

Progression in Science

Intent

We aim for children to have acquired the essential characteristics of scientists:

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations.
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.
- High levels of originality, imagination or innovation in the application of skills.
- The ability to undertake practical work in a variety of contexts, including fieldwork.
- A passion for science and its application in past, present and future technologies.

We believe Science is crucial in terms of the children learning the essential skills they need to be resilient leaders. We believe in a hands on teaching and learning approach that encapsulates the spirit of what Science is all about, so that the children will forever be 'Scientists' in the way that they interact with the world around them. Our Science curriculum reflects this, through our mixture of theory and working scientifically. The thoughts and opinions of our children is uppermost when planning the curriculum and this approach of theory and hands on learning is what excites and enthuses them.

Implementation:

- 1 Curriculum drivers shape our curriculum breadth in Science. They are derived from an exploration of the backgrounds of our students, our beliefs about high quality education and our values. They are used to ensure we give our students appropriate and ambitious curriculum opportunities. Our curriculum drivers are community, spirituality, culture, democracy and possibilities.
- 2 Cultural capital gives our students the vital background knowledge required to be informed and thoughtful members of our community who understand and believe in British values.
- 3 Curriculum breadth is shaped by our curriculum drivers, cultural capital, subject topics and our ambition for students to study the best of what has been thought and said by many generations of academics and scholars.
- 4 Our curriculum distinguishes between subject topics and 'Curriculum Themes'. Subject topics are the specific aspects of subjects that are studied.
- 5 Curriculum Themes tie together the subject topics into meaningful schema. The same concepts are explored in a wide breadth of topics. Through this 'forwards-and-backwards engineering' of the curriculum, students return to the same concepts over and over and gradually build understanding of them. In Science these are ***Living Things, Evolution and Inheritance, Properties of Materials, Forces, Light and Sound, Electricity and Earth and Space.***
- 6 Golden Threads: These 'Golden Threads' help students to relate each topic to previously studied topics and to form strong, meaningful schema.
- 7 Cognitive science tells us that working memory is limited and that cognitive load is too high if students are rushed through content. This limits the acquisition of long-term memory. Cognitive science also tells us that in order for students to become creative thinkers, or have a greater depth of understanding they must first master the basics, which takes time.
- 8 Progression: For each of the Curriculum Themes, learning is planned by year group, each of which includes the procedural knowledge and Golden Threads in each Topic, giving students a way of expressing their understanding of the Curriculum Themes.

9. **Cognitive Domains:** Within each year group, students gradually progress in their procedural fluency and semantic strength through three cognitive domains: remembering, knowing and reasoning. The goal for students is to display sustained mastery at the 'knowing' stage of understanding by the end of each phase (Key Stage 1, Lower Key Stage 2 and Upper Key Stage 2) and for the most able to have a greater depth of understanding at the 'reasoning' stage.
10. Cognitive science tells us that working memory is limited and that cognitive load is too high if students are rushed through content. This limits the acquisition of long-term memory. Cognitive science also tells us that in order for students to become creative thinkers, or have a greater depth of understanding they must first master the basics, which takes time.
11. **Progression:** For each of the Curriculum Themes, learning is planned by year group, each of which includes the procedural knowledge and Golden Threads in each Topic, giving students a way of expressing their understanding of the Curriculum Themes.
12. **Cognitive Domains:** Within each year group, students gradually progress in their procedural fluency and semantic strength through three cognitive domains: remembering, knowing and reasoning. The goal for students is to display sustained mastery at the 'advancing' stage of understanding by the end of each phase (EYFS, Key Stage 1, Lower Key Stage 2 and Upper Key Stage 2) and for the most able to have a greater depth of understanding at the 'deep' stage.

Progression through the Cognitive Domains		
Remembering	Knowing	Reasoning
Acquiring knowledge.	Applying knowledge.	Reasoning with knowledge.
Knowledge is explicit and unconnected.	Knowledge is explicit and connected.	Knowledge is connected and tacit.
Relying on working memory.	Drawing on long-term memory, freeing working memory to consider application.	Relies on long-term memory, freeing working memory to be inventive.
Procedures processed one at a time with conscious effort.	Procedures being automatic.	Automatic recall of procedures.
Understands only in the context in which the materials are presented.	Sees underlying concepts between familiar contexts.	Uses conceptual understanding in unfamiliar situations.
New information does not readily stick. Schemes are limited.	New information is linked to prior knowledge. Schemas are strong.	Readily assimilates new information into rapidly expanding schemas.
Struggles to search for problem solutions. Relies on means-end analysis.	Combines searching for problem solutions with means-end analysis.	Draws on a vast store of problem solutions.
Requires explicit instructions and models.	Uses models effectively.	Prefers discovery approaches to learning.

