



# CHJS Curriculum Map for Science



*Let your light shine (Matthew 5:16)*

In Science, children are encouraged to let their light shine by taking delight in learning about the God's wonderful world around them. By appreciating the wonder of science, children know how to make positive changes to humanity through innovation, exploration and scientific discovery. They are also encouraged to make positive changes within their classroom by sharing their knowledge with their peers and supporting each other with their learning. Children will let their sense of morality shine through by beginning to understand and debate a range of moral and ethical scientific issues.

Substantive Knowledge	Year 3/4 Cycle 2	Year 3/4 Cycle 1	Year 5	Year 6
<b>Animals, including humans.</b>	<p>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.</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>	<p>Describe the simple functions of the basic parts of the digestive system in humans.</p> <p>Identify the different types of teeth in humans and their simple functions.</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	<p>Describe the changes as humans develop to old age.</p>	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</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>
<b>Living things and their habitats.</b>		<p>Recognise that living things can be grouped in a variety of ways.</p> <p>Explore and use classification keys to help group, identify and name a</p>	<p>Describe the differences 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>	<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>variety of living things in their local and wider environment.</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things.</p>		<p>Give reasons for classifying plants and animals based on specific characteristics.</p>
<b>Light</b>	<p>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.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by a solid object.</p> <p>Find patterns in the way that the size of shadows change.</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 shadows have the same shape as the objects that cast them.</p>
<b>Forces and Magnets</b>	<p>Compare how things move on different surfaces.</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</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 effects of air resistance, water resistance</p>	

	<p>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.</p> <p>Describe magnets as having two poles.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>		<p>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>	
<p><b>Electricity</b></p>		<p>Identify common appliances that run on electricity.</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including 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</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>

		<p>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>		
<b>Plants</b>	<p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p> <p>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.</p> <p>Investigate the way in which water is transported within plants.</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>			
<b>Rocks</b>	<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p>			

	<p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter.</p>			
<b>States of Matter</b>		<p>Compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>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).</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>		
<b>Sound</b>		<p>Identify how sounds are made, associating some of them with something vibrating.</p> <p>Recognise that vibrations from sounds travel through a medium to the ear.</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>Recognise that sounds get fainter as the distance from the sound source increases.</p>		
<p><b>Properties and changes of materials</b></p>			<p>Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</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</p>	

			<p>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, including changes associated with burning and the action of acid on bicarbonate of soda.</p>	
<b>Earth and Space</b>			<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><b>Evolution and Inheritance</b></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><b>Disciplinary Knowledge</b></p>	<p><b>Year 3/4 Cycle 2</b></p>	<p><b>Year 3/4 Cycle 1</b></p>	<p><b>Year 5</b></p>	<p><b>Year 6</b></p>
<p><b>Working Scientifically</b></p> <p><b>Planning and Communication</b></p>	<p>Use pictures, writing, diagrams and tables as directed by their teacher.</p> <p>Use simple texts, directed by the teacher, to find information.</p> <p>Record their observations in written, pictorial and diagrammatic forms.</p>	<p>Record observations, comparisons and measurements using tables and bar charts.</p> <p>Begin to plot points to form a simple graph.</p> <p>Use graphs to point out and interpret patterns in their data.</p>	<p>Record observations systematically.</p> <p>Use appropriate scientific language and conventions to communicate quantitative and qualitative data.</p> <p>Select a range of appropriate sources of information including</p>	<p>Choose scales for graphs which show data and features effectively.</p> <p>Identify measurements and observations which do not fit into the main pattern.</p> <p>Begin to explain anomalous data.</p>



	Select the appropriate format to record their observations.	Select information from a range of sources provided for them.	books, internet and CD Rom.	Use appropriate ways to communicate quantitative data using scientific language.
<b>Working Scientifically</b> <b>Enquiry and Investigation</b>	Put forward own ideas about how to find the answers to questions.  Recognise the need to collect data to answer questions.  Carry out a fair test with support.  Recognise and explain why it is a fair test with help, pupils begin to realise that scientific ideas are based on evidence.	With help, pupils begin to realise that scientific ideas are based on evidence.  Show in the way they perform their tasks how to vary one factor while keeping others the same.  Decide on an appropriate approach in their own investigations to answer questions.  Describe which factors they are varying and which will remain the same and say why.	Use previous knowledge and experience combined with experimental evidence to provide scientific explanations.  Recognise the key factors to be considered in carrying out a fair test.	Describe evidence for a scientific idea.  Use scientific knowledge to identify an approach for an investigation. Explain how the interpretation leads to new ideas.
<b>Working Scientifically</b> <b>Observing and Recording</b>	Make relevant observations.  Measure using given equipment.  Select equipment from a limited range.	Carry out measurement accurately.  Make a series of observations, comparisons and measurements.  Select and use suitable equipment.  Make a series of observations and measurements adequate for the task.	Make a series of observations, comparisons and measurements with increasing precision.  Select apparatus for a range of tasks.  Plan to use apparatus effectively.  Begin to make repeat observations and	Measure quantities with precision.  Select and use information effectively.  Make enough measurements or observations for the required task.

