Year 10 Biology Curriculum Sequence

Intent

The Year 10 Science curriculum is designed to build on prior learning from Key Stage 3 and prepare all students for meaningful progression in Year 11, whether following the GCSE or Entry Level Certificate (ELC) pathway. Placement in each pathway reflects students' individual strengths, needs, and future aspirations, ensuring the most appropriate and supportive route to success.

Both pathways are equally valued and provide challenge and support, enabling students to develop confidence, subject knowledge, and scientific skills. Learning is structured to strengthen understanding of key concepts, develop analytical thinking, and foster the ability to apply scientific ideas to real-world situations, including global issues such as sustainability, health, and environmental responsibility.

Students on the **Year 10 GCSE Biology pathway** build upon their Key Stage 3 knowledge to develop a deep understanding of fundamental biological principles and how living organisms interact with their environment. Key topics include *Cell Biology*, *Ecology*, and human health. Students refine their scientific inquiry skills through practical experiments, data analysis, and problem-solving, fostering critical thinking and curiosity about the role of biology in everyday life. The curriculum integrates hands-on experiences and theoretical understanding to prepare students for Year 11, where these concepts will be expanded and explored in greater depth.

Students on the **Year 10 ELC Science pathway** consolidate and extend foundational knowledge from Year 9, building appreciation for core scientific ideas across biology, chemistry, and physics. Topics include *Environment, Evolution and Inheritance*, where students learn about the interconnected processes of natural systems, *Elements, Mixtures and Compounds*, revisiting atoms, the periodic table, and material properties, and *Energy, Forces and the Structure of Matter*, linking scientific principles to real-world examples such as braking distances and fuel use. Practical lessons and data collection reinforce understanding, while promoting problem-solving, observation, and analytical skills.
Across both pathways, students develop scientific literacy, numeracy, and investigative skills, preparing them for confident progression into Year 11. The curriculum ensures that all students are equipped with the knowledge, understanding, and transferable skills necessary for success in further study, post-16 education, or future careers in science-related fields.

Pathway 1: GCSE Biology (AQA)

