

SCIENCE CURRICULUM MAP

Intent: The science curriculum aims to develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. Developing an understanding of the nature, processes and methods of science through different modes of inquiry helps students to answer scientific questions about the world around them. The core of the science curriculum deals with science in our everyday lives. We aim for our students to see science all around them, and to utilise these knowledge and skills in ways that enhance their destinations and outcomes. With rigorous cross-curricular links to the STEM disciplines, our curriculum also aims to develop students into well-rounded scientific professionals who demonstrate the core ALET values of empowerment, enterprise, connectedness and transformation, so that they may apply, extend and create new paradigms in the future.

Year/Term	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 10	<p>Biology</p> <ul style="list-style-type: none"> Cell structure Diffusion & osmosis Cell division (differentiation) Stem cells <p>Chemistry</p> <ul style="list-style-type: none"> Atomic structure Separating mixtures History of the atom The Periodic Table (development & properties) 	<p>Biology</p> <ul style="list-style-type: none"> Human biology (digestion & circulation) Plant circulation (active transport & transpiration) <p>Chemistry</p> <ul style="list-style-type: none"> States of matter Ions Types of bonding (ionic, covalent & metallic) <p>Physics</p> <ul style="list-style-type: none"> Energy resources, power stations and renewables 	<p>Biology</p> <ul style="list-style-type: none"> Health & disease Human defence responses Drugs & vaccines <p>Chemistry</p> <ul style="list-style-type: none"> Chemical masses & calculations Relative masses & moles Yield & economy Titrations <p>Physics</p> <ul style="list-style-type: none"> Density 	<p>Biology</p> <ul style="list-style-type: none"> Cancer & health Smoking, alcohol and carcinogens Consolidation and cross-linking of covered topics <p>Chemistry</p> <ul style="list-style-type: none"> Reactivity series Displacement reactions Extracting metals from their salts Neutralisation & pH scale <p>Physics</p> <ul style="list-style-type: none"> Atoms & isotopes Alpha, beta and gamma radiation 	<p>Biology</p> <ul style="list-style-type: none"> Photosynthesis Factors affecting glucose production in plants Respiration in living organisms <p>Chemistry</p> <ul style="list-style-type: none"> Electrolysis of molten substances Electrolysis of aqueous solutions Energy changes during 	<p>Biology</p> <ul style="list-style-type: none"> Revision and consolidation of prior content (paper 1) Preparation for mock exams Summer project (TBC) <p>Chemistry</p> <ul style="list-style-type: none"> Revision and consolidation of prior content (paper 1) Preparation for mock exams