			measurements systematically.	
<p><b>Working Scientifically</b></p> <p><b>Considering Analysing and Evidence</b></p>	<p>Begin to offer explanations for what they see and communicate in a scientific way what they have found out.</p> <p>Begin to identify patterns in recorded measurements.</p> <p>Suggest improvements in their work.</p> <p>With support, evaluate their findings.</p>	<p>Predict outcomes using previous experience and knowledge and compare with actual results.</p> <p>Begin to relate their conclusions to scientific knowledge and understanding.</p> <p>Suggest improvements in their work, giving reasons.</p>	<p>Make predictions based on their scientific knowledge and understanding.</p> <p>Draw conclusions that are consistent with the evidence</p> <p>Relate evidence to scientific knowledge and understanding</p> <p>Offer simple explanations for any differences in their results.</p> <p>Make practical suggestions about how their working methods could be improved.</p>	<p>Make reasoned suggestions on how to improve working methods.</p> <p>Show how interpretation of evidence leads to new ideas</p> <p>Explain conclusions, showing understanding of scientific ideas.</p>
<p><b>Vocabulary</b></p> <p><b>Working Scientifically</b></p>	<p>develop, enquiry, practical enquiry, fair test, comparative test, relationships, conclusion, accurate, thermometer, estimate, data, diagram, key (identifying), table, chart, bar chart, results, observations, predictions, explanation, reason, similarities, differences, question, evidence, information, findings, criteria, values, properties, characteristics, research.</p>		<p>variables, constants, evidence, justify, accuracy, precision, scatter graphs, bar graphs, line graphs, argument (science), data logger, classify, interpret, pattern, analyse, conclude, evaluate,</p>	
<p><b>Animals including humans.</b></p>	<p>Movement, muscles, bones, skull, nutrition, skeletons, support, protection.</p>	<p>Mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine, herbivore, carnivore, molar, pre-molar, incisor, canine.</p>	<p>Foetus, embryo, womb, gestation, baby, toddler, teenager, elderly, development, puberty.</p>	<p>Circulatory, heart, blood, vessels, vein, arteries, oxygen.</p>

<b>Living things and their habitats</b>		Vertebrates, invertebrates, fish, amphibians, reptiles, birds, mammals, environment, habitats.	Mammal, reproduction, insect, offspring, sexual, asexual.	Classification, micro-organisms.
<b>Light</b>	Light, shadows, mirror, reflective, reflection, light source, opaque.			Light sources,
<b>Forces and magnets</b>	Magnet, magnetic, bar magnet, ring magnet, horseshoe magnet, force, attract, repel, pole, friction, push, pull, surface, movement.		Gravity, air resistance, water resistance, friction, levers, pulleys, gears, springs.	
<b>Electricity</b>		Electricity, simple circuit, light bulb, cell, wire, switch, battery, conductor, insulator, brightness		Buzzer, motor, voltage, components, symbols, circuit diagrams.
<b>Plants</b>	Air, light, water, nutrients, soil, reproduction, transportation, dispersal, pollination, flower, life cycle, fertiliser.			
<b>Rocks</b>	Fossils, soils, sandstone, granite, marble, pumice, crystals, sedimentary, metamorphic, igneous, absorbent, porous, durable, permeable, impermeable.			
<b>States of Matter</b>		Solid, liquid, gas, evaporation, condensation, particles, temperature, melting point, freezing		

