



Science at Our Lady of the Most Holy Rosary Catholic Academy



“The important thing is to never stop questioning.”

Albert Einstein

Science Lead:



Mrs Holt



Intent

The science curriculum at Holy Rosary aims to give all pupils a strong understanding of the world around them.

Throughout the programmes of study, the pupils will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills.

Science Yearly Overview										
EYFS	Children at the expected level of development will-Explore the world around them, making observations and drawing pictures of animals and plants;-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;- understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.									
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Area of Science	Biology				Chemistry	Physics				
Learning Focus: To understand	Plants	Living Things	Animals and Humans	Evolution and Inheritance	Materials	Magnets, Forces, Materials	Earth and Space	Light and Seeing	Sound and Hearing	Electricity
Year One	Unit 1		Unit 1		Unit 1	Unit 1	Unit 1 (link to Seasons)	Link to Animals and Humans (Unit 1- Senses)	Link to Animals and Humans (Unit 1- Senses)	
Year Two	Unit 2	Unit 1	Unit 2	Link to Animals and Humans Unit 2 (humans resemble their parents in many forms)	Unit 2					Unit 1
Year Three	Unit 3		Unit 3	Link to Materials Unit 3 (rocks and solids)	Unit 3	Unit 2		Unit 1		
Year Four		Unit 2	Unit 4		Unit 4		Unit 2		Unit 1	Unit 2
Year Five		Unit 3	Unit 5		Unit 5	Unit 3	Unit 3		Unit 2	
Year Six		Unit 4	Unit 6	Evolution and Inheritance Unit				Unit 2		Unit 3
Key Stage 3	Cells and organisation Photosynthesis Cellular respiration Ecosystems		Skeletal and muscular system Nutrition and digestion Gas and exchange systems Reproduction Health	Genetics and evolution	States of matter Chemical reactions Periodic Table Materials	Energy- changes and transfers Changes in systems Motion and forces	Earth and atmosphere Space physics	Light waves	Sound waves Energy and waves	Electricity and electromagnetism

Threshold Concept	Main theme	Notes
Diversity	<ul style="list-style-type: none"> The condition of having or being composed of differing elements or qualities 	<ul style="list-style-type: none"> The diversity of life: classification, variation and evolution; biodiversity. The diversity of materials: properties and uses of materials; periodic table
Cycles	<ul style="list-style-type: none"> An interval of time during which a sequence of a recurring succession of events or phenomena is completed. A course or series of events or operations that recur regularly and usually lead back to the starting point. 	<ul style="list-style-type: none"> Earth Cycles- Rock, carbon nitrogen Lifecycles: reproduction and development Recycling
Systems	<ul style="list-style-type: none"> A set of things working together as parts of a mechanism or an interconnecting network; a complex whole A set of principles or procedures according to which something is done, an organised scheme or method 	<ul style="list-style-type: none"> Earth Structure and resources Circuits Biological organ systems Space
Interactions	<ul style="list-style-type: none"> Mutual or reciprocal action or influence Communication or direct involvement with someone or something 	<ul style="list-style-type: none"> Ecosystems Chemical reactions Forces
Energy	<ul style="list-style-type: none"> The quantitative property that must be transferred to an object in order to perform work on, or to heat, the object 	<ul style="list-style-type: none"> Light Sound Magnetism Energy transfers Heating and cooling States of matter Irreversible reactions Biological reactions

Our curriculum identifies six threshold concepts which underpin teaching and learning and are the concept building blocks, linking, and reinforcing learning from Key Stage 1 to Key Stage 3.

At the heart of our bespoke curriculum is scientific investigation. Each unit embeds scientific enquiry skills and strands are developed throughout Key Stage 2 and into Key Stage 3. Topics, such as Plants, is taught in Key Stage One, studied again in further detail throughout Key Stage Two, then again in the Biology strand in Key Stage 3. This allows pupils to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this procedural knowledge into the long-term memory.

Pupils develop and use a range of skills including observations, planning and investigations, to question the world around them and become independent learners. Pupils develop scientific vocabulary and effective questioning across topics. Scientific concepts are reinforced through enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.



