THE Lodge AP

— At Sandbach House —

Year 11 Science Curriculum Sequence

Intent

The Year 11 Science curriculum is designed to consolidate prior learning and enable all students to achieve meaningful, recognised qualifications while deepening their understanding of scientific concepts and their real-world applications. In Year 11, students will follow **one of two purposeful pathways**: GCSE Biology or Entry Level Science. Placement is carefully determined to reflect each student's individual strengths, needs, and future aspirations, ensuring the most appropriate route to success.

Both pathways are equally valued and provide appropriate challenge and support, enabling every student to make progress and achieve meaningful outcomes. Learning is structured to strengthen subject knowledge, develop analytical thinking, and build confidence in applying scientific understanding to everyday life and global issues.

Students who follow the GCSE pathway revisit and deepen key concepts from across Key Stage 4, exploring topics such as Homeostasis and Response, Ecology, and Inheritance, Variation and Evolution. They refine their understanding of how living organisms function and interact with their environment, while further developing scientific enquiry skills through required practical work, data analysis, evaluation, and problem-solving. The curriculum promotes awareness of global challenges, including climate change and sustainability, and highlights clear progression routes into further study and science-related careers.

Students who follow the Entry Level pathway build upon foundational knowledge from Years 9 and 10, strengthening their understanding of core scientific ideas across biology, chemistry, and physics. Through the study of the human body, chemistry in the world, and electricity, magnetism and waves, students develop practical scientific knowledge and an appreciation of how science underpins everyday life. The curriculum emphasises health and wellbeing, environmental responsibility, and the practical application of scientific principles in domestic and technological contexts.Across both pathways, students develop scientific literacy, numeracy, and investigative skills, equipping them with the knowledge, confidence, and transferable skills required for successful progression into post-16 education, training, or employment.

Pathway 1: GCSE Biology (AQA)

Autumn HT1	Autumn HT2	Spring HT1	Spring HT2	Summer HT1 & HT2
Ecology	Inheritance, Variation and Evolution	Homeostasis & Response	Maths skills focus & revision	Revision
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.	**Intent** The study of inheritance, variation, and evolution helps students understand the fundamental principles that explain how genetic information is passed down and how species evolve over time. This topic is essential for understanding human genetics, genetic engineering, and the processes that lead to biodiversity. It builds on prior knowledge of cells and genetics while linking to future studies in biotechnology and conservation.	**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:** Mathematics is embedded within GCSE Biology exams to assess students' ability to analyse and interpret biological data. Questions may involve calculating magnification, interpreting graphs related to enzyme activity or photosynthesis rates, and analysing data on inheritance patterns. These skills ensure students can apply mathematical concepts to real-world biological scenarios, reflecting the practical nature of scientific inquiry.	**Intent:** The intent of the final half term is to consolidate, secure and strengthen students' knowledge and understanding of the full AQA GCSE Biology specification, ensuring they are fully prepared for success in their terminal examinations. This period focuses on revisiting core concepts across all topics, addressing misconceptions, and embedding key scientific vocabulary, required practical knowledge and exam command terms. Targeted retrieval practice, exam-style questioning and structured feedback are used to close knowledge gaps and improve exam technique. The aim is that all students, regardless of prior attainment or educational disruption, leave the course able to demonstrate secure subject knowledge, effective problem-solving skills and resilience under exam conditions
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.	**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 characteristics of living organisms are influenced by both their genome and the environment. • I can explain the difference between inherited and environmental variation. • I can give examples of variation within a species. • I can describe the basic structure of DNA. • I can explain how genes determine characteristics. • I can describe the process of sexual and asexual reproduction. • I can explain how mutations can affect organisms. • I can describe how natural selection leads to evolution over time. • I can explain how evolution accounts for biodiversity. • I can describe how all living organisms are related to varying degrees. • I can interpret evidence from fossils and other sources to support evolution. • I can explain selective breeding and its effects. • I can explain how adaptations help organisms survive in their environment. • I can use correct scientific vocabulary when describing inheritance, variation, and evolution. • I can apply my knowledge to answer exam-style questions on inheritance, variation, and evolution.	**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 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. • I can explain how hormones are used in contraception and fertility treatments. • 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 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 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 apply mathematical skills to understand biological concepts. • I can collect & present accurate data during practical work. • I can choose the most appropriate type of graph for my results. • I can analyse data to identify patterns and trends: including identifying anomalies, patterns, relationships and using the data to justify my conclusions. • I can observe and record changes over time accurately. • I can classify and group organisms or data using clear criteria. • I can plan and evaluate fair tests, identifying independent, dependent and control variables. • I can use secondary sources to research scientific information. • I can interpret information from graphs, charts and scientific texts. • I can use evidence to support or challenge a scientific claim.	**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 key facts, definitions and processes from across the biology course. • I can use accurate scientific vocabulary in my answers. • I can explain biological processes clearly and in detail. • I can describe the required practicals and explain what the results show. • I can retrieve information from memory without relying on notes. • I can link ideas from different topics together. • I can apply my knowledge to unfamiliar contexts and exam questions. • I can interpret data from tables, graphs and charts. • I can analyse results and identify patterns or trends. • I can answer different command words correctly (e.g. describe, explain, compare, evaluate). • I can structure clear, well-developed answers for 4–6-mark questions. • I can complete calculations accurately and include the correct units. I can check my answers and improve them using feedback. • I can manage my time effectively in exam conditions. • I can identify my weaker areas and take steps to improve them before the exam.