13. **Pedagogical Content Knowledge and Strategies:** As part of our progression model we use a different pedagogical style in each of the cognitive domains of remembering, knowing and reasoning. This is based on the research of Sweller, Kirschner and Rosenshine who argue to direct instruction in the early stages of learning and discovery based approaches later. We use direct instruction in the remembering domain and problem based discovery in the reasoning domain. This is called the reversal effect.
14. Our curriculum design is based on evidence from cognitive science; three main principles underpin it:
- Learning is most effective with spaced repetition.
 - Retrieval of previously learned content is frequent and regular, which increases both storage and retrieval strength.
 - By revisiting Golden Threads, pupils are able to build a strong schema, and develop skills as a Scientist.
15. In addition to the three principles, we also understand that learning is invisible in the short-term and that sustained mastery takes time.
16. Our content is subject specific. We make intra-curricular links to strengthen schema.
17. Continuous provision, in the form of daily routines, replaces the teaching of some aspects of the curriculum and, in other cases, provides retrieval practice for previously learned content.

EYFS

Communication and Language	Listening, Attention and Understanding	Make comments about what they have heard and ask questions to clarify their understanding.
Personal, Social and Emotional Development	Managing Self	Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
Understanding the World	The Natural World	<p>Explore the natural world around them, making observations and drawing pictures of animals and plants.</p> <p>Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</p> <p>Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.</p>

Milestone 1 Key Stage 1	Milestone 2 Lower Key Stage 2	Milestone 3 Upper Key Stage 2
Working scientifically		
<p>Ask simple questions.</p> <ul style="list-style-type: none"> • Observe closely, using simple equipment. • Perform simple tests. • Identify and classify. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions. 	<ul style="list-style-type: none"> • Ask relevant questions. • Set up simple, practical enquiries and comparative and fair tests. • Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. • 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, bar charts and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. • Identify differences, similarities or changes related to simple, scientific ideas and processes. • Use straightforward, scientific evidence to answer questions or to support their findings. 	<p>Plan enquiries, including recognising and controlling variables where necessary.</p> <ul style="list-style-type: none"> • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. • Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. • Present findings in written form, displays and other presentations. • Use test results to make predictions to set up further comparative and fair tests. • Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Understanding plants – Living Things		
Year 1	Year 3	Year 5
<p>Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.</p> <ul style="list-style-type: none"> Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers. 	<p>* Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers.</p> <ul style="list-style-type: none"> 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 role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. 	
Year 2	Year 4	Year 6
<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. 		<p><i>Relate knowledge of plants to studies of evolution and inheritance.</i></p> <ul style="list-style-type: none"> <i>Relate knowledge of plants to studies of all living things</i>

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Understand animals and humans – Living Things		
Year 1	Year 3	Year 5
<ul style="list-style-type: none"> • Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates. • 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 (birds, fish, amphibians, reptiles, mammals and invertebrates, 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"> • 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 changes as humans develop to old age.
Year 2	Year 4	Year 6
<ul style="list-style-type: none"> • Notice that animals, including humans, have offspring which grow into adults. • Investigate 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"> • 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"> • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions. • Describe the ways in which nutrients and water are transported within animals, including humans.

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Investigate living things – <i>Living Things</i>		
Year 1	Year 3	Year 5
<ul style="list-style-type: none"> Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals) 		<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.
Year 2	Year 4	Year 6
<ul style="list-style-type: none"> Explore and compare the differences between things that are living, that are dead and 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 micro-habitats. 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 specific habitats. 	<ul style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics. Give reasons for classifying plants and animals based on specific characteristics.

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Understand evolution and inheritance - Evolution and Inheritance		
Year 1	Year 3	Year 5
Year 2	Year 4	Year 6
		<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.

