Programme of study for Year 10 Science

Autumn (1st half term)	Autumn (2nd half term)	Spring (1st half term)	Spring (2nd half term)	Summer (1st half term)	Summer (2nd half term)
Topics: • B5 Health and Disease • P8 Forces in balance • C1 Atomic Structure • C3 Structure and Bonding Assessment: Linear assessment focussing on Year 9 foundational content	Topics: • C5 Energy changes • B8 Photosynthesis • B9 Respiration • P9 Motion Assessment: 1. Electricity 2. Investigating light intensity on photosynthesis practical.	Topics: • B6 Immunity • B7 Non-communicable diseases • C6 Chemical Changes • P10 Force and motion • B10 The Nervous System Assessment: 1. Required practical assessment 2. Required practical assessment	Topics: • C9 Crude Oil and Fuels • P7 Radioactivity • B11 Hormonal Coordination • C7 Energy Changes • B15 Adaptations, interdependence, and competition Assessment: Year group linear assessment on topics from Autumn 1 to Spring 1	Topics: • B16 Organising an ecosystem • C8 Rates of and equilibrium Assessment: 1. Required practical assessment 2. Required practical assessment	Topics: • B17 Biodiversity and ecosystems • P11 Waves • Time dependent – P12 Electromagnetic spectrum Assessment: 1. Required practical assessment 2. Required practical assessment

Skills (students should be able to do):
AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures.
AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures.
AO3: Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures

Key learning outcomes (Students should know): Electricity in the home: - Explain the principles of electric circuits, including series and parallel circuits. - Calculate current, voltage, and resistance using Ohm's Law. - Identify the components of mains electricity, including live, neutral, and earth wires. - Describe the importance of fuses, circuit breakers, and earthing in household electrical safety. Calculate electrical power using the formula $P = I V$ P=IV and energy	Key learning outcomes (Students should know): Photosynthesis: - Understand the process of photosynthesis, including the reactants and products involved - Explain the role of chlorophyll in capturing light energy - Describe the factors that affect the rate of photosynthesis Respiration: - Understand the process of respiration and the reactants and products involved - Explain the difference between aerobic and anaerobic respiration - Describe the importance of respiration in releasing energy Motion: - Understand the concept of motion and how it can be measured - Describe the factors affecting motion, such as force, mass, and	Key learning outcomes (Students should know): Non-communicable diseases: - Understand the causes and risk factors of non-communicable diseases - Describe the impact of non-communicable diseases on individuals and societies - Explain the methods of prevention and treatment for non-communicable diseases Force and motion: - Understand the relationship between force, mass, and acceleration - Describe the different types of forces, such as gravitational, frictional, and magnetic - Explain how forces can change the motion of objects Crude oil and fuels: - Understand the structure and properties of organic compounds - Describe the process of fractional distillation to produce smaller mixtures of alkanes, and how this	Key learning outcomes (Students should know): Radioactivity: - Understand the concept of radioactivity and the different types of radiation - Describe the uses and applications of radioisotopes - Explain the risks and safety precautions associated with radioactivity Hormonal Coordination: - Understand the role of hormones in maintaining homeostasis - Describe the endocrine glands and their functions - Explain the feedback mechanisms involved in hormonal regulation Energy Changes: - Understand the different forms of energy and how they can be converted from one form to another - Explain the concept of energy efficiency - Describe the factors influencing energy transfer in systems	Key learning outcomes (Students should know): Organising an ecosystem: - Understand how ecosystems are structured and the different components within ecosystems - Describe the processes of energy transfer and nutrient cycling in ecosystems - Explain the concept of succession and the changes that occur in ecosystems over time Rates and equilibrium: - Understand the factors affecting reaction rates - Describe how reaction rates can be altered - Explain the concept of dynamic equilibrium in chemical reactions	Key learning outcomes (Students should know): Biodiversity and ecosystems: - Understand the importance of biodiversity for ecosystem stability and resilience - Describe the factors that threaten biodiversity - Explain the methods used to conserve and protect biodiversity Waves: - Understand the characteristics of waves, including amplitude, frequency, and wavelength - Describe the properties of different types of waves, such as sound and electromagnetic waves - Explain how waves can be reflected, refracted, and diffracted Electromagnetic spectrum: - Understand the different types of

transfer with $E = P t$ E=Pt. - Compare power ratings of various household appliances and their energy consumption. - Distinguish between alternating current (AC) and direct current (DC) and describe where each is used in household settings. - Explain why AC is used in mains electricity and the role of transformers. - Calculate the efficiency of electrical devices and discuss how efficiency impacts	acceleration - Explain the relationship between distance, time, and speed Chemical Changes: - Explain the difference between physical and chemical changes - Describe the factors influencing the rate of chemical reactions - Understand the concept of conservation of mass in chemical reactions Electrolysis: - Understand the process of electrolysis and the role of ions - Describe the products of electrolysis - Explain the factors affecting the rate of electrolysis	can be used to create other important products - Explain the importance of organic compounds in everyday life The Nervous System: - Understand the structure and functions of the nervous system, including neurons and synapses - Describe the pathway of nerve impulses - Explain the role of the nervous system in coordinating responses and maintaining homeostasis	Adaptations, interdependence, and competition: - Understand the concept of adaptation and how organisms adapt to their environments - Describe the interdependence of organisms in ecosystems - Explain the concept of competition and its role in natural selection		electromagnetic radiation and their uses - Describe the properties and effects of different parts of the electromagnetic spectrum - Explain the principles of wave-particle duality

