SCIENCE YEAR 8 Curriculum Overview

SCIENCE OVERVIEW KS3 YEAR 8	**BIG IDEAS CURRICULUM** **In Year 8, students deepen their understanding of how the living, physical and chemical worlds connect. During the autumn term they study how the body moves and breathes, explore the effects of forces and reactions in the world around them, and learn to safely test acids and alkalis through hands-on practicals.** **In spring, they discover how electric current and voltage power devices, investigate how plants harness light in photosynthesis, and explore how our digestive system breaks down and absorbs nutrients. They also begin to recognise patterns in elements, compounds and mixtures and practise separating materials using filtration and distillation.** **The summer term brings big, exciting ideas together: students explore waves, speed, gravity and pressure, and examine how metals and resources shape our planet. They finish the year studying how heat moves and how human activity affects the Earth's systems.** **Throughout the year, students continue to develop their scientific enquiry skills — asking questions, predicting, planning and evaluating investigations. They work collaboratively, use precise scientific language, and build the curiosity and confidence needed for success at KS4 and beyond.**

SCIENCE YEAR 8 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Term 1** **Topic 1**	**BIOLOGY** **BIG IDEA** **Organisms** **TOPIC** **Systems (Movement and Breathing)**	**Core Substantive Knowledge** • Skeletal and muscular systems and how they enable movement • Role of joints, tendons and ligaments • Structure and function of the respiratory system • Gas exchange and the effect of exercise **Disciplinary Focus (Skills & Working Scientifically)** • Using models to represent systems • Measuring pulse and breathing rate • Recording and presenting data • Linking structure to function in biological systems	**• Practical on breathing rate and exercise** **• Low-stakes retrieval quiz** **• End-of-topic test (Deliberate Practice)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Term 1** **Topic 2**	**CHEMISTRY** **BIG IDEA** **Reactions** **TOPIC** **Acids and Alkalis**	**Core Substantive Knowledge** • Properties of acids and alkalis • pH scale and indicators • Neutralisation reactions • Everyday examples and uses **Disciplinary Focus (Skills & Working Scientifically)** • Planning and conducting neutralisation practicals • Using universal indicator and pH paper safely • Writing simple word equations • Linking experimental results to particle theory	**• Core practical – testing household substances** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 8 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Term 2** **Topic 1**	**PHYSICS** **BIG IDEA** **Electricity & Magnetism** **TOPIC** **Current and Voltage**	**Core Substantive Knowledge** • Electric current as flow of charge • Potential difference (voltage) and resistance • Series and parallel circuits revisited • Safety with electricity **Disciplinary Focus (Skills & Working Scientifically)** • Constructing and testing circuits • Measuring current and voltage using ammeters/voltmeters • Predicting and explaining changes in circuits • Recording data in tables and graphs	**• Circuit practical investigation** **• Low-stakes retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 8 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Term 2** **Topic 2**	**BIOLOGY** **BIG IDEA** **Ecosystems** **TOPIC** **Plants and Photosynthesis**	**Core Substantive Knowledge** • Structure of a leaf and adaptations for photosynthesis • Word equation for photosynthesis • Factors affecting rate – light, CO_2, temperature • Role of photosynthesis in food chains and ecosystems **Disciplinary Focus (Skills & Working Scientifically)** • Planning and carrying out experiments on light and photosynthesis • Measuring gas production • Using microscopes to examine leaves • Presenting data graphically	**• Core practical – investigating photosynthesis** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 8 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Term 1** **Topic 1**	**BIOLOGY** **BIG IDEA** **Organisms** **TOPIC** **Systems (Digestion)**	**Core Substantive Knowledge** • Structure and function of digestive organs • Enzymes and their role in digestion • Nutrient absorption in small intestine • Importance of a balanced diet **Disciplinary Focus (Skills & Working Scientifically)** • Modelling the digestive process • Food tests for starch, sugar, protein, fat • Drawing and labelling diagrams accurately • Data