

The weeks highlighted in **yellow** are milestone assessments or internal examinations. Time has been built into the curriculum to account of preparation time for these assessments.

Year 13 are taught by two specialist teachers. Each teacher is responsible for delivering their section of the course.

Lead teacher for Biology is Mrs Fletcher supported my Mr Maneffa.

	Autumn 1= 8 weeks								Autumn 2= 7 weeks							Spring 1=6 weeks							Spring 2= 5 weeks					Summer 1 = 6 weeks						Summer 2 = 7 weeks											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39						
Year 13 Biology	Unit 7 genetics, populations, evolution, and ecosystems Pupils will develop their knowledge of genetic and phenotype diversity through study of genetic inheritance (building on knowledge of genetic crosses/genotype and phenotype from Y11) and the effect of allele frequency in populations. Having learned about evolution through natural selection in Y12 and Y10/11, pupils will develop this into understanding the impact of genetic bottlenecks, isolation and speciation and the impact of allele frequencies in populations. <u>Working scientifically</u> In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed include sampling techniques to assess the impact of human activity on the distribution of species, presentation of data through kite diagrams, evaluating methods, statistical testing and risk assessing. Pupils will also develop the use of pedigree diagram analysis and use these to predict the outcomes of genetic crosses and applying the chi squared statistical test to these scenarios.												Unit 6 Organisms respond to changes in their internal and external environments Pupils will develop their knowledge of the roles of receptors in homeostasis, as well as a detailed exploration of the molecular interactions within the nervous and endocrine systems to bring about responses in living things, building on their work in homeostasis and response from Year 10. In addition to this, pupils will also encounter new knowledge of responses to stimuli of both plants (separate scientists cover briefly) and invertebrate organisms. <u>Working scientifically</u> In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Pupils will also select and carryout statistical testing to test the significance of the differences in their data and using this to evaluate their conclusions. In addition, pupils will experience the use of invertebrate organisms to collect data safely and ethically. They will also apply their knowledge of calibration curves to diagnose diabetes of ‘urine’ samples.												A Level preparation and Examinations During the topics pupils will complete exam style questions, including whole exam paper practice and receive feedback. Paper 1: Biological molecules, cells, organisms exchange substances with the environment, genetic information, variation and relationships between organisms Paper 2: Energy transfers in and between organisms, organisms’ response to changes in their internal and external environments, genetic, populations, evolution and ecosystems, the control of gene expression Paper 3: - Any content from paper 1 and 2 including relevant practical skills and synoptic essay Examination skills will be practiced through the above topics. These include - interpreting questions - extended writing - required practicals and CPAC - calculations - data handling and analysis - interpreting graphical information - strategies for synoptic essay																				
	Unit 5 Energy transfers in and between organisms Pupils will develop their knowledge of photosynthesis, aerobic and anaerobic respiration from Y9/Y10, and the role of organelles and their subcellular structures from unit 2 in the biochemical pathways involved in these two processes. <u>Working scientifically</u> In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Pupils will use a variety of techniques in order to extract pigment and analyse it, as well as determine the role of dehydrogenase enzymes.												Unit 8 control of gene expression Pupils will develop their knowledge of control of cellular processes through regulation of transcription and translation as determined by the genome. This links back to the protein synthesis topic in Year 12 and Year 11 and the genetic engineering topic in Y11. Pupils will learn about the many factors that control transcription and translation and the effect of these on phenotype. Pupils will also learn about how genomes can be manipulated to treat conditions and the principles and limitations of this technology, including the impact of CRISPR gene technology. <u>Working scientifically</u> In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed include the use of restriction enzymes as a tool to digest DNA and analyse it using gel electrophoresis, and the use of PCR to increase the number of copies of DNA and the use of this in crime solving. identity solving and disease diagnosis.																																