Chemistry Unit: Materials Misconceptions	
Year	Misconception
1 (Elementary materials)	<ul style="list-style-type: none"> Only fabrics are materials Only building materials are materials Only writing materials are materials The word 'rock' describes an object not a material 'Solid' is another word for hard An object cannot be made from more than one material (composite) Dark objects cannot shine e.g., a 2p coin
2 (Basic of everyday materials)	<ul style="list-style-type: none"> Only fabrics are materials Only building materials are materials Only writing materials are materials The word rock describes an object rather than a material Solid is another word for hard An object cannot be made from more than one material (composite) Dark objects cannot shine e.g., a 2p coin
3 (State of matter)	<ul style="list-style-type: none"> 'Solid' is another word for hard or opaque Solids are hard and cannot break or change shape easily and are often in one piece Substances made of very small particles like sugar or sand cannot be solids Particles in liquids are further apart than in solids and they take up more space When air is pumped into balloons, they become lighter Water in different forms – steam, water, ice – are all different substances All liquids boil at the same temperature as water (100 degrees) Melting, as a change of state, is the same as dissolving Steam is visible water vapour (only the condensing water droplets can be seen)
4 (Properties and changes of materials)	<ul style="list-style-type: none"> Thermal insulators keep cold in or out Thermal insulators warm things up Solids dissolved in liquids have vanished and so you cannot get them back Lit candles only melt, which is a reversible change
7 (The Particle Model)	<ul style="list-style-type: none"> Particles are inside matter (as opposed to matter being made of particles). Particles in a liquid are spread out and not all touching. Particles in a liquid are drawn in the centre of its container. Particles in a solid do not move. Gases cannot be poured. Liquids can be compressed. Sponge is a solid but can be compressed. Particles are 2D objects with no dimension. Particle shape is limited to spheres/circles. Particles in a liquid fill from the bottom of the container. Mass changes when a substance changes state. The particles escape from the top of the liquid during boiling. Boiling and evaporation are interchangeable terms. Mass changes when a substance changes state. Data points joined dot-to-dot. All substances have an exact melting/boiling point. Diffusion occurs in all states. Particles move randomly. Substances have melting points and boiling points the same as water.
7 (Acids and Alkalis)	<ul style="list-style-type: none"> The metal salt produced from neutralisation can be converted back into an acid and an alkali. Substances that are neutral are safe. Alkalis are safer than acids. All acids are dangerous. A diluted strong acid is the same as a weak acid.

Implementation

Within Bishop Hogarth Catholic Education Trust, primary and secondary staff have worked collaboratively to develop a clear progression map to ensure effective coverage of the National Curriculum and the three disciplines of Biology, Chemistry and Physics. Pupils know that they are learning science, the specific discipline, and the unit of work. Science is taught discretely each week.

We have implemented a science curriculum which is sequential and knowledge rich, building on prior learning from EYFS, though Key Stage 1 and connecting to future learning in Key Stage 2 and through to Key Stage 3. Each unit of work has an accompanying knowledge organiser, called 'learn it, link it.'

Our curriculum highlights common misconceptions to address throughout the units of work, which supports teacher's subject knowledge. Scientific vocabulary is taught and revised in each unit.

Impact

Assessment for learning in science is continuous throughout the planning, teaching, and learning cycle. We measure and assess the impact that our science curriculum is having through in a variety of ways: conducting learning walks, pupil voice, observing lessons and termly monitoring of looking at pupils' books which indicates that they are gaining a range of practical experiences.

Below is an outline of the impact we are looking for in our pupils in the curriculum area of science:

- Pupils are knowledgeable about the scientific content of each unit of learning
- Pupils use knowledge organisers effectively and know which discipline they are learning
- Pupils can set up an investigation based around scientific thinking
- Pupils are engaged in science lessons, asking scientific questions and being curious
- Learning demonstrates secure curriculum coverage for all science units
- There is clear progression of work and teachers' expectations in our school
- Pupils are becoming increasingly independent in science, selecting their own tools and materials, completing pupil led investigations and choosing their own methods for recording
- Pupils can use and spell scientific vocabulary accurately to communicate their understanding
- Pupils can present science learning using Maths and English skills where appropriate
- Verbal and written feedback from teachers has effective impact on our pupils' learning
- Pupils have firm foundations in Science and are well placed to make good progress at Key Stage 3

