SCIENCE YEAR 10 Curriculum Overview

SCIENCE OVERVIEW KS3 YEAR 10	**BIG IDEAS CURRICULUM** **In Year 10, students build upon the foundations from KS3 to explore the major scientific principles that underpin GCSE Science. They begin the year by studying how infectious diseases spread and how the body defends itself, before applying their knowledge of particles and energy to explain electrical resistance, atomic structure, radiation and the behaviour of matter.** **During the spring term, students examine the vital role of plants in ecosystems and investigate the chemistry of acids, metals and chemical reactions. They also study the properties of waves and the structure of the atom, developing confidence with abstract concepts and quantitative data.** **In the summer term, students explore how living organisms maintain stable internal conditions through homeostasis, analyse the relationship between forces, motion and energy, and investigate how reaction rates can be changed in everyday and industrial processes.** **Across the year, practical work and enquiry are at the heart of lessons. Students plan, carry out and evaluate experiments, interpret data, and apply mathematical skills to scientific contexts. By the end of Year 10 they are well-prepared for the demands of Year 11 and the terminal GCSE examinations.**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Topic 1**	**BIOLOGY** **BIG IDEA** **Organisms** **TOPIC** **B3 Infection and Response**	**Core Substantive Knowledge** • Communicable and non-communicable diseases • Pathogens – bacteria, viruses, fungi, protists • Immune system and vaccination • Antibiotics and drug development **Disciplinary Focus (Skills & Working Scientifically)** • Planning aseptic technique investigations • Analysing data on disease spread • Evaluating the use of vaccines and medicines • Communicating scientific arguments using evidence	**• Practical – investigating disinfectants and antibiotics** **• Retrieval quiz and exam-style questions** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Topic 2**	**PHYSICS** **BIG IDEA** **ELECTRICITY AND MAGNETISM** **TOPIC** **P2 Electricity (Resistance)**	**Core Substantive Knowledge** • Current, potential difference and resistance • Ohm's Law (V = IR) • Series and parallel circuits • Factors affecting resistance (wire length, temperature, material) **Disciplinary Focus (Skills & Working Scientifically)** • Constructing and testing circuits safely • Measuring current and voltage • Analysing data to calculate resistance • Evaluating sources of error and uncertainty	**• Core practical – resistance of a wire** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Topic 3**	**PHYSICS** **BIG IDEA** **Matter** **TOPIC** **P3 Particle Model of Matter**	**Core Substantive Knowledge** • Density and states of matter • Changes of state and internal energy • Specific latent heat and specific heat capacity • Pressure in gases **Disciplinary Focus (Skills & Working Scientifically)** • Measuring mass and volume to calculate density • Using mathematical formulas for energy changes • Modelling particle behaviour • Evaluating experimental data	**• Core practical – density investigation** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
AUTUMN **Topic 4**	**PHYSICS** **BIG IDEA** **Matter** **TOPIC** **P4** **Radiation**	**Core Substantive Knowledge** • Types of nuclear radiation (α, β, γ) • Properties and penetrating power • Half-life and decay calculations • Uses and dangers of radiation **Disciplinary Focus (Skills & Working Scientifically)** • Modelling nuclear decay with data • Calculating half-life using graphs and tables • Evaluating risks and benefits of radiation • Applying scientific reasoning to real-world contexts	• **Radioactivity data task** • **Retrieval quiz** • **End-of-term assessment (Physics topics)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Topic 1**	**BIOLOGY** **BIG IDEA** **Ecosystems** **TOPIC** **B1/B2/B4** **Plants**	**Core Substantive Knowledge** • Photosynthesis – equations and limiting factors • Transport systems in plants (xylem and phloem) • Transpiration and translocation • Role of plants in ecosystems and carbon cycle **Disciplinary Focus (Skills & Working Scientifically)** • Investigating rate of photosynthesis • Measuring transpiration using apparatus • Graphing and interpreting data • Linking structure to function	**• Core practical – photosynthesis light intensity** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Topic 2**	**CHEMISTRY** **BIG IDEA** **Reactions** **TOPIC** **C4 Chemical Changes (Acids and Alkalis)**	**Core Substantive Knowledge** • Reactions of acids with metals, bases and carbonates • pH scale and neutralisation • Ionic equations for acid reactions • Making salts practically **Disciplinary Focus (Skills & Working Scientifically)** • Planning neutralisation practicals • Writing balanced symbol and ionic equations • Recording and interpreting data • Safe use of chemicals and apparatus	**• Core practical – preparing a pure dry salt** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Topic 3**	**CHEMISTRY** **BIG IDEA** **Earth** **TOPIC** **C4 Chemical Changes (Metals)**	**Core Substantive Knowledge** • Reactivity series and displacement • Extraction of metals from ores • Oxidation and reduction processes • Electrolysis overview **Disciplinary Focus (Skills & Working Scientifically)** • Observing metal reactions and recording results • Using reactivity data to predict outcomes • Writing symbol equations • Evaluating sustainability of metal use	**• Reactivity practical** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Spring **Topic 4**	**PHYSICS** **BIG IDEA** **Waves** **TOPIC** **P1 & P4 Atomic Structure**	**Core Substantive Knowledge** • Properties of waves – frequency, amplitude, wavelength • Reflection, refraction and diffraction • Electromagnetic spectrum • Atomic structure and link to radiation **Disciplinary Focus (Skills & Working Scientifically)** • Using wave equations • Modelling wave behaviour • Measuring wave speed • Analysing EM radiation data	**• Practical – wave investigation** **• End-of-term assessment (Spring topics)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Summer **Topic 1**	**BIOLOGY** **BIG IDEA** **Genes** **TOPIC** **Homeostasis and Response**	**Core Substantive Knowledge** • Nervous system and reflex actions • Endocrine system and hormonal control • Blood glucose regulation • Thermoregulation and negative feedback **Disciplinary Focus (Skills & Working Scientifically)** • Investigating reaction time • Analysing data on homeostasis • Evaluating control systems • Communicating scientific concepts clearly	**• Core practical – reaction time investigation** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Summer **Topic 2**	**PHYSICS** **BIG IDEA** **Forces** **TOPIC** **P5 Forces**	**Core Substantive Knowledge** • Scalar and vector quantities • Force and acceleration (Newton's Laws) • Weight = mass × gravitational field strength • Work done and elastic potential energy **Disciplinary Focus (Skills & Working Scientifically)** • Measuring force and extension • Calculating work and energy transfer • Drawing and interpreting force diagrams • Using equations with correct units and significant figures	**• Core practical – Hooke's Law** **• Retrieval quiz** **• End-of-topic test (Deliberate Practice)**

SCIENCE YEAR 10 Curriculum Overview

TERM	THEMES/ TOPICS	KEY KNOWLEDGE & SKILLS	KEY ASSESSMENTS
Summer **Topic 3**	**CHEMISTRY** **BIG IDEA** **Reactions** **TOPIC** **C6 Rate and Extent of Chemical Change**	**Core Substantive Knowledge** • Factors affecting rate of reaction • Collision theory and activation energy • Catalysts and reversible reactions • Dynamic equilibrium and Le Chatelier's Principle **Disciplinary Focus (Skills & Working Scientifically)** • Measuring rate using gas volume and precipitate methods • Plotting and analysing graphs • Applying mathematical relationships • Evaluating accuracy and reliability	**• Core practical – rate of reaction investigation** **• Retrieval quiz** **• End-of-year exam (cumulative GCSE paper)**