Feeds from: All components of the AQA GCSE Biology qualification are interconnected and build upon one another. Core principles such as cell structure, organisation, and transport processes underpin later topics including infection and response, bioenergetics, homeostasis, inheritance, and ecology. Key scientific skills — including practical techniques, data analysis, mathematical application, and evaluation of evidence — are developed throughout the course and assessed through required practical activities and written examinations. This structure enables students to demonstrate a coherent, integrated understanding of biology and the working of living systems.
Feeds into: The AQA GCSE Biology qualification provides a strong foundation for post-16 study, including A-level Biology and other science courses, as well as vocational pathways.

Pathway 2: Entry Level Certificate

Autumn HT1	Autumn HT2	Spring HT1	Spring HT2	Summer HT1	Summer HT2
Physics – Electricity, Magnetism and Waves	Physics – Electricity, Magnetism and Waves (TDA & ESA)	Chemistry – Chemistry in our World	Chemistry – Chemistry in our World (TDA & ESA)	Biology – Environment, Evolution and Inheritance	Biology – Environment, Evolution and Inheritance (ESA & TSA)
Intent : Develops students' understanding of how electricity is used to supply energy in domestic and industrial contexts. Students will learn that electric current, measured in amps, is the flow of electrical charge. They will explore the differences between direct current (d.c.) from cells and alternating current (a.c.) from mains electricity, and how resistance affects current flow. Additionally, students will investigate how electric currents create electromagnets and produce electromagnetic waves, understanding their practical applications in energy transfer and communication.	**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 'Investigate which materials are the best electrical conductors'	**Intent**: Develops students' understanding of how acids react with metals, alkalis, and bases to form salts. Students will explore how chemical reactions can cause temperature changes and how reaction rates can be altered by changing conditions. Additionally, they will study the evolution of the Earth's atmosphere, the impact of human activities on atmospheric composition, and the importance of clean, safe drinking water for human health.	**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 'Investigate the amount of dissolved solids in water from different locations by evaporating samples and weighing residues'	**Intent** : Develops students' understanding of how life on Earth relies on photosynthesis for carbon fixation and energy production. Students will explore how living organisms interact with each other and their environment, the impact of human activities on ecosystems, and the cycling of chemicals in nature. They will also study evolution through natural selection, genetic influences on characteristics, and modern applications of genetic engineering.	**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 'Investigate the rate of photosynthesis in pond weed'
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 electric current flows in a simple circuit. • I can explain the difference between a.c. (alternating current) and d.c. (direct current). • I can give examples of where a.c. and d.c. are used, such as mains electricity and batteries. • I can correctly and safely wire a 3-pin UK plug. • I can identify the live, neutral and earth wires and state their colours. • I can explain why a fuse is used in a plug. • I can explain how electrical energy is transferred into useful forms such as heat, light or movement. • I can give examples of energy transfers in everyday electrical appliances. • I can read an electricity meter and record the meter reading correctly. • I can describe the properties of magnets. • I can explain the difference between a permanent magnet and an electromagnet. • I can state the uses of magnets, electromagnets and solenoids. • I can describe the properties of transverse waves. • I can describe the properties of longitudinal waves. • I can give examples of transverse and longitudinal waves. • I can recall the correct order of the electromagnetic spectrum. • I can describe the uses of different types of electromagnetic waves. • I can identify which electromagnetic waves have the highest and lowest frequencies.	