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Investigate materials – <i>Properties of Materials</i>		
Year 1	Year 3	Year 5
<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"> • Compare and group together different kinds of rocks on the basis of their simple, physical properties. • Relate the simple physical properties of some rocks to their formation (igneous or sedimentary). • Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock. • Recognise that soils are made from rocks and organic matter. 	<ul style="list-style-type: none"> • Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. • Understand how 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, oxidisation and the action of acid on bicarbonate of soda.
Year 2	Year 4	Year 6
<ul style="list-style-type: none"> • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/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 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 the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 	

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Understand movement, forces and magnets - Forces		
Year 1	Year 3	Year 5
	<ul style="list-style-type: none"> • Compare how things move on different surfaces. • Know how a simple pulley works and use to on to lift an object • 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. 	<p>Magnets</p> <ul style="list-style-type: none"> • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing. <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. • Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces. • <i>Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.</i> • <i>Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.</i> • Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect.
Year 2	Year 4	Year 6

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Understand light and seeing - Light and Sound		
Year 1	Year 3	Year 5
	<p>Recognise that they need light in order to see things and that dark is the absence of light.</p> <ul style="list-style-type: none"> • 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 a solid object. • Find patterns in the way that the size of shadows change. 	
Year 2	Year 4	Year 6
		<ul style="list-style-type: none"> • Understand 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 eyes. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes. • 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.

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Investigate sound and hearing – <i>Light and Sound</i>		
Year 1	Year 3	Year 5
Year 2	Year 4	Year 6
	<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. 	

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Understand electrical circuits - Electricity		
Year 1	Year 3	Year 5
Year 2	Year 4	Year 6
	<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.

Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
Understand the Earth's movement in space - Earth and Space		
Year 1	Year 3	Year 5
<p><i>To understand our solar system and to know that there is more out there other than just earth.</i></p> <p><i>To know the planets in our solar system and their order from the sun.</i></p> <p><i>To know the features of each planet.</i></p> <p><i>Observe the apparent movement of the Sun during the day.</i></p> <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. 		<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.
Year 2	Year 4	Year 6
Note		
<p>Items in italics are not statutory in the English National Curriculum</p>		

Progression in Science Vocabulary

Milestone 1 Key Stage 1	Milestone 2 Lower Key Stage 2	Milestone 3 Upper Key Stage 2
Tier 2 vocab- Diver words.		
<p>Draw, label, name, recognise, describe, match, identify, observe, list, apply, follow instructions, place, plan, think, illustrate, explain, group, design, summarise, notice, construct, predict</p> <p>Suggest, create, diagnose, modify, devise, prove, contrast, evidence, reason and justify.</p>	<p>Answer questions, compare and contrast, recommend, suggest reasons, reason, justify, propose, arrange, complete, experiment, summarise, cite evidence, relate, note, similarities and differences,</p> <p>Explain concepts, give examples, Demonstrate, Prove or disprove.</p>	<p>Graph, interpret, generalise, argue the statement, demonstrate, present, adapt, explain patterns, continuous variables.</p>
Working scientifically		
<ul style="list-style-type: none"> Question, answer, observe, equipment, identify, classify, sort, group, record, map, data, compare, describe, Biology, Chemistry, Physics. 	<p>Scientific enquiry, comparative and fair test, systematic, accurate, measurements, equipment, datalogger, thermometer, gather, classify, labelled diagrams, differences and similarities, changes, improve, construct, prove</p>	<p>Present, interpret, variables, precision, repeat readings, report, conclusion, causal relationships, explanations, degree of trust, reliability, quantitative measurements</p>
Understanding plants – Living Things		
<p>Root, stem, leaf, trunk, branches, water, temperature, flowers, blossom, fruit, vegetable, nutrients, evergreen, deciduous, wild, seasons, seeds, bulb, soil, dark, light, sun, germination</p> <p>Holly, Yew, Scots Pine Oak, Beech, Willow</p> <p>Flowers: Daisy, snowdrop, daffodil, Rose, Poppies, sun flower,</p>	<p>Warmth, growth, height, function, support, seed dispersal, capillary, xylem, phloem, stamen, anther, pollen, oxygen, carbon dioxide, photosynthesis, pollination, fertilizer, nutrition</p> <p>Ash, Silver birch, maple, Horse Chestnut</p> <p>Foxglove, bluebell, dandelion, lavender, geranium,</p> <p>Birds- Rook, blue tit, Great Tit, chaffinch, sparrow, Wren, Kestrel, Heron,</p>	<p>Trees- Sycamore, Alder, Lime, Crab Apple, Hawthorn, Rowan</p> <p>Flowers- Primrose, heather, pansies, honeysuckle, chrysanthemum,</p> <p>Birds- Tawny owl, Barn owl, swallow, House Martin, Greenfinch, Coal Tit, Warbler, Kite</p> <p>Photosynthesis</p>

