

In year 9, pupils will continue to build on their understanding of the concepts they learnt during years 7 & 8. In year 9, pupils are taught within the specialisms of biology, chemistry and physics. Pupils of all abilities continue to develop their knowledge and understanding of the 'big ideas' in science. In year 9, pupils will continue to develop the skills required to be able to see the world analytically, to explain phenomena, to make predictions and evaluate the use of models in science. The Year 9 curriculum is designed to be engaging, contextual and assessable to all pupils. Pupils will continue to develop practical skills which develop not only deep scientific understanding but also key transferable skills such as teamwork, leadership, and organisation. Proficiency in the laboratory is important for enabling progression on to science beyond GCSE, A-level and University. Pupils will continue to have the opportunity to apply mathematical concepts and calculate results to draw conclusion from. Interpret observations, evaluate data, showing an awareness of potential sources of random and systematic error and identify further questions arising from experimental results.

In year 9, each discipline contains smaller topics that build in complexity. For example, 'Waves', topics builds upon the simpler, more concrete topics 'Light' and 'Sound' covered in year 7 and 8, to more abstract ones 'Wave properties' and 'Wave effects', thus building effective foundations for GCSE.

Autumn Term	Core Biology The genome and inheritance Variation and Evolution	Core Chemistry Periodic Table	Core Physics Floating and Sinking Electricity and magnetism
Key subject knowledge:	Building on the year 7 topic of cells and year 8 cells to organ systems, this covers inheritance, chromosomes, DNA and genes. It includes learning about Watson, Crick, Wilkins and Franklin and their role in the development of the DNA model. It builds upon the big idea in biology that differences between organism's	The topic of the periodic table pulls together all previous learning of materials, particle model, atoms, and chemical reactions. This foundational knowledge allows students to study the atomic model, identify periodic patterns and trends in physical properties.	Students will build on their year 7 work on forces when studying floating and sinking. This topic also covers 'density' and student will use their chemistry and physics understanding of particle theory for this concept. Pressure is also covered (both in solids and fluids) linking force and surface area in a quantitative way.

	cause species to evolve by natural selection.		In the electricity and magnetism topic, students are introduced to the final way of energy transfer. They build on their knowledge of the structure of the atom when looking at static electricity, and forces when they consider why charges can attract or repel. Students will learn how to build circuits and describe qualitatively the relationships between current, voltage and resistance. Students will use their understanding of energy transfer to compare power ratings and domestic fuel bills, fuel use and costs.
Key disciplinary knowledge:	Describe how scientists worked together to develop the DNA model. Use simple genetic diagrams to predict how alleles may affect an organism's future offspring. Be able to use graphical data to see the relationship between continuous and discontinuous variation.	Make predictions about reactions of elements based on their position within a group. Make and record accurate experimental observations. Development of scientific models over time.	Describe factors that affect gas pressure and interpret observations. Describe the factors that affect the pressure on a solid and apply the equation to real life scenarios Describe what is meant and how we measure current, potential difference and calculate resistance in series and parallel circuits. Draw field lines round a magnet in detail. Predict and test the effect of changes to an electromagnet.

Summative Assessment Strategies	In-class quiz Homework-Seneca Assignment End of unit test (Forms)	In-class quiz Homework-Seneca Assignment End of unit test (Forms)	In-class quiz Homework-Seneca Assignment End of unit test (Forms)
How does this unit prepare students for future study?	Students use knowledge of genetics and the theory of natural selection to explain evolution throughout all GCSE, A-level and University courses	The Periodic Table of Elements is central to the study of modern Chemistry. Pupils will continue to study the periodic table beyond A-level	The method of transferring energy is a theme that is continued throughout GCSE physics and beyond

Spring Term	Core Biology Health and Disease	Core Chemistry Reactions of Metals and Metal Compounds	Core Physics Work done and turning forces
Key subject knowledge:	This topic builds on the core understanding of cell structure and looks at how disease can affect organ systems in multicellular organisms. It builds on the concept that organisms must stay in good health to survive and thrive, the health of an individual organism results from interactions between the organism's body, behaviour, environment, and other organisms. Pupils will learn about how the health of humans can be affected by communicable and non-communicable diseases.	Building on their work of the periodic table and year 8 'acids and alkali', this topic will focus specifically on the reactions of acids with metals and the chemical properties of metal and non-metal oxides with respect to acidity. Students will revisit exothermic and endothermic chemical reactions.	Students will build on their year 7 work on forces when studying moments (the turning effect of a force). This will build on students understanding of balanced and unbalanced forces and allow for quantitative analysis of why unbalanced forces would produce a moment. They will build upon their knowledge of energy transfers and the concept of 'work' done in physics.

