The curriculum is designed so that students of all abilities make progress towards developing the skills required, whilst forming a solid understanding of a range of scientific concepts. Students will have the opportunity to use the most common apparatus and techniques (including measurement) that they will use throughout their years of studying science. Students will also learn how to carry out specific procedures and protocols safely and with proficiency in the laboratory (and later field work), this is important for enabling progression on to science beyond GCSE, A-level and University. Students will gain the knowledge that all measurements involve some error and how scientist put steps in place to reduce this. The first term will introduce students to seven influential scientists and their works, with the aim of introducing methods that scientists have used to answer questions. This will then lead into the core units for each discipline. In Chemistry this includes learning about elements, compounds and how to navigate the periodic table. Pupils will find out how discoveries about atomic structure led to the development of the periodic table. In Biology, pupils will learn about the structure of plant and animal cells, how cells become specialised and why cellular processes like respiration and photosynthesis are fundamental to life. In Physics, pupils will learn why forces are so important, how objects interact with each other and learn about Newton's laws of motion. Transfer of energy involved in all interactions. Pupils will build upon their knowledge of atomic structure and discover how electrons and electricity are related; they will become confident at calculating resistance, current and voltage. Extended writing and mathematical skills within topics will allow pupils to develop their scientific vocabulary and analytical skills.

Autumn Term	Core Biology	Core Chemistry	Core Physics
Key subject knowledge:	Cells and organisation. cells as the fundamental unit of living organisms. The structures of a cell and their functions, similarities and differences between plant and animal cells. The difference between unicellular and multicellular, the structural adaptations of unicellular organisms and the hierarchical organisation of multicellular organisms. The process of diffusion in and out of cells	Properties and Materials. Dalton's simple atomic model, atoms and molecules as particles, the differences between atoms, elements, and compounds. The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure. Changes of state in terms of the particle model.	Forces and Energy Stores Energy stores and how energy is transferred between these stores. Balanced and unbalanced forces. The use force arrows in diagrams, adding forces in one dimension, and use data to gain quantitative insight into changes of motion.

Key disciplinary knowledge:	How to observe, interpret and record cell structure using a light microscope.	Using macroscale objects and apply models to them. Producing tables for data collection. Data collection from observation. Development of scientific models over time.	Using observations to identify trends. Using equipment to measure forces. Knowledge that all measurements involves some error and how scientist put steps in place to reduce this (calibration, parallax).
Summative Assessment Strategies	In-class quiz End of unit test (Forms)	In-class quiz End of unit test (Forms)	In-class quiz End of unit test (Forms)
How does this unit prepare students for future study?	All future studying of biology is based on the understanding of cells.	Students use the particle model throughout all GCSE, A-level and University courses.	Students will study Newtonian physics until university, this topic lays the foundation of all future physics study.

Spring Term	Life cycles, growth, and human reproduction - Biology	Elements and Compounds – Chemistry	Sound and Light - Physics
Key subject knowledge:	Using humans as an example of mammals, this topic will include the structure and function of the male and female reproductive systems, menstrual cycle, gametes, fertilisation, gestation, and birth including the effect of maternal lifestyle on the foetus through the placenta.	This topic builds on Core Chemistry and looks microscopically at the particles they have been discussing. Using tier three terminology to build fluency of science language – for example the similarities and differences between the words: atom, element, compound, and molecule. Then looking macroscopically to designer materials.	This topic will introduce the concept of sound and light waves as a method of transferring energy. The similarities and differences between light waves and sound waves. Students will build on their understanding of particle models and apply this to the propagation of sound waves, the frequencies of sound waves, echoes, reflection and absorption of sound. The speed of sound in air, in water, in solid. Sound

			produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. The auditory range of humans and animals.
Key disciplinary knowledge	Present observations and data using appropriate methods, including tables and graphs. Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions	To ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience	Use appropriate techniques, apparatus, and materials during practical work. Understand and use SI units.
Summative Assessment Strategies	In-class quiz Homework booklets End of unit test	In-class quiz Homework booklets End of unit test	In-class quiz Homework booklets End of unit test
How does this unit prepare students for future study?	Students will deepen their understanding of animal reproduction during GCSE, and study of the endocrine system in later years.	This unit provides the building blocks to all future chemistry study e.g. inter- vs intra-molecular bonding, separation techniques and organic synthesis at A-level and university.	The methods of transferring energy is a theme that is continued throughout GCSE. The understanding of light acting as a wave is explored in more depth at A-level.

Summer Term	Plant Reproduction – Biology	Substances and mixtures – Chemistry	Earth and Space – Physics
Key subject knowledge	This topic includes flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.	This covers the concept of a pure substance, identification of pure substances, mixtures including dissolving and simple techniques for separating mixtures including filtration, evaporation, distillation and chromatography.	Space will encompass gravity force, how to calculate weight, the difference in weight on different planets, gravity forces between the Earth and Moon and between the Earth and Sun. It will then cover the seasons and the Earth's tilt, our Sun as a star, other stars in our galaxy, other galaxies and light years as a unit of astronomical distance.
Key disciplinary knowledge	Evaluate data, showing awareness of potential sources of random and systematic error. Identify further questions arising from their results.	Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Consider the accuracy, precision, repeatability and reproducibility of their data.	Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review. Apply mathematical concepts and calculate results
Summative Assessment Strategies	In-class quiz Homework booklets End of unit test	In-class quiz Homework booklets End of unit test	In-class quiz Homework booklets End of unit test
How does this unit prepare students for future study?	Plant biology underpins knowledge of genetic mutation and selective breeding of plants – topics that are covered in secondary biology and beyond.	Learning to perform techniques safely with a high level of repeatability is vital at all stages in science education.	Astrophysics is taught in more depth at GCSE e.g. Hubble's constant and the methods used to calculate it and at A-level in Astrophysics and Cosmology.