<p>Birds- Wren, Blackbird, Robin, Carrion Crow, Magpie, pigeon, Sparrow Hawk</p>		
<p align="center">Understand animals and humans and Investigate living things – Living Things</p>		
<p>birds, fish, amphibians, reptiles, mammals and invertebrates. food chain</p> <p>carnivores, herbivores and omnivores, habitat, natural, man-made, MRS GREN, survive</p> <p>Offspring, hygiene, exercise, lifestyle, reproduce, diet, healthy, senses, body parts (hand, nose, mouth, eyes)</p> <p>Dead, alive, habitats, dependence, MRS GREN, suitability, micro-habitats, environment, natural</p>	<p>micro-habitats, producer, consumer, prey, predator, adaptations, camouflage, primary, secondary and tertiary consumers, Classification keys classify compare</p> <p>balanced diet, carbohydrates, proteins, fats, minerals, vitamins, calcium, scurvy, rickets, reproduce, skeleton, bones, ribs, vertebrates, invertebrates, contract, relax, muscles, joint, tissue, connective, calcium, X-ray, breast bone, pelvis, tibia, fibia, endoskeleton exoskeleton hydrostatic, ball joint socket joint hinge joint gliding joint</p> <p>digestion mouth tongue - mixes, moistens saliva oesophagus transports stomach acid enzymes small intestine – absorbs water vitamins large intestine – compacts colon</p>	<p>,biomes, ecosystems, Linnaean Carl Linnaeus,classification, domain,kingdom, phylum, class, order, family genus, species, characteristics, microorganisms or flowering non-flowering</p> <p>puberty life cycle gestation growth reproduce foetus baby fertilisation toddler child teenager adult old age life expectancy adolescence adulthood early adulthood middle adulthood late adulthood childhood</p> <p>internal organs, heart, lungs, liver, kidney, brain, circulatory system,blood vessels, impact lifestyle, alcohol, substances</p> <p>Artery, capillaries, aorta, diffusion, plasma, pulmonary vein, mucus membrane, toxins, fitness regime, vein, oxygenated, coronary, diabetes, insulin, pancreas, drug misuse, smoking,</p>
<p align="center">Understand evolution and inheritance – Evolution and Inheritance</p>		
	<p>Breeding, characteristics, inherit, selective breeding, environmental factors. parent offspring</p>	<p>evolution, survival of the fittest.</p> <p>inherited traits, adaptive traits, natural selection Charles Darwin Alfred Wallace, DNA, genes variation, fossilisation</p>

Investigate materials - Properties of Materials

<p>Material, wood, plastic, glass, metal, water and rock. brick/rock, and paper/cardboard</p> <p>physical properties.</p> <p>squashing, bending, twisting and stretching.</p>	<p>Rocks and Soils</p> <p>Matamorphic, igneous or sedimentary, granite, slate, shale, mudstone, sandstone, limestone, chalk, marble, pumice, lava, magma. properties , absorbcancy</p> <p>fossil formation.</p> <p>organic matter.</p> <p>solids, liquids or gases.</p> <p>evaporation and condensation in the water cycle, water vapour, solidfy, Degrees Celcius.</p>	<p>oxidisation and the action of acid on bicarbonate of soda.</p> <p>solubility transparency electrical conductor thermal conductor response to magnets dissolve solution separate separating solids liquids gases evaporating reversible changes dissolving mixing evaporation filtering sieving melting irreversible new material burning rusting magnetism electricity chemists Spencer Silver Ruth Benerito quantitative measurements conductivity insulation chemical</p>
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Understand movement, forces and magnets - Forces

<p>magnets</p>	<p>force push pull open surface magnet magnetic attract repel magnetic poles North South, metal, iron, aluminium, copper, steel, brass, stretch and compress</p>	<p>gravity air resistance water resistance friction surface force effect move accelerate decelerate stop change direction brake mechanism pulley gear spring theory of gravitation Galileo Galilei Isaac Newton, drag forces,</p>
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Understand light and seeing - Light and Sound

<p>Light, dark, see, sun, movement, travel, flames, seasons, light source.</p>	<p>Reflect, surface, natural, star, Sun, Moon, shadow blocked, artificial torch candle lamp sunlight dangerous protect eyes, translucent, transparent, opaque.</p>	<p>light travels straight reflect reflection object shadows mirrors periscope rainbow filters</p>
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Investigate sound and hearing - Light and Sound

