

Curriculum Overview

Links to KS3		Subject content taught at KS3 is developed and expanded to provide greater understanding of the key concepts of all three science disciplines. Practical skills are developed and equipment and apparatus used in KS3 is expected to be applied to KS4.					
Intent	Statement of Intent	The aim of the science curriculum is to equip the pupils with the scientific literacy skills to make informed decisions about their future, to inspire a love of science that will see them continue their scientific education, be curious about the world around them and have the knowledge and skills to question concepts and communicate ideas.					
	Timeline	Term 1 - 7 Weeks	Term 2 - 7 Weeks	Term 3 - 7 Weeks	Term 4 - 6 Weeks	Term 5 - 5 Weeks	Term 6 - 6 Weeks
Implementation (Year 9)	Year Overview	The AQA Science GCSE specification is taught. In the first year the topics chosen are those that are more accessible to the year group. All students are taught the higher tier of entry material and are not set until Year 10.					
	SOW	B1 - Cell Biology P1 - Energy		C1 - Atoms and the Periodic Table B2 - Organisation - part 1		B2 - Organisation - part 2 C2 - Structure and Bonding	
	Assessment Type & Unit Focus	B1 - Cell Biology: Prokaryotes, eukaryotes, animal and plant cells, cell differentiation and specialisation, microscopy and magnification. Culturing microorganisms. Chromosomes, cell cycle, growth curves, mitosis and meiosis, stem cells and cancer. Diffusion and exchange surfaces, investigating diffusion (link to surface area:volume ratio), osmosis, active transport. P1 - Energy: Energy stores and systems, Changes in energy stores Energy calculations, Power and efficiency, Conservation and dissipation of energy, National and Global Energy resources. Skills: EDedicated lessons for skills, to be taught within topics. Assessment is by end of unit tests and through practical skills.		C1 - Atoms and the Periodic Table: Atomic structure, separation techniques, history of the atom, RAM, chemical equations, electronic structure, the PT, groups 1,7 and 0, transition metals B2 - Organisation: Enzymes - Function of enzymes, lock and key theory, investigating enzyme reactions, digestive enzymes, human digestive system, food tests. Principles of organisation. Animal organisation - Heart and blood vessels, blood, CHD. Health issues and effect of lifestyle. Plant organisation - Tissues, organs and transport systems, transportation and translocation. Assessment is by end of unit tests and through practical skills.		B2 - Organisation: Enzymes - Function of enzymes, lock and key theory, investigating enzyme reactions, digestive enzymes, human digestive system, food tests. Principles of organisation. Animal organisation - Heart and blood vessels, blood, CHD. Health issues and effect of lifestyle. Plant organisation - Tissues, organs and transport systems, transportation and translocation. C2 - Bonding, Structure and the properties of matter: Types of bonding: Ionic, covalent and metallic. The properties of these types of bonding including boiling points, melting points, thermal and electrical conductivity, hardness etc. Some specific examples of giant covalent compounds, the trends in simple covalent molecules, polymers, nanoscience Assessment is by end of unit tests and through practical skills.	
Implementation (Year 10)	Year Overview	Most pupils will now follow the AQA Combined Science (Trilogy) Specification. A number of pupils will continue to study the AQA Separate Science route that has more content.					
	SOW	P2 - Electricity B3 - Infection and Response C3 - Quantitative Chemistry P3 - Particle model of matter		C4 - Chemical changes B4 - Bioenergetics P4 - Atomic structure P5 - Forces - part 1		P5 - Forces - part 2 B7 - Ecology C5 - Energy changes C6 - Rates of Reaction	
	Assessment Type & Unit Focus	P2 - Electricity: Circuit symbols, Current, P.D., Resistance, IV characteristic curves, Resistors in series and parallel, Non-ohmic conductors, Mains electricity, Electrical energy and power, The National Grid, Static Electricity, Electric fields B3 - Infection and Response: Communicable diseases, human primary and secondary defence systems, antibiotics & painkillers, vaccination and the discovery & development of drugs. Plant diseases and defence responses. Producing and uses of monoclonal antibodies, identifying and detecting plant diseases C3 - Quantitative Chemistry: Conservation of mass, relative formula mass, moles (HT Only), reacting masses, limiting factors (HT), percentage yield and atom economy, concentrations, titrations and volumes of gases (HT Triple only). P3 - Particle model of matter: Measuring density, Internal energy and energy transfers, Changes of state, Latent heat and SHC, Particle model of pressure, Pressure in gases Assessment is by end of unit tests and through practical skills.		C4 - Chemical changes: The reactivity series, extraction of metals, reduction and oxidation, reactions of acids, soluble salts, pH, neutralisation, titrations (Triple only), strong and weak acids (HT), electrolysis, electrolysis of aqueous solutions. B4 - Bioenergetics: Photosynthesis, uses of glucose in plants, investigate the rate of photo'. Interaction of limiting factors, explain graphs of rate of photosynthesis involving several limiting factors, inverse square law, economics of enhancing conditions for maximum growth rate. Aerobic and anaerobic respiration, response to exercise and metabolism. explanation of oxygen debt P4 - Atomic structure: Mass number and isotopes. History of the atom, Rutherford's experiment, Radiation, Nuclear equations, Half-life of radioactivity, Contamination and irradiation, Hazards and background radiation, Uses of radiation, Fission and fusion. P5 - Forces: Scalars and Vectors, Gravity and weight Resultant forces, Work done and energy transfer by force, Forces and elasticity, Moment, levers and gears, Pressure in fluids inc. atmosphere, Velocity and acceleration, Equations of motion, Newton's Laws, Forces and Braking, Momentum and rate of change of momentum Assessment is by end of unit tests and through practical skills.		P5 - Forces: Scalars and Vectors, Gravity and weight Resultant forces, Work done and energy transfer by force, Forces and elasticity, Moment, levers and gears, Pressure in fluids inc. atmosphere, Velocity and acceleration, Equations of motion, Newton's Laws, Forces and Braking, Momentum and rate of change of momentum B7 - Ecology: Communities, abiotic and biotic factors, adaptations, levels of organisation, trophic levels, biomass and sampling investigation. How materials are cycled, biodiversity, waste management, deforestation, global warming, maintaining biodiversity, pollution and land use. Decomposition. Food production (HT only impact of environmental change) C5 - Energy changes: Exothermic reactions, endothermic reactions, reaction profiles, energy changes of reactions (HT only), fuel cells (Triple only), cells and batteries. C6 - The rate and extent of chemical change: Calculate rates of reactions, factors affecting reaction rates, collision theory, activation energy, catalysts, reversible reactions, equilibrium, dynamic equilibrium, temperature and concentration on equilibrium (HT). Assessment is by end of unit tests and through practical skills.	