interpretation from experiments	**• Practical – food tests** **• Low-stakes retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 8 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Term 1** **Topic 2**	**CHEMISTRY** **BIG IDEA** **Matter** **TOPIC** **Elements, Compounds and Mixtures**	**Core Substantive Knowledge** • Distinction between elements, compounds, mixtures • Particle diagrams and symbols • Separation techniques: filtration, evaporation, distillation, chromatography • Conservation of mass **Disciplinary Focus (Skills & Working Scientifically)** • Designing separation experiments • Using models to represent mixtures and compounds • Recording and interpreting chromatograms • Collaborative learning and peer explanation	**• Practical – separation of mixtures** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 8 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Term 2** **Topic 1**	**PHYSICS** **BIG IDEA** **Waves** **TOPIC** **Types of Wave**	**Core Substantive Knowledge** • Longitudinal and transverse waves • Amplitude, frequency, wavelength • Reflection and refraction recap • Sound and light as examples of waves **Disciplinary Focus (Skills & Working Scientifically)** • Modelling and measuring wave properties • Using oscilloscopes or ripple tanks • Drawing and interpreting wave diagrams • Applying mathematics to wave speed	• **Practical – investigating waves** • **Retrieval quiz** • **End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 8 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Term 2** **Topic 2**	**BIOLOGY** **BIG IDEA** **Genes** **TOPIC** **Inheritance**	**Core Substantive Knowledge** • Variation within and between species • Inherited and environmental characteristics • Simple genetic crosses • Role of chromosomes, genes and DNA **Disciplinary Focus (Skills & Working Scientifically)** • Analysing inheritance data • Using models to represent chromosomes • Ethical discussion of genetics in society • Application of key terminology	• **Retrieval quiz** • **End-of-topic test (Deliberate Practice)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Summer **Term 1** **Topic 1**	**PHYSICS** **BIG IDEA** **Forces** **TOPIC** **Speed, Gravity and Pressure**	**Core Substantive Knowledge** • Calculating speed = distance ÷ time • Gravity and weight • Pressure in solids, liquids, gases • Atmospheric pressure and applications **Disciplinary Focus (Skills & Working Scientifically)** • Measuring distance and time accurately • Graphing motion data • Investigating pressure on different surfaces • Problem-solving using formulae	**• Practical – speed and pressure investigation** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 8 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Summer **Term 1** **Topic 2**	**CHEMISTRY** **BIG IDEA** **Earth** **TOPIC** **Metals**	**Core Substantive Knowledge** • Properties and uses of metals • Reactivity series and displacement • Extraction of metals from ores • Corrosion and prevention **Disciplinary Focus (Skills & Working Scientifically)** • Conducting reactivity experiments • Writing balanced word equations • Evaluating experimental data • Considering sustainability of metal extraction	**• Core practical – reactivity series** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Summer **Term 2** **Topic 1**	**PHYSICS** **BIG IDEA** **Heating and Cooling** **TOPIC** **Thermal Energy**	**Core Substantive Knowledge** • Heat transfer: conduction, convection, radiation • Thermal insulators and conductors • Energy efficiency in homes • Practical applications of thermal science **Disciplinary Focus (Skills & Working Scientifically)** • Planning and carrying out insulation experiments • Measuring temperature changes • Drawing conclusions from evidence • Linking microscopic and macroscopic models	**• Practical – insulation investigation** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

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TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Summer **Term 2** **Topic 2**	**CHEMISTRY** **BIG IDEA** **Earth** **TOPIC** **Human Impacts**	**Core Substantive Knowledge** • The carbon cycle and greenhouse effect • Pollution and global warming • Recycling and resource management • Human impact on biodiversity **Disciplinary Focus (Skills & Working Scientifically)** • Analysing environmental data • Evaluating evidence for climate change • Communicating scientific ideas for sustainability • Debating ethical issues in science	**• Project – reducing human impact** **• End-of-topic test (Deliberate Practice)** **• End-of-year cumulative exam**