Lead teacher for Chemistry is Mr Jingini supported by Miss Murray

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1=6 weeks						Spring 2= 5 weeks						Summer 1 = 6 weeks						Summer 2 = 7 weeks														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39									
Year 13 Chemistry	Physical Chemistry: Thermodynamics, Electrochemical cells & Rates Equation In this topic students will learn about thermodynamics which builds on the Energetics section and is important in understanding the stability of compounds and why chemical reactions occur. They will also learn to link enthalpy change with entropy change and how this link can be used to calculate free energy in reactions. The Born-Haber cycle and Gibbs free energy used as frameworks for the calculations. In the rate equations section, pupils will learn about the mathematical relationship between rate of reaction and concentration and how this relationship gives information about the mechanism of a reaction that may occur in several steps. Building on from their knowledge in year 10 pupils will learn about redox reactions that take place in electrochemical cells to create a potential difference is created that can drive an electric current to do work. Commercial applications of electrochemical cells such as portable supply of electricity to power electronic devices such as mobile phones, tablets and laptops and on a larger scale such as providing energy to vehicles, are explored. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding.															Inorganic Chemistry: Transition metals, period 3 elements and Equilibria Pupils will learn about transition metals and how they different to group 1 and 2 metals in forming coloured compounds and having different oxidation states. Some of their properties such as being good catalysts are studied in this section. The reactions of the Period 3 elements with oxygen are considered and explanations of how and why these reactions occur are developed. Further study of equilibria considers how the mathematical expression for the equilibrium constant K_p enables us to calculate how an equilibrium yield can be influenced by the partial pressures of reactants and products. This has important consequences for many industrial processes. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding															A Level Examinations During the topics pupils will complete exam style questions, including whole exam paper practice and receive feedback. Paper 1: - Physical chemistry topics (sections 3.1.1 to 3.1.4, 3.1.6 to 3.1.8 and 3.1.10 to 3.1.12) - Inorganic chemistry (section 3.2) - Relevant practical skills from above Paper 2: - Relevant physical chemistry topics (sections 3.1.2 to 3.1.6 and 3.1.9) - Organic chemistry (section 3.3) - Relevant practical skills Paper 3: - Any content - Any practical skills Examination skills will be practiced through the above topics. These include - interpreting questions - extended writing - required practicals and CPAC - calculations - data handling and analysis - interpreting graphical information - strategies for multiple choice questions on paper 3																	
	Organic Chemistry: Optical Isomerism, Aldehydes, Ketones and Carboxylic Acids In this topic pupils explore organic compounds further my looking at aldehydes and ketones and how their bonding affects their reactivity and physical properties such as solubility and boiling points. Pupils will also learn about naturally occurring esters such as vegetable oils and animal fats. Important products obtained from esters include biodiesel, soap and glycerol are also explored. Pupils will also learn about their reaction mechanisms. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding.															Organic Chemistry: Aromatic and Biochemistry Pupils will learn about aromatic compounds, their unique stability, and their chemical and physical properties. The benzene is studied as an example of this type of molecule and at the structure of the benzene ring and its substitution reactions are explored. Pupils will also learn about amines reactions, their base properties and how they can be prepared. The study of polymers is extended to include condensation polymers. The ways in which condensation polymers are formed are studied, together with their properties and typical uses. Problems associated with the reuse or disposal of both addition and condensation polymers are considered. Pupils will also learn about the structure and bonding in amino acids, proteins and DNA and the way they interact is studied. Drug action is also considered. This is then linked to organic synthesis of new and useful compounds. This section builds on the year 10 and year 11 biology and chemistry topics on DNA and organic chemistry respectively. Building on year 7, 8 9 and 11 work chromatography (TLC, CC, GC) are discussed. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding																																

