St Michael's Church of England High School

Curriculum Plan

Science

The Aims of the Science National Curriculum

The national curriculum for Science aims to ensure that 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

Science Intent Statement

Our approach to the science curriculum is based firmly in an expectation that all students are capable of achieving high standards in science. From key stage 3 we aim to develop a firm foundational knowledge base through use of knowledge organisers and core questions for each of the topics studied. The foundational knowledge obtained can then be developed further through teaching and learning that aims to develop conceptual understanding, an understanding and appreciation of scientific processes and methods and a cultural capital beyond examination content that provides social equity and mobility to all of our students. Throughout the 5-year science curriculum students will link both their existing and new knowledge to the 10 big ideas in science.

Our students begin in year 7 building on the knowledge from KS2 topics such as working scientifically and forces to develop their understanding and knowledge further. Students will develop their basic practical skills by looking at how to work safely in a science laboratory and begin to consider important variables in investigation.

The 8 big ideas in science are as follows

1. All material in the Universe is made of very small particles.
2. Objects can affect other objects at a distance. Changing the movement of an object requires a net force to be acting on it.
3. The total amount of energy in the Universe is the same but energy can be transformed when things change or are made to happen.
4. The composition of the Earth and its atmosphere and the process occurring within them shape the Earth's surface and its climate.
5. The solar system is a very small part of one of millions of galaxies in the Universe.
6. Organisms are organised on a cellular basis.
7. Organisms require a supply of energy and materials for which they are often dependent on or in competition with other organisms.
8. Genetic information is passed down from one generation of organisms to another. The diversity of organisms, living and extinct, is the result of evolution.

Throughout the 5 year curriculum and the various extra-curricular events and projects students take part in, these ideas are revisited and linked. Schemes of work and knowledge organisers highlight the relevance of the learning to each of the big ideas.

Key Stage 3

How are the Big Ideas developed through Key Stage 3

	Topics studied	Big ideas links	
Year 7	Working scientifically	All	Term 1
	Cells, tissues, organs and systems	1 and 7	Term 1
	Energy	2 and 3	Term 1
	Mixtures and separation	1,2 and 4	Term 1
	Sexual reproduction in animals	6, 7 and 8	Term 1
	Atoms, elements and molecules	1 and 4	Term 2
	Forces	2	Term 2
	The particle model	1	Term 2
	Muscle and bones	6	Term 2
	Electricity	3	Term 2
	Acids and alkalis	1	Term 3
	Sound	3	Term 3
	Ecosystems	1 and 7	Term 3
Year 8	Working Scientifically	All	Term 1
	Food and nutrition	6 and 7	Term 1
	Energy transfers	3	Term 1
	The periodic table	1 and 4	Term 1
	Fluids	2 and 3	Term 1
	Breathing and Respiration	6 and 7	Term 2
	Light	3	Term 2
	Combustion	1,3 and 4	Term 2
	Unicellular organisms	6 and 7	Tern 2
	Rocks	1 and 4	Term 2
	Metals and their uses	1 and 4	Term 3
	Earth and space	5 and 6	Term 3
	Plants and their reproduction	6, 7 and 8	Term 3
Year 9	Genetics and evolution	6, 7 and 8	Term 1
	Making materials	1 and 4	Term 1
	Forces and motion	2 and 3	Term 1
	Plant growth	6 and 7	Term 1
	Reactivity	1 and 4	Term 1
	Force fields and electromagnets	2 and 3	Term 1
	Key concepts in Biology	1,6,7 and 8	Term 2
	Key concepts in Chemistry	1 and 4	Term 2
	Key concepts in Physics	2,3 and 5	Term 2
	Key skills in Biology	1,6,7 and 8	Term 3
	Key skills in Chemistry	1 and 4	Term 3
	Key skills in Physics	2,3 and 5	Term 3

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	**Working scientifically** **7A Cells, tissues, organ and systems** **7I Energy**	**7E Mixtures and separation** **7B Sexual reproduction in animals**	**7H Atoms, elements and molecules** **7K Forces** **7G The particle model**	**7C Muscles and bones** **7JElectricity**	**7FAcids and alkalis** **7LSound** **7D Ecosystems**	**End of year review and assessment**
Year 8	**Numeracy skills in science** **8A Food and nutrition** **8K Energy transfers**	**8F The periodic table** **8I Fluids**	**8C Breathing and respiration** **8J Light** **8ECombustion**	**8D Unicellular organisms** **8H Rocks**	**8G Metals and their uses** **8L Earth and space** **8B Plants and their reproduction**	**End of year review and assessment**
Year 9	**9B Plant growth** **9E Making materials** **9I Forces and motion**	**9A Evolution and inheritance** **9F Reactivity** **9J Force fields and electromagnets**	**Key concepts in Biology** **Key concepts in Chemistry** **Key concepts in Physics**	**Key skills in Biology** **Key skills in Chemistry** **Key skills in Physics**	**GCSE ready**	**GCSE ready**

Key Stage 4

GCSE Combined Science: Edexcel

Year 10 Combined

Biology	Chemistry	Physics
Key concepts in Biology	Key concepts in Chemistry	Key concepts in Physics
Cells and control	States of matter and mixtures	Motion and forces
Genetics	Chemical changes	Conservation of energy
Natural selection and genetic modification	Extracting metals and equilibria	Waves
Health, disease and the development of molecules		Light and the electromagnetic spectrum
		Radioactivity

Year 11 Combined		
Biology	Chemistry	Physics
Key concepts in Biology	Key concepts in Chemistry	Key concepts in Physics
Plant structures and their functions	Groups in the periodic table	Energy-Forces doing work
Animal coordination, control and homeostasis	Rates of reaction and energy changes	Forces and their effects
Exchange and transport in animals	Fuels and Earth Science	Electricity and circuits
Ecosystems and material cycles		Magnetism and the motor effect
		Electromagnetic induction
		Particle model
		Forces and matter

Separate Science:Edexcel

Year 10 Separate		
Biology	Chemistry	Physics
Key concepts in Biology	Key concepts in Chemistry	Key concepts in Physics
Cells and control	States of matter and mixtures	Motion and forces
Genetics	Chemical changes	Conservation of energy
Natural selection and genetic modification	Extracting metals and equilibria	Waves
Health, disease and the development of molecules	Separate Chemistry 1	Light and the electromagnetic spectrum
		Radioactivity
		Astronomy

Year 11 Separate		
Biology	Chemistry	Physics
Key concepts in Biology	Key concepts in Chemistry	Key concepts in Physics
Plant structures and their functions	Groups in the periodic table	Energy-Forces doing work
Animal coordination, control and homeostasis	Rates of reaction and energy changes	Forces and their effects
Exchange and transport in animals	Fuels and Earth science	Electricity and circuits
Ecosystems and material cycles	Separate chemistry 2	Static electricity
		Magnetism and the motor effect
		Electromagnetic induction
		Particle model
		Forces and matter