enquiries, include oral and written explanations, displays or presentations of results and conclusions use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identify differences, similarities or changes related to simple scientific ideas and processes use straightforward scientific evidence to answer questions or to support their findings. 		

Y5	Curriculum content	Pupils performing below ARE Y5	
Living things and their habitats	<ul style="list-style-type: none"> describe the difference 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. 		
Animals including humans	<ul style="list-style-type: none"> describe the changes as humans develop to old age 		
Properties and changes of materials	<ul style="list-style-type: none"> compare and group together everyday materials based on evidence from comparative and fair tests, 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, include changes associated with burning and the action of acid on bicarbonate of soda 		
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 		
Forces	<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 effect 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 		

Pupils performing below and beyond expectation in National Curriculum Science 'Working Scientifically' knowledge content (UKS2) in Y5	Pupils below expectation	Pupils beyond expectation
Plan <ul style="list-style-type: none"> plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary use test results to make predictions to set up further comparative and fair tests 		
Do <ul style="list-style-type: none"> take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate 		
Record <ul style="list-style-type: none"> record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 		
Review <ul style="list-style-type: none"> report and present findings from enquiries, including conclusions, causal relationships and explanations results, explanations of and degree of trust in results, in oral and written forms such as displays and other presentations identify scientific evidence that has been used to support or refute ideas or arguments. 		

Y6	Curriculum content	Pupils performing below ARE (Y6).
Living things and their habitats	<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 the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (including the pulse and clotting) 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 	
Light	<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 	
Electricity	<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 	

Pupils performing below and beyond expectation in National Curriculum Science 'Working Scientifically' knowledge content (UKS2) in Y6	Pupils below expectation	Pupils beyond expectation
Plan <ul style="list-style-type: none"> plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary use test results to make predictions to set up further comparative and fair tests 		
Do <ul style="list-style-type: none"> take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate 		
Record <ul style="list-style-type: none"> record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs 		
Review <ul style="list-style-type: none"> report and present findings from enquiries, including conclusions, causal relationships and explanations results, explanations of and degree of trust in results, in oral and written forms such as displays and other presentations identify scientific evidence that has been used to support or refute ideas or arguments. 		

IMPLEMENTATION: HEALTH & SAFETY AND SAFEGUARDING

Activities are Risk Assessed as appropriate. Evolve and Risk Assessments are completed for all off site activities. Appropriate staff supervision ratios are ensured. Approved venues and transport are used.

IMPLEMENTATION: STAFF DEVELOPMENT

Our school maintains the culture, training, partnerships and levels of resources necessary to ensure the continuous development of all aspects of our Science curriculum.

INDUCTION

All new staff members are given copies of the Science Handbook. The Science co-ordinator provides a general overview of the scheme and explains the chosen approach. The co-ordinator is always available for further advice and support if necessary. As each member of staff works alongside another in a year group, advice from the experienced member of staff that you work alongside is also available.

DEVELOPMENT

Both generic whole school and individual training are organised in response to any identified needs.

IMPLEMENTATION: RESOURCES

Science funding is allocated annually and includes elements to cover consumables and enrichment and development activities. General science equipment, reference books and other science resources are stored in class bases and our School's Phiz Lab. Outside agencies and organisations are used to further promote teaching and learning.

IMPACT

OUR SCIENCE CURRICULUM

- Ensures that all of our children have equal access to a broad and balanced mastery science curriculum which supports them to sequentially develop their knowledge, understanding and skills across all strands of the subject
- Responds to the unique value of every child and supports the formation of the whole person. It also helps embed the Gospel Values of Excellence, Respect, Responsibility, Courage, Commitment, Co-operation, inclusion and initiative. It also promotes the British Values of Democracy, Tolerance, and Mutual Respect.

OUR CHILDREN

Ensures all of our children have equal access to a relevant and accessible curriculum and a range of pedagogy which support them to achieve their full potential with regards to their **SPIRITUAL, MORAL, EMOTIONAL, INTELLECTUAL, SOCIAL, PHYSICAL AND CULTURAL** development.

We provide opportunities for our children to develop the universally applicable skills of:

- Problem-solving
- Critical thinking
- Generating ideas
- Weighing decisions intelligently
- Understanding the evidence behind policy decisions
- Resilience, reflection and resourcefulness
- Knowledge and understanding of the big ideas that shape the world
- Confidence and responsibility

OUR SCHOOL IS

- An **INCLUSIVE SCHOOL** where all are treated equally and fairly and given equality of opportunity and voice regardless of gender, religion, additional need, disability or race.
- An **ACHIEVING SCHOOL** in which success and achievement are promoted and all of our children are supported to set high standards for themselves and to work hard to achieve these.
- A **HEALTHY SCHOOL** in which we ensure the physical, social spiritual and emotional education and development of our children through both our curriculum and extra curricula provision.
- An active **PARTNER** with local and national agencies with the shared aim of providing the best possible Science education for our children.