<p><u>Ear- senses - hearing</u></p>	<p>vibrate vibration vibrating air medium ear hear sound volume pitch faint fainter loud louder string percussion woodwind brass insulate</p> <p>ear drum, canal,</p>	
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Understand electrical circuits - Electricity		
<i>Appliance, battery, circuit, electricity,</i>	electrical circuit, cell, wire, bulb, buzzer, danger, electrical safety, sign, insulators, rubber, conductors, switch open closed, series circuit, motor	voltage brightness volume switches danger working safely with electricity electrical safety sign circuit diagram recognised symbols
Understand the Earth's movement in space - Earth and Space		
<i>Day, night, light, moon, sun, earth, sphere</i>	Orbit, spherical, time zones, shadow clock, sundial, rotate, axis, Solar system	Eclipse, universe, solar, planet- Mars, Jupiter, Uranus, Neptune, Venus, Saturn.
Note		
<i>Items in italics are not statutory in the English National Curriculum</i>		



St Elizabeth's Catholic Voluntary Academy

Science Curriculum Map

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn (1)	<p>Understanding the World:</p> <ul style="list-style-type: none"> Comments and ask questions about the natural world <p>The World:</p> <ul style="list-style-type: none"> Looks closely at similarities, differences, pattern and change 	<p>Animals, including Humans</p> <ul style="list-style-type: none"> Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds Know and classify animals by what they eat (carnivore, herbivore and omnivore) Know how to sort by living and non-living things Know the name of parts of the human body that can be seen 	<p>Animals including humans</p> <ul style="list-style-type: none"> Know the basic stages in a life cycle for animals, (including humans) Know why exercise, a balanced diet and good hygiene are important for humans 	<p>Plants</p> <ul style="list-style-type: none"> Know the function of different parts of flowering plants and trees Know how water is transported within plants Know the plant life cycle, especially the importance of flowers 	<p>Animals including humans</p> <ul style="list-style-type: none"> Identify and name the parts of the human digestive system. Know the functions of the organs in the human digestive system. Identify and know the different types of human teeth. Know the functions of different human teeth. Use and construct food chains to identify producers, predators and prey. 	<p>Forces</p> <ul style="list-style-type: none"> Gravity Friction Forces and motion of mechanical devices. Know what gravity is and its impact on our lives Identify and know the effect of air and water resistance Identify and know the effect of friction Explain how levers, pulleys and gears allow a smaller force to have a greater effect 	<p>Light</p> <ul style="list-style-type: none"> Know how light travels Know and demonstrate how we see objects Know why shadows have the same shape as the object that casts them Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

Autumn (2)	<p><u>Understanding the World:</u></p> <ul style="list-style-type: none"> Shows care and concern for living things and the environment <p><u>The World:</u></p> <ul style="list-style-type: none"> Looks closely at similarities, differences, pattern and change 		<p>Animals including humans</p> <ul style="list-style-type: none"> Know the basic stages in a life cycle for animals, (including humans) Know why exercise, a balanced diet and good hygiene are important for humans 	<p>Rocks and Soils</p> <ul style="list-style-type: none"> Compare and group rocks based on their appearance and physical properties, giving reasons Know how soil is made and how fossils are formed Know about and explain the difference between sedimentary, metamorphic and igneous rock 	<p>Electricity</p> <ul style="list-style-type: none"> Identify and name appliances that require electricity to function. Construct a series circuit. Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers). Predict and test whether a lamp will light within a circuit. Know the function of a switch. Know the difference between a conductor and an insulator; giving examples of each. 	<p>Earth and Space</p> <ul style="list-style-type: none"> Know about and explain the movement of the Earth and other planets relative to the Sun Know about and explain the movement of the Moon relative to the Earth Know and demonstrate how night and day are created Describe the Sun, Earth and Moon (using the term spherical) 	<p>Electricity</p> <ul style="list-style-type: none"> Compare and give reasons for why components work and do not work in a circuit Draw circuit diagrams using correct symbols Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer
Spring (1)	<p><u>Understanding the World:</u></p> <ul style="list-style-type: none"> Comments and asks questions about where they live Be interested in families and talk about their own family <p><u>The World:</u></p> <ul style="list-style-type: none"> Children know about similarities and differences in relation to places, objects, materials and living things 	<p>Seasonal change</p> <ul style="list-style-type: none"> Name the seasons and know about the type of weather in each season <p>Space</p> <ul style="list-style-type: none"> To know what is meant by 'solar system' and to know that there are other planets, more than Earth. Know the planets in our solar system and their order from the sun. Know some of the features of the planets in the solar system. 	<p>Everyday Materials</p> <ul style="list-style-type: none"> Know how materials can be changed by squashing, bending, twisting and stretching Know why a material might or might not be used for a specific job 	<p>Forces</p> <ul style="list-style-type: none"> Know about and describe how objects move on different surfaces Know how a simple pulley works and use to on to lift an object Know how some forces require contact and some do not, giving examples Know about and explain how magnets attract and repel Predict whether magnets will attract or repel and give a reason 	<p>States of Matter</p> <ul style="list-style-type: none"> Know the temperature at which materials change state. Know about and explore how some materials can change state. Know the part played by evaporation and condensation in the water cycle. 	<p>Animals including Humans</p> <ul style="list-style-type: none"> Changes as humans develop from birth to old age. Create a timeline to indicate stages of growth in humans. 	<p>All living things and their habitats</p> <ul style="list-style-type: none"> Classify living things into broad groups according to observable characteristics and based on similarities and differences Know how living things have been classified Give reasons for classifying plants and animals in a specific way

