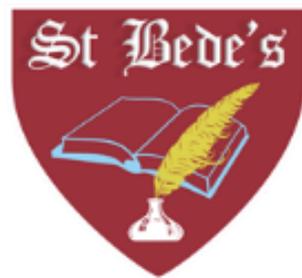


St Bede's Catholic Primary School



Science

Science at St. Bede's Catholic Primary School

A high-quality science education will help pupils gain a coherent knowledge and understanding of God's wonderful world around them via exploration. It should inspire pupils' to be curious and creative, as scientific enquiry is 'crucial in developing and sustaining curiosity'. Teaching should equip pupils to ask perceptive questions, make a hypothesis, carry out experiments, collect and analyse data and draw conclusions. Science is present in our daily lives and therefore helps pupils to understand how the world in which they live works, developing their analytical thinking and problems solving skills.

Intent

The science curriculum at St. Bede's 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.

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

We aim to offer a high-quality science education that will:

- Develop scientific knowledge and conceptual understanding.
- Develop awareness of the nature, processes and methods of science.
- Equip learners with the scientific knowledge required to understand the applications and implications of science.

	Animals, humans and plants are made up of complex interacting systems in order to function.		The particle theory of matter is the idea that helps us to develop an understanding of why materials behave as they do
	Organisms require a supply of energy to carry out the basic functions of life and to grow.		Energy is a powerful and unifying abstract idea which is difficult to define.
	The Earth is a complex of interacting rock, water, air and life.		Forces change the state of rest or motion of a body. They hold matter together and interplay between all objects.

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

Threshold concepts are identified per unit and woven through each strand in the curriculum map.

Threshold concepts will:

- Builds a picture of how the science curriculum content knowledge develops and forms links between the disciplines.
- Develops secure understanding.
- Aids in scaling knowledge across transitional points.

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.

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.

Biology Unit: Living things.	
Misconceptions	
Year	Misconception
2	<ul style="list-style-type: none"> • An animal's habitat is like its 'home'. • Plants and seeds are not alive as they cannot be seen to move. • Fire is living. • Arrows in a food chain mean 'eats.' • Snakes are invertebrates.
4	<ul style="list-style-type: none"> • The death of one of the parts of a food chain or web has no or limited consequences on the rest of the chain • There is always plenty of food for wild animals. • Animals are only land-living creatures. • Animals and plants can adapt to their habitats; however, they change. • All changes to habitats are negative. • Snakes are invertebrates.
5	<ul style="list-style-type: none"> • All plants start out as seeds. • All plants have flowers. • Plants that grow from bulbs do not have seeds. • Only birds lay eggs.
6	<ul style="list-style-type: none"> • All micro-organisms are harmful. • Mushrooms are plants.
7	<p>Cells</p> <ul style="list-style-type: none"> • All cells are the same and have the same function. • Plants do not have cells. • Plant and animal cells are the same. • Sperm cells are the size of a tadpole, and have eyes, so they can see where they are going. • Cells can be seen with the naked eye. • Cells are 2 dimensional. • Biological drawing is the same as normal drawing. • Nucleus is the brain of the cell. • Animal cells are more complex than plant cells. • Cells only have a nucleus, cell membrane and cytoplasm. • When examining slides under a microscope they can be seen without stain. • Skin is not an organ. • Plants are not multicellular. • Humans have only one system. • All organisms are multicellular. • Diffusion happens in all states.
8	<p>Interdependence</p> <ul style="list-style-type: none"> • Plants are not alive. • Herbivores predate plants. • All animals are carnivores. • Plants do not produce their own food. • Arrows can be placed in either direction to show energy transfer. • Bioaccumulation- Predators consume more of a toxin and that's why they are affected. • The amount of energy

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