Autumn HT1	Autumn HT2	Spring HT1	Spring HT2	Summer HT1	Summer HT2
Cell Biology	Organisation	Infection and Response	Bioenergetics	Homeostasis and Response	Ecology
Intent: The study of cells is fundamental to understanding the structure and function of all living organisms. This topic aims to develop students' knowledge of cell biology, enabling them to appreciate the complexity and diversity of life at a microscopic level. Through engaging lessons and practical investigations, students will explore the differences between eukaryotic and prokaryotic cells, specialised cells, cell division, and transport mechanisms.	**Intent**: The study of organisation in biology provides students with a deeper understanding of how multicellular organisms are structured and function efficiently. This topic builds on knowledge of cells and explores how they form tissues, organs, and organ systems. It lays the foundation for understanding human biology, health, and disease.	**Intent**: The study of infection and response helps students understand how pathogens cause disease, how the body defends itself, and how scientists develop treatments to combat infections. This topic is crucial for understanding public health, medical advancements, and the importance of vaccination and hygiene in preventing disease spread.	**Intent**: Bioenergetics helps students understand how organisms obtain and use energy to sustain life. This topic is essential for understanding processes such as photosynthesis and respiration, which are fundamental to all living things. It also builds on prior knowledge of cells and organisation, linking biological concepts to real-world applications in health, exercise, and sustainability.	**Intent**: The study of homeostasis and response allows students to understand how the body maintains stable internal conditions and responds to changes in the environment. This topic is essential for understanding bodily functions, nervous and hormonal control, and how medical advancements help regulate bodily processes. It builds on prior knowledge of cells, organisation, and bioenergetics while linking to future studies in health and disease.	**Intent**: Ecology helps students understand the interactions between organisms and their environments. This topic is essential for understanding biodiversity, ecosystems, and the impact of human activity on the natural world. It provides a foundation for addressing global challenges such as climate change, conservation, and sustainability.
Intended Skills and Outcomes: The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can identify and label the parts of animal and plant cells. • I can describe the function of cell organelles (e.g. nucleus, cytoplasm, membrane, mitochondria, ribosomes). • I can explain the differences between plant and animal cells. • I can describe how cells are specialised for their function. • I can give examples of specialised animal and plant cells. • I can use the equation: magnification = image size ÷ real size. • I can describe how light microscopes and electron microscopes differ. • I can explain how microscopes have improved our understanding of cells. • I can describe the stages of the cell cycle. • I can explain how mitosis produces identical cells. • I can explain why mitosis is important for growth and repair. • I can describe what stem cells are and where they are found. • I can explain how stem cells can differentiate into different cell types. • I can discuss the uses and risks of stem cells. • I can describe diffusion as the movement of particles from high to low concentration. • I can explain osmosis as the movement of water across a partially permeable membrane. • I can describe active transport as movement against the concentration gradient using energy. • I can explain why these processes are important in cells.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can describe the levels of organisation (cells → tissues → organs → systems). • I can explain the role of the digestive system. • I can describe how enzymes break down food. • I can describe the structure and function of the heart. • I can explain how blood moves through the circulatory system. • I can compare arteries, veins and capillaries. • I can identify the main components of blood (red cells, white cells, platelets, plasma). • I can explain how blood transports substances around the body. • I can describe the structure and function of plant tissues (xylem, phloem). • I can explain how water and minerals are transported in plants. • I can describe transpiration and factors affecting it.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can describe how diseases are spread. • I can explain the difference between bacteria, viruses and fungi. • I can give examples of communicable and non-communicable diseases. • I can describe how the body defends itself against pathogens. • I can explain how medicines (e.g. antibiotics, painkillers) work. • I can explain the importance of vaccination. • I can describe how new drugs are tested. • I can explain why drugs must be tested for safety and effectiveness.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can write the word equation for photosynthesis. • I can explain the factors affecting photosynthesis (light, CO_2, temperature). • I can describe how plants use glucose. • I can write the word equation for aerobic respiration. • I can explain the difference between aerobic and anaerobic respiration. • I can describe why respiration is important in cells. • I can describe what happens to the body during exercise. • I can explain oxygen debt and lactic acid. • I can describe metabolism as all the chemical reactions in the body.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can describe how the nervous system coordinates responses in the body. • I can explain the roles of receptors, coordination centres and effectors. • I can describe how reflex actions help protect the body. • I can compare nervous and hormonal coordination. • I can explain how the endocrine system uses hormones to bring about responses. • I can describe how blood glucose levels are controlled. • I can explain how body temperature is regulated. • I can describe how water levels are controlled in the body. • I can explain how negative feedback helps maintain stable internal conditions. • I can describe the role of hormones in puberty and the menstrual cycle (Foundation content). • I can explain how hormones are used in contraception and fertility treatments (Foundation overview). • I can describe the structure and function of the eye and explain common vision defects. • I can explain how the body responds to stimuli from the environment. • I can describe how organic compounds such as glucose are used in cellular respiration. • I can explain that respiration releases energy needed for other chemical reactions in the body. • I can link respiration to active processes such as maintaining body temperature and muscle contraction. • I can apply my knowledge of homeostasis to unfamiliar exam questions. • I can use correct scientific vocabulary when explaining homeostatic control.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can explain how organisms interact with each other and their environment. • I can identify producers, consumers, and decomposers in an ecosystem. • I can describe how energy flows through food chains and food webs. • I can construct and interpret food chains and food webs. • I can calculate energy transfer between trophic levels. • I can explain how materials such as water, carbon, and nitrogen cycle through ecosystems. • I can analyse data to identify patterns in populations and ecosystems. • I can explain the effects of environmental changes on ecosystems. • I can investigate the distribution of organisms using sampling techniques. • I can interpret results from quadrat or transect surveys. • I can evaluate the reliability of ecological data. • I can suggest ways humans impact ecosystems and biodiversity. • I can use evidence to explain how chemical cycles sustain life in ecosystems. • I can apply my knowledge of ecosystems to answer exam-style questions.

Feeds from: The GCSE Biology course builds on the knowledge and skills developed through Key Stage 3 science and prior science qualifications such as the Entry Level Certificate (ELC). Students enter the course with a solid understanding of biology, chemistry, and physics concepts, alongside practical and investigative skills including planning experiments, collecting and analysing data, and drawing scientific conclusion.
Feeds into: The Year 10 GCSE Biology course prepares students for Year 11, the second year of the course, by developing a deeper understanding of key biological concepts and refining practical and investigative skills. Students build on their knowledge of cells, systems, genetics, ecology, and physiology, while becoming more confident in planning experiments, analysing data, and applying scientific ideas. This strong foundation ensures they are ready to tackle more complex topics and exam-style assessments in Year 11.