Spring (2)

Understanding the World:

- Talk about why things happen and how things work

The World:

- They talk about the feature of their own immediate environment and how environments might vary from one another

Everyday Materials

- Know the name of the materials an object is made from
- Know about the properties of everyday materials

Everyday Materials

- Know how materials can be changed by squashing, bending, twisting and stretching
- Know why a material might or might not be used for a specific job

Animals including Humans

- Know how nutrients, water and oxygen are transported within animals and humans
- Know about the skeletal and muscular system of a human
- Know about the importance of a nutritious, balanced diet
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All living things and habitats

- Know the life cycle of different living things e.g. mammal, amphibian, insect and bird
- Know the differences between different life cycles
- Know the process of reproduction in plants
- Know the process of reproduction in animals

Evolution and inheritance

- Know how the Earth and living things have changed over time
- Know how fossils can be used to find out about the past cycles
- Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents)

Understanding the World:

- Developing an understanding of growth, decay and changes over time

The World:

- They make observations of animals and plants and explain why things occur

Plants

- Know and name a variety of common wild and garden plants
- Know and name the petals, stem, leaves and root of a plant
- Know and name the roots, trunk, branches and leaves of a tree

Plants

- Know and explain how seeds and bulbs grow into plants
- Know what plants need in order to grow and stay healthy (water, light & suitable temperature)

Light

- Know that dark is the absence of light
- Know that light is needed in order to see and is reflected from a surface
- Know and demonstrate how a shadow is formed and explain how a shadow changes shape
- Know about the danger of direct sunlight and describe how to keep protected

Sound

- Know how sound is made, associating some of them with vibrating.
- Know how sound travels from a source to our ears.
- Know the correlation between pitch and the object producing a sound.
- Know the correlation between the volume of a sound and the strength of the vibrations that produced it.
- Know what happens to a sound as it travels away from its source.

Properties and changes of materials

- Compare properties of everyday materials
- Soluble/ dissolving
- Reversible and irreversible substances
- Compare and group materials based on their properties. (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets)
- Know and explain how a material dissolves to form a solution
- Know and show how to recover a substance from a solution
- Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating)
- Know and demonstrate that some changes are reversible and some are not
- Know how some changes result in the formation of a new material and that this is usually irreversible

EVOLUTION AND INHERITENCE cont.

- Know how animals and plants are adapted to suit their environment
- Link adaptation over time to evolution
- Know about evolution and can explain what it is

Summer (2)

Understanding the World:

- Developing an understanding of growth, decay and changes over time

The World:

- Children know about similarities and differences in relation to place, objects, materials and living things.
- They talk about the features of their own immediate environment and how environments might vary from one another.
- They make observations of animals and plants and explain why some things occur and talk about changes.

Habitats

- Classify things by living, dead or never lived
- Know how a specific habitat provides for the basic needs of things living there (plants and animals)
- Match living things to their habitat
- Name some different sources of food for animals.
- Know about and explain a simple food chain

All Living Things and Their Habitats

- Use classification keys to group, identify and name living things.
- Know how changes to an environment could endanger living things.
- Group materials based on their state of matter (solid, liquid, gas).

Animals including humans

- Identify and name the main parts of the human circulatory system
- Know the function of the heart, blood vessels and blood
- Know the impact of diet, exercise, drugs and lifestyle on health
- Know the ways in which nutrients and water are transported in animals, including humans

RED – PHYSICS

ORANGE – CHEMISTRY

GREEN – BIOLOGY