SCIENCE YEAR 11 Curriculum Overview

SCIENCE OVERVIEW KS3 YEAR 11	**BIG IDEAS CURRICULUM** **In Year 11, students consolidate and extend their scientific understanding as they prepare for GCSE examinations. During the autumn term they investigate how genetic information is inherited and how variation drives evolution, explore the chemistry of substances through analysis and the changing atmosphere, and examine how living organisms interact within ecosystems.** **In spring, they revisit key concepts in physics and chemistry — studying waves, electricity, bonding and organic chemistry — and develop the confidence to apply knowledge across multiple contexts.** **The summer term focuses on structured revision, practical mastery and exam technique. Students refine their ability to interpret data, construct explanations, and communicate scientifically, ensuring they are fully prepared for their final GCSE assessments and for progression into post-16 science study.**

SCIENCE YEAR 11 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Topic 1**	**BIOLOGY** **BIG IDEA** **Genes** **TOPIC** **B6 Inheritance and Variation**	**Core Substantive Knowledge** • DNA structure and genetic inheritance • Dominant, recessive and codominant alleles • Genetic crosses and Punnett squares • Evolution and natural selection • Genetic engineering and ethical issues **Disciplinary Focus (Skills & Working Scientifically)** • Constructing and interpreting genetic diagrams • Analysing data on inheritance and variation • Evaluating evidence for evolution • Communicating ethical and scientific arguments	**• Retrieval quiz** **• Exam-style question practice** **• End-of-topic test (Deliberate Practice)**

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AUTUMN **Term 1** **Topic 2**	**CHEMISTRY** **BIG IDEA** **Reactions** **TOPIC** **C8** **Chemical Analysis**	**Core Substantive Knowledge** • Pure substances and formulations • Chromatography and Rf values • Gas tests for common gases **Disciplinary Focus (Skills & Working Scientifically)** • Carrying out analytical practicals safely • Recording and interpreting results accurately • Using evidence to identify unknown substances • Applying mathematical skills to data analysis	**• Core practical – chromatography of inks** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Term 2** **Topic 1**	**CHEMISTRY** **BIG IDEA** **Earth** **TOPIC** **C9 Chemistry of the Atmosphere**	**Core Substantive Knowledge** • Evolution of Earth's atmosphere • Greenhouse gases and global warming • Atmospheric pollutants and their effects • Carbon footprints and climate change mitigation **Disciplinary Focus (Skills & Working Scientifically)** • Analysing environmental data • Evaluating scientific evidence and bias • Communicating ideas about sustainability • Making connections between chemistry and society	• **Retrieval quiz** • **End-of-topic test (Deliberate Practice)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Term 2** **Topic 2**	**BIOLOGY** **BIG IDEA** **Ecosystems** **TOPIC** **B7 Ecology**	**Core Substantive Knowledge** • Levels of organisation in ecosystems • Competition, adaptation and interdependence • Carbon and water cycles • Biodiversity and human impact **Disciplinary Focus (Skills & Working Scientifically)** • Sampling techniques – quadrats and transects • Analysing population data • Evaluating environmental impact information • Using graphs and models to explain processes	**• Core practical – fieldwork sampling** **• Retrieval quiz** **• End-of-term assessment (Biology topics)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Topic 1**	**PHYSICS** **BIG IDEA** **Genes** **TOPIC** **P6** **Waves**	**Core Substantive Knowledge** • Types of waves and wave equations • Reflection, refraction and diffraction • Electromagnetic spectrum and applications • Sound waves and ultrasound **Disciplinary Focus (Skills & Working Scientifically)** • Measuring wave properties practically • Using mathematical formulae ($v = f \times \lambda$) • Analysing graphs and data • Applying knowledge to real-world examples	**• Core practical – ripple tank investigation** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Term 1** **Topic 2**	**CHEMISTRY** **BIG IDEA** **Matter** **TOPIC** **C7/C1/C2 Organic Chemistry and Bonding**	**Core Substantive Knowledge** • Crude oil fractional distillation • Hydrocarbons and alkanes vs alkenes • Combustion and polymerisation • Review of bonding and structure (link to properties) **Disciplinary Focus (Skills & Working Scientifically)** • Drawing structural and displayed formulas • Balancing equations for combustion and addition reactions • Linking bonding to boiling points and reactivity • Evaluating environmental impact of plastics and fuels	**• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Term 2** **Topic 1**	**PHYSICS** **BIG IDEA** **Electricity and Magnetism** **TOPIC** **P2 Electricity**	**Core Substantive Knowledge** • Current, potential difference and resistance • Ohm's Law and resistor characteristics • Power and energy transfer • Domestic electricity and safety features **Disciplinary Focus (Skills & Working Scientifically)** • Building and testing circuits • Measuring current and voltage accurately • Calculating energy and efficiency • Applying equations consistently with units	**• Core practical – IV characteristics** **• Retrieval quiz** **• End-of-term assessment (Physics & Chemistry)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
SUMMER	**CHEMISTRY** **BIOLOGY** **PHYSICS** **BIG IDEA** **REVISION** **TOPIC** **GCSE PREP**	**Core Substantive Knowledge** • Consolidation of key concepts across Biology, Chemistry and Physics • Targeted revision for Paper 1 and Paper 2 examinations • Practice of required practicals and mathematical skills • Mastery of extended responses and command words **Disciplinary Focus (Skills & Working Scientifically)** • Exam technique and time management • Interpreting data and graphs in unfamiliar contexts • Application of knowledge to multi-step problems • Self-reflection and identifying areas for improvement	**• Mock examinations and exam-style papers** **• Diagnostic feedback and targeted intervention** **• GCSE final examinations (Papers 1 & 2 combined science series)**