energy use in homes. - Interpret electricity bills and estimate the cost of running different household appliances. Health and disease: - Understand the definition and impact of health and disease on individuals and society. - Learn about the causes, transmission, and prevention of infectious diseases. - Explore the principles and benefits of vaccination. - Understand the importance of a balanced diet and the consequences of malnutrition. - Learn about the effects of lifestyle choices, such as smoking and					

substance abuse, on health. - Explore the importance of exercise and the impact of physical activity on health and well-being. - Understand the principles of first aid and the role of healthcare professionals in promoting and maintaining good health. Forces in balance: - Learn about different types of forces such as gravitational, electromagnetic, and nuclear forces. - Understand the concept of forces in balance, including equilibrium conditions and resultant forces. - Explore the effects of forces on motion, such as acceleration, deceleration, and					

changes in direction. - Learn about the factors affecting the speed and direction of moving objects. - Investigate the relationship between forces, mass, and acceleration using Newton's laws. - Understand the principles of moments and their applications, including simple levers and balancing objects. - Explore the principles of pressure and the ways it can be applied and measured. Atomic structure: - Understand the historical development of atomic theory and the contributions of different scientists. - Learn about the structure of					

atoms, including subatomic particles and the arrangement of electrons within energy levels and orbitals. - Understand the different models of atomic structure, including the Bohr model and the quantum mechanical model. - Learn about isotopes and their uses in medicine, industry, and research. - Explore the composition and properties of elements and compounds. - Understand the concept of nuclear radiation and its applications and risks. - Investigate the principles of radioactive decay and the concept of half-life.					

Structure and bonding: - Explore different types of chemical bonds, including ionic, covalent, and metallic bonds. - Understand the relationship between the structure and properties of substances. - Learn about the importance of chemical bonding in determining the physical and chemical properties of materials. - Investigate the concept of electrostatic forces and their role in bonding. - Understand the periodic table and the patterns and trends in chemical properties of elements. - Explore the principles of chemical reactions,					

including the law of conservation of mass and balancing equations. - Investigate the role of catalysts in chemical reactions and the factors affecting reaction rates.					

Assessments: 2 linear assessments, 8 other assessed practicals indicated above

Building understanding: Rationale / breakdown for your sequence of lessons:

his Year 10 sequence is strategically designed to build on the foundational knowledge established during Key Stage 3, ensuring a comprehensive understanding of core concepts in biology, chemistry, and physics. The rotation of two teachers facilitates a diverse teaching approach while providing continuity and coherence across disciplines.

Biology: The sequence begins with Health and Disease, introducing essential concepts related to human health, which serves as a context for subsequent topics like Immunity and Non-communicable Diseases. This progression allows students to explore both the physiological and social implications of health, fostering an understanding of the body's defenses and lifestyle factors. Following this, topics such as Photosynthesis and Respiration provide insights into energy transformations in living organisms, linking back to the importance of health and disease management. Ending with Biodiversity and Ecosystems, Adaptations, and Organising an Ecosystem ensures students grasp ecological relationships and environmental impacts, culminating in a holistic view of life sciences.

Chemistry: Chemistry topics are introduced with Atomic Structure and Structure and Bonding, which lay the groundwork for understanding material properties and chemical behavior. This is further developed through Chemical Changes and Energy Changes, emphasizing the dynamic nature of chemical reactions. Introducing Crude Oil and Fuels connects chemistry to real-world applications and environmental issues. The Rates of Reaction and Equilibrium topics provide students with an understanding of reaction kinetics and the factors influencing chemical processes, essential for higher-level chemistry understanding.

Physics: The physics curriculum commences with Forces in Balance and progresses to Motion, laying a strong foundation for understanding dynamics and kinematics. This foundational knowledge is crucial as students delve into more complex concepts like Waves and the Electromagnetic Spectrum. The arrangement allows students to apply their understanding of forces and motion to explain wave phenomena, enhancing their analytical skills. The inclusion of Radioactivity connects physics to real-world applications in medicine and energy, making the subject matter relevant and engaging.

This sequence not only provides a logical flow of content across the sciences but also emphasizes interdisciplinary connections. By aligning topics that share common themes, such as energy changes in biology and chemistry, students develop a more integrated understanding of scientific concepts. The collaborative teaching approach allows for varied instructional strategies, accommodating diverse learning styles and enhancing student engagement. Overall, this well-structured sequence promotes a deeper understanding of scientific principles, preparing students for further studies and real-world applications.

Home – Learning:
Teachers will set home learning using lesson materials. Some of these will be assessed. This will be indicated.

Reading / literacy:
Students are encouraged to prior reading on topics. In lessons students are taught how to construct answers through use of writing frames and exemplar answers where extended writing is required and command words and keywords that are relevant to the topic are consistently assessed in lessons through questioning and written question practice.

Numeracy:

- Recognise and use expressions in decimal form: Recognise and use expressions in standard form; Use ratios, fractions and percentages; Make estimates of the results of simple calculations
- Handling data: Use an appropriate number of significant figures; Find arithmetic means; Construct and interpret frequency tables and diagrams, bar charts and histograms; Make order of magnitude calculations
- Algebra: Understand and use the symbols: =, <>, >, ∝ , ~ ;Change the subject of an equation; Substitute numerical values into algebraic equations using appropriate units for physical quantities
- Graphs: Translate information between graphical and numeric form; Understand that y = mx + c represents a linear relationship; Plot two variables from experimental or other data; Determine the slope and intercept of a linear graph; Draw and use the slope of a tangent to a curve as a measure of rate of change
- Geometry and trigonometry: Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects; Calculate areas of triangles and rectangles, surface areas and volumes of cubes

Enrichment / opportunities to develop cultural capital (including careers, WRL and SMSC):

- Trips during science week and curriculum days
- Science week
- Science club
- STEM club