**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 complete practical investigations independently and follow instructions safely. • I can take part in grouped investigations and contribute to shared tasks. • I can collect data accurately and record my results clearly in tables or charts. • I can use appropriate equipment correctly when carrying out practical work. • I can work effectively with others, sharing ideas and listening to different viewpoints. • I can communicate my findings clearly to others. • I can contribute positively to group discussions and practical 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 acids and alkalis. • I can describe how acids react with metals. • I can explain what neutralisation is and give examples of neutralisation reactions. • I can identify signs that a chemical reaction has taken place (such as colour change, gas produced or temperature change). • I can describe the energy changes that can happen during a reaction (exothermic and endothermic). • I can explain ways to increase the rate of a reaction (such as changing temperature, concentration, surface area or using a catalyst). • I can describe how the Earth's atmosphere has changed over time. • I can explain how the early atmosphere developed into the atmosphere we have today. • I can describe how human activities impact the atmosphere. • I can explain what crude oil is and how it is used to make fuels. • I can describe the effects of burning fossil fuels on the atmosphere. • I can explain how drinking water is treated and purified to make it safe to drink.	**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 complete practical investigations independently and follow instructions safely. • I can take part in group investigations and carry out my role responsibly. • I can collect data carefully and record my results clearly and accurately. • I can present data in tables, charts or graphs where appropriate. • I can work cooperatively with others and share tasks fairly. • I can communicate my ideas clearly when working in a group. • I can listen to others and respond respectfully during discussions and practical work.	**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 that the Sun is the main source of energy for life on Earth. • I can describe the role of plants in photosynthesis. • I can explain how plants and animals are adapted to survive in their environments. • I can describe food chains and food webs. • I can explain how plants and animals compete for resources to survive. • I can describe the role of decomposition in recycling carbon back into the atmosphere. • I can explain the effects of human population growth on the environment. • I can describe what evolution is. • I can explain the difference between natural selection and artificial selection. • I can describe sexual reproduction and asexual reproduction. • I can explain the basic role of genes in inheritance.	**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 practical investigations independently and follow safety rules. • I can take part in group investigations and contribute to shared tasks. • I can collect and record data accurately during practical work. • I can present my results clearly in tables, charts or graphs. • I can work effectively with others to complete investigations. • I can communicate my ideas clearly when working in a team. • I can listen to others and respond respectfully during discussions and practical activities.

Feeds from: All components of the Science ELC qualification are interconnected and build upon one another. Knowledge and skills developed in Biology, Chemistry and Physics support learning across the course, particularly in key themes such as energy, the environment, and scientific investigation. Practical skills, data analysis, and evaluation techniques are continuously developed and then applied within both Teacher Devised Assessments and External Set Assignments, allowing pupils to demonstrate a secure and joined-up understanding of science.
Feeds into: The Science ELC qualification provides a strong foundation for post-16 study in vocational science courses. It also supports future careers in health, engineering, environmental science, and other science-related fields.