Key disciplinary knowledge	Plan a practical that will allow you to investigate the effect of caffeine on heart rate. Experimental improvements to reduce random and systematic errors. Data analysis related to health.	Compare chemical properties of metals and non-metals through experiment. Analysing data. Equation writing.	Manipulate formulaic relationship of work done and relate to levers and gears. Manipulate formulaic relationship of moments and relate to situations involving moments. Understand and use SI units.
Summative Assessment Strategies	In-class quiz Homework-Seneca Assignment End of unit test Mid-year cumulative assessment	In-class quiz End of unit test Homework-Seneca Assignment Mid-year cumulative assessment	In-class quiz End of unit test Homework-Seneca Assignment Mid-year cumulative assessment
How does this unit prepare students for future study?	Students will deepen their understanding of health and disease at GCSE, and study of the immune system in later years.	Students will continue to deepen their knowledge of bond breaking and making, a key theme that is continued at GCSE and A-levels.	The formula for moments and use of it to solve problems involving levers and gears is a theme that is continued throughout GCSE and beyond.

Summer Term	Core Biology Biochemistry	Core Chemistry Earth's Resources	Core Physics Water waves Scientific Processes and Methods
Key subject knowledge	The topic of biochemistry comprises of two parts: cellular respiration (both aerobic and anaerobic) and, plant nutrition and photosynthesis. The topics build on foundational knowledge of 'cells to organ systems' and 'interdependence'.	Building on their understanding of Earth as a rocky planet (year 7 space topic) and evolution of the atmosphere (Planet Earth pollution), students will study in more detail the structure of the Earth and the rock cycle (drawing on prior KS2 knowledge).	The waves topic builds on students' prior knowledge of transverse waves (year 8 topic 'How we see') and apply this to water waves. Students will be taught that water waves can be reflected, refracted and how two waves can interact. In the scientific processes and methods topic pupils revisits the working scientifically skills students have been working on through year 7,8 and 9 and deepen their understanding to build the effective foundation for GCSE. Skills include presenting data, analysing patterns, drawing conclusions and discussing limitations. Constructing explanations, communicating ideas, critiquing claims and justifying opinions. Devising questions, testing hypotheses, planning to control variables and collecting data.

Key disciplinary knowledge	Investigate the effect of exercise on pulse/breathing rate. Carry out the variegated leaf practical accurately and safely. Draw and interpret graphs on how the rate of photosynthesis is affected by changing conditions.	Model weathering using experimental work. Carry out practical work to determine hardness of sedimentary rocks. Relate crystal size to conditions of crystallisation. Graphing Analysing data and drawing conclusions	Create relationship of energy stores and transfer. Comparative evaluation Relate wave speed to frequency and wavelength. Use the formula $v=f\lambda$
Summative Assessment Strategies	In-class quiz Homework-Seneca Assignment End of unit test End of Year GL assessment	In-class quiz Homework-Seneca Assignment End of unit test End of Year GL assessment	In-class quiz Homework-Seneca Assignment End of unit test End of Year GL assessment
How does this unit prepare students for future study?	Biochemistry in plants and animals – topics that are covered in GCSE biology and beyond.	Rocks and minerals are important for learning about earth materials, structure, and systems. Studying these natural objects incorporates an understanding of earth science, chemistry, and geology is taught in more depth at GCSE and at A-level in Geology and Archaeology.	Engineers must understand the properties of waves—such as wavelength, frequency, amplitude and speed —and how waves can differ from one another in order to design safe and effective products. The study of waves continues at GCSE and beyond.