	<p>Physics</p> <ul style="list-style-type: none"> • Maths Skills for Physics • Types of energy stores • Efficiency and energy stores • Conduction, convection & infrared radiation • Specific Heat Capacity of materials 	<ul style="list-style-type: none"> • Electrical circuits in series and parallel • AC current and power 	<ul style="list-style-type: none"> • States of matter • Internal energy & kinetic theory • Specific Latent Heat of Fusion & Vaporisation 	<ul style="list-style-type: none"> • Discovery of the nucleus • Nuclear Fusion & fission 	<p>reactions (endothermic & exothermic)</p> <ul style="list-style-type: none"> • Energy profiles for reactions <p>Physics</p> <ul style="list-style-type: none"> • Balanced & unbalanced forces • Scalars & vectors • Moments & equilibrium • Graphs of motion 	<ul style="list-style-type: none"> • Summer project (TBC) <p>Physics</p> <ul style="list-style-type: none"> • Revision and consolidation of prior content (paper 1) • Preparation for mock exams • Summer project (TBC)
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<p>Year 11</p>	<p>Biology</p> <ul style="list-style-type: none"> • Homeostasis • The nervous system and the Reflex arc • Hormonal coordination • Human reproduction & fertility <p>Chemistry</p> <ul style="list-style-type: none"> • Rates of chemical reactions • Collision theory & factors affecting rates • Dynamic equilibrium in reversible reactions • Catalysts <p>Physics</p> <ul style="list-style-type: none"> • Newton's Laws of Motion • Weight & terminal velocity • Momentum & its conservation • Elastic forces • Forces and pressure in fluids 	<p>Biology</p> <ul style="list-style-type: none"> • Excretory systems • DNA and the genome • Protein synthesis • Inheritance & genetic transmission <p>Chemistry</p> <ul style="list-style-type: none"> • Crude oil and extracting fuels • Fractional distillation • Cracking hydrocarbons • Organic chemistry (alkenes, alcohols, acids & esters) • Polymers <p>Physics</p> <ul style="list-style-type: none"> • The Physics of Waves • Properties of waves • The Electromagnetic Spectrum • Waves in medicine and communication 	<p>Biology</p> <ul style="list-style-type: none"> • Variation & evolution • Natural selection & speciation • Genetic engineering • Systems of classification <p>Chemistry</p> <ul style="list-style-type: none"> • Chemical analysis of pure and impure substances • Testing for ions • Testing for gases • Useful polymers & alloys • Haber process and production of fertilisers <p>Physics</p> <ul style="list-style-type: none"> • Properties of light • Lenses • Reflection & refraction • Filters and colour 	<p>Biology</p> <ul style="list-style-type: none"> • Competition in living organisms • Adaptation and survival • Feeding relationships • The Carbon cycle • Human population • Biodiversity & ecosystems <p>Chemistry</p> <ul style="list-style-type: none"> • Renewable resources • Water purification and treatment • Extracting metals from ores • Life cycle assessments <p>Physics</p> <ul style="list-style-type: none"> • Electromagnetism • Magnetic fields and Induction • Motors, generators & transformers • Space Physics (star life cycles & the expanding universe) 	<p>Biology</p> <ul style="list-style-type: none"> • Global warming • Pollution and its effects • Revision and consolidation of prior content (paper 1 & 2) • Preparation for Final exams • Boosters & Interventions • Required practical review <p>Chemistry</p> <ul style="list-style-type: none"> • Climate change and the earth's atmosphere • Pollutants and atmospheric changes • Revision and consolidation of prior content (paper 1 & 2) • Preparation for Final exams • Boosters & Interventions 	<p>Biology</p> <p>Final GCSE exams</p> <p>Chemistry</p> <p>Final GCSE exams</p> <p>Physics</p> <p>Final GCSE exams</p>
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		(infrared, microwave, radio, UV, X-rays, gamma)			<ul style="list-style-type: none">• Required practical review <p>Physics</p> <ul style="list-style-type: none">• Revision and consolidation of prior content (paper 1 & 2)• Preparation for Final exams• Boosters & Interventions• Required practical review	
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Impact:

Measuring the impact of our curriculum is vital to the department and we strive to get more students transitioning on to A level science courses, thus boosting the school's pupil retention.

KS4 and KS5 students will be given marked assessments at the end of a topic; tests using exam questions or extended pieces of writing will be utilised to provide a clear idea of student progression. Students will be expected to answer exam questions using appropriate key scientific terminology, as well as by using appropriate mathematical skills (such as rearranging formula, drawing lines of best fit and calculating gradients). Extended pieces of writing will have a clearly defined success criteria that students would follow. Data for each assessment will be added to a tracker that the HoD can monitor to check the progress of classes or individual students. Analysis of assessment and mock data will help teachers decide which topics may need to be re-taught; teachers will make a decision on whether to teach topics again that students have performed badly on or challenge students by looking at topics from a different perspective (cross-linking across different subjects). The HoD will consult with teachers from other departments (such as Maths & Engineering) to compare student attainment in similar curriculum areas (for example, elastic forces are taught in Engineering, and algebraic manipulation is a key element in Maths). Data will also be used to make changes to class sets: those students that consistently perform well in assessments and KPI activities will be able to move up to a higher set where the work is more challenging.

The Science department will ensure that all key practical activities are carried out in thorough and comprehensive fashion, allowing students to develop their experimental skills, whilst continually linking theory to experimentation. Both KS4 and KS5 students will have separate practical lab books which they will maintain alongside their regular class work, and they will use these to hone their empirical skills. At KS4, teachers will set homework activities based on their class practical, and students will need to demonstrate knowledge and understanding of key words, formulas, calculations and data collection. At KS5, students will be provided with full documentation of their CPAC requirements per practical, and will be required to show proficiency in handling high-grade equipment like lasers and radioactive sources.

Extra curricular clubs and enrichment will tie in neatly to the curriculum. We will continue to provide our students with intervention and booster sessions, whilst also offering our students STEM opportunities that highlight the overlap in Science, Technology and Engineering. Year 10 students will also be offered a general science club that focuses on the KS4 curriculum and links the learning of information to fun, interactive science experiments.