Programme of Study: Science

KS2 Underpinning Concepts		Year 7	Year 8	Year 9	Year 10	Year 11	KS5 & CEAIG Opportunities	Links to SMSC
Biology **KS2 Topics:** Life cycles and reproduction Nutrition and health Classification of living things Adaptation and habitats **Chemistry** **KS2 Topics:** States of matter Simple properties of materials Changes of state and reversible/irreversible changes **Physics** **KS2 Topics:** Forces and magnets Light and sound Electricity Earth and space **Scientific Enquiry (Working Scientifically)** **KS2 Focus:** Asking questions Planning fair tests Making observations and measurements Drawing conclusions	Autumn 1	**Working scientifically** - Laboratory Safety, Using Lab Equipment, Using Scales and Measuring Accurately, Using a Bunsen Burner, Recording, Analysing and Evaluating Data **Core Chemistry concepts** - C1.1: Particles, C1.2: Elements	**Chemistry: Elements and Mixtures** **C2.1: The Periodic Table** - Metals & Non-Metals, Groups & Periods, Group 1 Elements, Group 7 Elements, Group 0 Elements **C2.2: Separation Techniques** – Mixtures, Solutions, Solubility, Filtration, Evaporation & Distillation, Chromatography	**Biology: Building Life – Genes, Health, and Ecosystems** **B1: You and Your genes: DNA & Genes**: Genetic instructions and variation. **Inheritance**: How traits are passed on. **Gene Technology**: DNA modification and its impacts. **B2 – Keeping Healthy: Causes**: Pathogens, genes, lifestyle. **Defences**: Barriers and immune response. **Prevention**: Vaccines, hygiene, public health; **Influences**: Genetic, lifestyle, environmental. **Treatment**: Medicines and clinical trials. **B3 – Living Together: Photosynthesis**: Enzyme-driven energy capture. **Energy Transfer**: Movement of energy through ecosystems. **Food Webs**: Feeding relationships and energy flow. **Interdependence**: Species and environmental reliance. **Human Impact**: Effects of pollution and climate change. **Chemistry: The Chemistry of Air and Water** **C1 – Air and Water: Composition of Air**: Gases in the atmosphere and their roles. **Pollution:** Sources and effects of pollutants like CO_2, NO_x, SO_2. **Water Purification:** Filtration, distillation, and water safety. **Solubility and Solutions:** Dissolving, saturation, and crystallisation. Exploring Element Trends and Reactions **C2 – Chemical Patterns: Periodic Table**: Groups and periods, trends in reactivity. **Group 1 and Group 7 Elements:** Alkali metals and halogens. **Reactivity Series:** Metals and displacement reactions. **Ionic Compounds:** Formation and properties **Physics: Waves, Energy, and Electromagnetic Radiation** **P1 – Waves and Radiation: Types of Waves**: Transverse and longitudinal. **Wave Properties:** Frequency, wavelength, amplitude, speed. **Electromagnetic Spectrum:** Uses and dangers of EM waves. **Radiation:** Infrared, UV, X-rays, and their applications. **P2 – Sustainable Energy: Energy Resources:** Renewable vs non-renewable. **Generating Electricity:** Wind, solar, hydro, fossil fuels. **Efficiency and Conservation:** Reducing energy waste. **Environmental Impact:** Carbon footprint and sustainability.	**Biology: The Story of Life – Energy, Control, and Evolution** **B4 – Using Food and Controlling Growth** **Photosynthesis**: Making food from sunlight; **Respiration**: Releasing energy; **Enzymes**: Supporting digestion and metabolism; **Growth Control**: Hormones, growth factors, cell division **B5 – The Human Body** **Nervous System**: Reflexes and coordination; **Hormonal Control**: Homeostasis and the endocrine system; **Reproduction**: Fertility and contraception; **Health**: Immune system and lifestyle diseases **B6 – Life on Earth – Past, Present and Future** **Evolution**: Natural selection and evidence; **Extinction & Biodiversity**: Causes and impact; **Classification**: Grouping life forms; **Fossils**: Clues to Earth's history **Chemistry: Understanding Nature, Materials, and Methods** **C3 – Chemicals of the Natural Environment** **Atmosphere**: Gases and their roles; **Water & Air**: Pollution and treatment; **Earth's Resources**: Metals, minerals, sustainability **C4 – Material Choices** **Properties of Materials:** Metals, polymers, ceramics. **Smart Materials:** Responsive materials and their uses. **Sustainability:** Life cycle assessments, recycling. **C5 – Chemical Analysis** **Purity and Formulations:** Identifying pure substances. **Chromatography:** Separating mixtures. **Qualitative Tests:** For ions and gases. **Physics: Exploring the Physics Around Us** **P3 – Electric Circuits** **Circuit Components,** Current, Voltage, Resistance, Ohm's Law and calculations. Series and Parallel Circuits: Differences and applications. **P4 – Explaining Motion** **Forces & Motion**: Newton's Laws, speed, acceleration; **Motion Graphs**: Distance-time and velocity-time; **Momentum**: Conservation and safety **P5 – Radioactive Materials** **Atoms**: Isotopes and radiation; **Radiation Types**: Alpha, beta, gamma; **Uses & Risks**: Medical, industrial, nuclear safety	**Chemistry: Creating with Reactions** **C6 – Making Useful Chemicals** **Chemical Reactions**: Types (e.g. synthesis, neutralisation, precipitation). **Industrial Processes:** Haber process (ammonia), contact process (sulfuric acid). **Rates of Reaction:** Factors affecting speed (temperature, concentration, catalysts). **Yield and Atom Economy:** Efficiency and sustainability in chemical manufacturing. **Physics: Understanding Matter – Particles, Energy, and Change** **P6 – Matter** **States of Matter**: Solid, liquid, gas, and changes of state. **Particle Model:** Explaining properties and behaviour of matter. **Density:** Calculations and practical applications. **Internal Energy and Heating:** Specific heat capacity, latent heat.	