		point, precipitation, water cycle.		
<b>Sound</b>		Volume, vibrate, vibrations, sound waves, pitch, tone, speaker, insulation.		
<b>Properties of Materials</b>			Properties, hardness, soluble, solubility, transparent, opaque, translucent, separating, filter, evaporation, dissolving, thermal conductor, thermal insulator, electrical conductor, electrical insulator.	
<b>Earth and Space</b>			Solar system, planets, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus, moon, stars, spherical bodies, rotation, orbit, satellite, waxing, waning, full, new, year, month, axis.	
<b>Evolution and Inheritance</b>				Fossils, organisms, adaptation, evolve, evolution, inherit, inheritance, variation, characteristics, genetics.
<b>Cross-curricular reading</b>	How the Leopard got its spots. (Linked to rainforests) The Great Kapok Tree	Climate Change information and newspaper reports The Last Bear Digestive system explanation texts	Little Foxes British Wildlife Cosmic Astronaut biographies Space information texts Floodlands	Information texts related to Darwin. Dr Fisher On the Origin of Species

	Information Texts including light and Stone/Bronze and Iron Age.			
<b>Cross-curricular links</b>	<p><b>English</b> – Information reports.</p> <p><b>PSHE</b> – Water and Farming.</p> <p><b>Art</b> – Cave paintings linked to rocks.</p> <p><b>DT</b> – British nature and Andy Goldsworthy and Food Technology and where food comes from.</p>	<p><b>English</b> – Use the digestive system as our theme for explanation texts.</p> <p><b>DT</b> – Electricity and circuits used in the torches the children design.</p> <p><b>Computing</b> – Children make a PowerPoint about a famous scientist.</p> <p><b>Art</b> – Drawing plants.</p>	<p><b>English</b> – Use Floodlands to discuss climate change. Tim Peake used as theme for non-fiction reports.</p> <p><b>PSHE</b> – Climate change.</p> <p><b>Art</b> – Tonal planets, William Morris and flowering plants.</p>	<p><b>English</b> – Use Darwin to write non-chronological reports.</p> <p><b>RE</b> - Creation and Science: conflicting or complementary?</p> <p><b>Art</b> – Animals of the rainforests.</p>
<b>Christian Values</b>	<p><b>Courage:</b> Children develop courageous advocacy to make positive changes in the world. They show the courage to understand that some experiments will involve taking risks and learn from mistakes. When completing scientific investigation, children will learn that not everything happens as expected and they will need to persevere to achieve the answers they need. Children will learn to appreciate through scientific exploration that being courageous involves working within defined parameters and trial and error.</p> <p><b>Fairness:</b> Through a range of Scientific questioning techniques, all children are encouraged to have a voice in the classroom and particularly when involved in group work. They are given opportunities for healthy debate.</p> <p><b>Kindness:</b> Children are able to compare their own lives with others and show compassion for those in need. Mutual respect is always modelled in the classroom especially when listening to all ideas, predictions and findings whether the answer is right or wrong. Children learn to appreciate our natural world and all the different plants and animals that live on it.</p> <p><b>Koinonia:</b> Through this subject, children can demonstrate understanding and respect of other cultures and beliefs, including economic and political knowledge. They learn how our co-humanity is inextricably involved with others as we share life on our finite planet. Science often involves the children taking part in both group</p>			

	<p>and whole class work where they share ideas and working through problems together. Children are encouraged to take part in our science fayre and showcase their ideas and projects to both our school and wider community. As a whole school the children take part in a science day, where activities and challenges are shared. During many occasions including collective worship and curriculum time children explore a range of famous scientists.</p> <p><b>Responsibility:</b> Children develop the discipline for seeking wisdom. They know that they are caretakers of the planet and how our everyday actions and small changes can make a difference. Morals of science ethics and the use of science is debated and discussed. During all practical sessions, children are encouraged to think about health and safety in the classroom.</p> <p><b>Thankfulness:</b> Children show thankfulness for the natural world and the wonder of creation. Children explore developments and gratitude for science through exploring innovations and having a sense of wonder about all things Scientific.</p> <p><b>Truthfulness:</b> Children explore this value through developing confidence, delight in seeking wisdom, knowledge and truth. They further explore this through the investigative aspects of Science and the testing of hypotheses. They develop a growing appreciation for the positive impact scientists can have to the global community.</p>
<p><b>Spiritual Development</b></p>	<p>We encourage the children to develop their awe and wonder of science. Children question and debate the beginning, creation and evolution. Through our Science lessons children discover the limits of experimentation and develop their knowledge and understanding of the universe and beyond. Children explore the beliefs in science and the faith we have in scientists. During many opportunities and experiences the children understand the impact of scientific achievements.</p>