Pathway 2: Entry Level Certificate

Autumn HT1	Autumn HT2	Spring HT1	Spring HT2	Summer HT1	Summer HT2
Biology - The Human Body	Biology - The Human Body (TDA & ESA)	Chemistry- Elements, Mixtures and Compounds	Chemistry- Elements, Mixtures and Compounds (TDA & ESA)	Physics – Energy, Forces and Structure of Matter	Physics – Energy, Forces and Structure of Matter (TDA & ESA)
Intent: Develops students' understanding of how organ systems work together to carry out essential life processes, supported by energy from respiration. Students explore how the body delivers nutrients and oxygen, removes waste, and coordinates functions through the nervous and hormonal systems. The curriculum also promotes understanding of health through balanced nutrition, exercise, and disease prevention, equipping students with knowledge to make informed lifestyle choices and understand how the body defends itself against illness.	**Intent**: Students will take part in a implementing their knowledge through ESAs (Externally Set Assignment) and TDAs. This will gradually be built up through a series of low-stakes knowledge retrieval, modelled around the ESAs and TDAs questions. Example TDAs will be completed in run up to the final TDA 'The effect of exercise on heart rate'.	**Intent**: Develops students' understanding of matter as being composed of atoms, with around 100 naturally occurring types called elements, displayed in the periodic table. Students will learn how elements combine to form compounds and how different atomic arrangements result in substances with unique properties. They will also explore the characteristics of solids, liquids, and gases, as well as the nature of mixtures and their everyday applications.	**Intent**: Students will take part in a implementing their knowledge through ESAs (Externally Set Assignment) and TDAs. This will gradually be built up through a series of low-stakes knowledge retrieval, modelled around the ESAs and TDAs questions. Example TDAs will be completed in run up to the final TDA 'Which metal is the best conductor'	**Intent**: Develops students' understanding of how forces, as pushes or pulls, cause objects to move, transferring energy and doing work. Students will learn that energy can be transferred, stored, or dissipated but cannot be created or destroyed. They will explore braking forces, braking distances, and how energy transfer affects motion. Additionally, students will study renewable and non-renewable energy resources, and how atomic processes can release energy through particle or gamma ray emission.	**Intent**: Students will take part in a implementing their knowledge through ESAs (Externally Set Assignment) and TDAs. This will gradually be built up through a series of low-stakes knowledge retrieval, modelled around the ESAs and TDAs questions. Example TDAs will be completed in run up to the final TDA 'Which material will keep my cup of tea the warm the longest'.
Intended Skills and Outcomes: The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can identify the parts of an animal cell and explain what each part does. • I can describe how cells form tissues, tissues form organs, and organs form systems. • I can explain how the human digestive system works. • I can describe how respiration happens and why it is important for my body. • I can explain how lifestyle choices affect my health. • I can explain what infectious diseases are and how they spread. • I can describe the role of white blood cells in defending the body against disease. • I can explain how medicinal drugs help treat illnesses. • I can describe the main parts of the nervous system and how they work together. • I can explain what hormones are and how they affect the body. • I can describe the role of hormones in human fertility.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can carry out independent practical exercises safely and carefully. • I can take part in investigations with a group and share my ideas. • I can collect and record data accurately. • I can work together with others and communicate my ideas clearly. • I can listen to others and contribute to teamwork during science activities.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can describe the properties of atoms, elements, and compounds. • I can explain the different states of matter and how they change. • I can describe the different forms of carbon (allotropes) and their properties. • I can explain what a mixture is and describe its properties. • I can describe how chromatography works and what it is used for. • I can explain where metals come from. • I can describe the properties of metals and alloys. • I can describe the properties of a polymer.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can carry out independent practical exercises safely and accurately. • I can take part in investigations with a group and share my ideas. • I can collect, record, and organise data carefully. • I can work together with others and communicate my ideas clearly. • I can listen to others and contribute positively during teamwork.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can recall the different ways energy is stored. • I can explain how energy changes from one form to another and understand efficiency. • I can describe what thermal conductivity is and how it works. • I can explain different energy resources and how we use them. • I can describe types of forces and explain their effects. • I can calculate average speed and understand what affects stopping distances and reaction times. • I can describe the properties of radioactivity.	**Intended Skills and Outcomes:** The below 'I can' statements clarify what students will be able to do by the end of this unit. • I can carry out independent practical exercises safely and carefully. • I can take part in investigations with a group and share my ideas. • I can collect and record data accurately. • I can work together with others and communicate my ideas clearly. • I can listen to others and contribute to teamwork during science activities.

Feeds from: The Year 11 Entry Level Certificate (ELC) Science pathway builds on the knowledge and skills developed through the Year 9 scheme of work and wider Key Stage 3 curriculum. Students enter the course with secure foundations in biology, chemistry, and physics, alongside core practical and investigative skills such as planning experiments, analysing data, and drawing conclusions. Within the ELC pathway, each component complements and reinforces the others. Topics including the human body, chemistry in the world, and electricity, magnetism and waves interconnect, enabling students to apply scientific understanding across contexts and recognise links between disciplines. Practical and analytical skills are embedded throughout, supporting a coherent and joined-up understanding of science.
This pathway values and extends prior learning, offering flexible accreditation and preparing students for confident progression beyond Year 11.
Feeds into: The Year 10 Science scheme of work develops the knowledge, practical skills, and investigative understanding that underpin Year 11 Entry Level Certificate study. Core concepts and scientific skills are consolidated and extended, ensuring students enter their final year confident and prepared to succeed.