Implementation (Year 11)	Year Overview	The AQA specification is completed by Easter in the final year of KS4		
	SOW	B5 - Homeostasis and Response P6 - Waves C7 - Organic Chemistry P8 - Space Physics (Separate Science Only) C8 - Chemical Analysis C9 - Chemistry of the atmosphere	B6 - Inheritance, variation and evolution P7 - Magnetism and electromagnetism C10 - Using Resources	
	Assessment Type & Unit Focus	<p>B5 - Homeostasis and Response: The human nervous system, the brain and eye. Homeostasis, the human endocrine system, control of blood glucose, hormones in reproduction and contraception. Control of body, plant hormones. Glucagon, negative feedback cycle to control blood glucose, hormonal control of the menstrual cycle, hormones to treat infertility, feedback systems, vasoconstriction and vasodilation, deamination and ammonia production, ADH and water balance</p> <p>P6 - Waves: Longitudinal and transverse waves, Properties of waves (reflection, refraction diffraction), Period of a wave and wave equation, Sound waves, Uses of waves (ultrasound and P and S waves), Electromagnetic spectrum and properties and uses, Lenses, Visible light, Blackbody radiation</p> <p>C7 - Organic Chemistry: Crude oil, hydrocarbons, alkanes, fractional distillation, properties of hydrocarbons, alkenes, cracking alkenes, reactions of alkenes and alcohols, reactions of alkenes, alcohols, carboxylic acids, Synthesis of polymers, Condensation polymerisation, Amino acids, and DNA.</p> <p>C8 - Chemical Analysis: Purity, formulations, chromatography, identification of common gases, Tests for oxygen/carbon dioxide/chlorine, Identification of ions, metal hydroxides, carbonates, halides, sulfates, flame emission spectroscopy.</p> <p>C9 - Chemistry of the atmosphere: The evolution of the atmosphere, climate change and greenhouse gases, carbon footprints and air pollution.</p> <p>Assessment is by end of unit tests and through practical skills.</p>	<p>B6 - Inheritance, variation and evolution: Cells, reproduction, inheritance and variation, genetic engineering and selective breeding.</p> <p>P7 - Magnetism and electromagnetism: Magnetic fields Induced magnetism, Motor effect and Fleming's LHR, Electric motors and loudspeakers, Induction: generators, microphones, transformers</p> <p>C10 - Using Resources: Materials and their properties, earth's resources, potable water, treating waste water, alternative methods of extracting metals, life cycle assessment, reducing the use of resources Rusting and prevention, useful alloys, ceramics, Haber process, fertilisers</p> <p>Assessment is by end of unit tests and through practical skills.</p>	
	Topic Texts	AQA revision guide, Carousel Learning, BBC Bitesize, and Seneca Learning.		
	Impact	Year Tracking	Data from end of topic assessments are collected by the Science department Tracking for whole school assesment is completed as per the school diary.	
		Literacy and Numeracy links	Literacy tasks are embedded within each topic and are designed to build confidence with the key words for the topic. Subject specific command words are used to build confidence with extended written responses. Numeracy is developed throughout the course by a range of methods including the calculation of means, the calculation of percentages, recording data in tables, presenting data graphically and looking for patterns in the data. Primary data is collected through a range of instruments.	
How It is Used / Skills Set Developed / Outcomes		Every unit contains a common practical for all classes to complete. This develops skills in planning investigations, using scientific equipment safely, collecting and recoring data, presenting data graphically, analysing the results and presenting a conclusion. Further practical work is completed during most topics		
Links to Higher Education		KS3 provides the bedrock for the GCSE Science courses, which in turn leads on to a wide variety of Scientific courses and KS5 and in Higher Education.		
Careers in the Curriculum		Career links to each topic are available that highlight a range of industries that rely on an understanding of the subject content.		