**KS5 Pathways:** **A-Level Sciences**: Biology, Chemistry, Physics. **Applied Science**: BTEC Level 3 Applied Science. **Other STEM Subjects**: Psychology, Environmental Science, Geology. **Vocational Routes**: Health & Social Care, Engineering, Animal Care. **Career Pathways: STEM Careers** Medicine, Nursing, Engineering, Veterinary Science, Pharmacology. **Technical Careers** Lab Technician, Forensics, IT & Data Analysis. **Apprenticeships** Science-based roles in healthcare, engineering, and manufacturing. **Further Education** Access to science-related university courses.	**Spiritual Development** Exploring awe and wonder in nature (e.g., ecosystems, space). Understanding life processes and the complexity of living organisms. Considering ethical questions in genetics and stem cell research. **Moral Development** Debating the ethics of genetic engineering, cloning, and animal testing. Discussing responsibility in environmental issues like climate change. Evaluating the impact of scientific decisions on health and society. **Social Development** Collaborative practical work and investigations. Understanding public health measures and their societal impact. Considering how science influences technology and daily life. **Cultural Development** Learning about scientific contributions from different cultures. Exploring global challenges such as energy resources and sustainability. Appreciating diversity in scientific thought and innovation.
	Autumn 2	**Biology: From Cells to Life** **B1: Cells** - Understanding Cells, Using Microscopes, Specialised Cells, Unicellular Organisms **B1.3 : Reproduction** - Puberty, Reproductive Systems, Fertilisation, Pregnancy and Birth, Growth and Development	**Biology: Living Well and Living Together** **B2.1: Health and lifestyle** – Nutrients, Food Tests, Unhealthy Diet, Digestive System, Gut Bacteria, Enzymes, Drugs, Alcohol, Smoking **B2.2: Ecosystems** - Food Chains & Web, Competition , Flowers & Pollination, Fertilisation & Germination, Seed Dispersal					
	Spring 1	**Physics: Exploring Motion and Sound** **P1.1: Forces** – Deformation, Friction & Drag, Non-Contact Forces, Force Balance, Gravity & Weight **P1.2: Sound** – Waves, Sound & Energy Transfer, Loudness & Pitch, Detecting Sound, Echoes & Ultrasound	**Physics: Power and Energy** **P2.1: Electricity** – Charging Up, Circuits & Current, Potential Difference, Resistance, Series & Parallel Circuits , Magnets & Electromagnets **P2.2: Energy** - Food and Fuels, Energy Resources, Energy, Temperature, Energy Transfer: Particles, Radiation & Forces , Power					
	Spring 2	**Chemistry: Exploring how substances change** **C1.3: Reactions** - Word Equations, Burning Fuels, Thermal Decomposition, Conservation of Mass, Exothermic & Endothermic Reactions **C1.4: Acids & Alkalis** - Indicators & pH, Neutralisation, Making Salts	**Chemistry: Reacting Materials** **C2.3: Metals & Acids** - Metal reactions with Acids, Oxygen, Water & Displacement Reactions, Extracting Metals, Ceramics, Polymers, Composites			**Forensic analysis and synoptic consolidation:** **Biology Units B1–B6** – From genetics to ecosystems **Chemistry Units C1–C6** – From atomic structure to industrial processes **Physics Units P1–P6** – From waves and energy to the nature of matter **Working Scientifically** – Developing practical skills, analytical thinking, and data interpretation **Application and Exam Technique** – Strengthening understanding through contextual problem-solving and assessment preparation		
	Summer 1	**Biology: The Living Body** **B1.2: Body systems** - Levels of Organisation, Gas Exchange, Breathing, The Skeleton, Movement: Joints, Movement: Muscles	**Biology: Survival and Change** **B2.3: Adaptation & Inheritance** - Competition, Variation, Inheritance, Natural Selection, Extinction **Chemistry: Planet in Balance** **C2.4 – The Earth** - Sedimentary, Igneous and Metamorphic Rocks, The Rock Cycle, The Carbon Cycle, Climate Change and Global Warming, Recycling			**GCSE EXAM PREPARATION**		
	Summer 2	**Physics: Beyond Earth - Light and Space** **P1.3: Light** - Reflection, Refraction, The Eye & the Camera, Colour **P1.4: Space** – The Night Sky, The Earth & Moon, The Solar System	**Physics: Forces in Action** **P2.3: Motion & Pressure** – Speed, Motion Graphs, Pressure, Turning Forces			**GCSE EXAMINATIONS**		