Lead teacher for Physics is Miss O'Grady supported by Mr James

	Autumn 1 = 8 weeks							Autumn 2 = 7 weeks							Spring 1 = 6 weeks							Spring 2 = 5 weeks					Summer 1 = 6 weeks						Summer 2 = 7 weeks										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39				
Year 13 Physics	Fields: Electric fields, electric potential. Comparison of fields Capacitance: Capacitors, energy stored, dielectrics, charge and discharge, Magnetic fields: Magnetic flux density, force on a wire, charged particles, electromagnetic induction, flux linkage, Faraday's and Lenz's laws, alternating current, transformers. The fields topics link back to 8 sciences with the 8P2 Forces and 8P3 Electricity. We then build upon these with 10P2 Electricity and 10P3 Magnetism. In terms of skills the students must apply complex maths skills to calculation the electricity and magnetic fields produced, then these are rotated, and pupils must be able to calculate the fields produced. Practical skills are tested to be able to build difference circuits and calculate the capacitance of different capacitors.							Nuclear Physics: This topic builds upon 10P1.1 The atom. Students must understand the safety aspects of using radiation in labs and everyday life. They study the creating of electricity by nuclear power stations and how that can be an advantage. Rutherford's scattering experiment, nuclear radius and density, properties of nuclear radiation, background radiation and intensity, law of decay, half-life and its applications, nuclear decay, mass defect and binding energy, nuclear fission and fusion, fission reactors Practical skills: pupils must safely be able to use radioactive sources to calculate the inverse square law for gamma radiation.							Turning points in Physics This topic links many different topics together as it studies the key turning points in the physics history. Light (Newton vs Huygens), electromagnetic waves, photoelectric effect wave particle duality, Michelson -Morley experiment, Special relativity.							A Level preparation and Examinations During the topics pupils will complete exam style questions, including whole exam paper practice and receive feedback. Paper 1: Measurements and their errors, Particles and radiation, Waves, Mechanics and materials, Electricity, Periodic motion Paper 2: Assumed knowledge from paper 1, Thermal physics, Fields and their consequences, nuclear physics Paper 3: Section A: Compulsory section: Practical skills and data analysis, section B: Turning points in physics Examination skills will be practiced through the above topics. These include - interpreting questions - extended writing - required practicals and CPAC - calculations and multistep calculations - data handling and analysis - interpreting graphical information - strategies for multiple choice questions																					
	Further mechanics: This topic builds upon mechanics in Year 12 and the GCSE topic of forces. In this topic pupils will learn about Circular motion, simple harmonic motion, oscillations and pendulums, forced and free vibrations. Working scientifically Pupils will investigate the simple harmonic motion of pendulums and mass spring systems							Fields: This topic builds upon the concept of circular motion and applies it to celestial bodies. Students will study gravitational fields, gravitational field strength, gravitational potential, orbits as well as point objects and neutral points between two bodies.							Thermal Physics: This topic builds upon many aspects of energy transfer, specific heat capacity, gas pressure and kinetic theory. Pupils will further study energy transfer, a range of gas laws, the ideal gas equation, kinetic molecular theory of gases. Working scientifically Pupils will carryout written procedures to prove Boyles and Charles gas laws.							Turning points in Physics This topic explores some key discoveries in physics that fundamental changed our knowledge and understanding. Students will learn about the discovery of the electron, specific charge on electron, Millikan's experiment, electron microscopes																					

Lead teacher for Biology is Mrs Fletcher supported my Mr Maneffa.

Year 12 Biology	Autumn 1= 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks						Summer 1 = 6 weeks						Summer 2 = 7 weeks																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39															
	Unit 1 Biological molecules: This unit builds on both biology and chemistry knowledge. Pupils will learn about the importance of water in hydrolysis and condensation in polymerisation and the formation of triglycerides, phospholipids, and ATP. Pupils will learn about carbohydrates from monosaccharides to the different structures and functions of polysaccharides. Pupils will learn about proteins from amino acids through to polypeptides and proteins. Enzymes are proteins and their structure as determined by their amino acid sequence determines specificity with substrates. Pupils will apply this knowledge to discuss the effect of different factors on the rate of enzyme-controlled reactions. Pupils will also learn about the roles of ions in biology, not least phosphate ions which are essential in DNA replication. The similarities and differences in polynucleotide structures will be compared. Working scientifically In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Pupils will also develop their ability to follow methods and carry out the qualitative tests for reducing sugars, non-reducing sugars and starch, and the emulsion test for lipids and biuret test for protein. Pupils will develop their knowledge of chromatography, with known standard solutions, to separate a mixture of monosaccharides or amino acids and identify their components, as well as produce a dilution series of glucose solution and use colorimetric techniques to produce a calibration curve with which to identify the concentration of glucose in an unknown solution. When completing a scientific report pupils will also cite sources, process, and present data appropriately.																		Unit 3 Exchange and transport: Surface area, gas exchange (humans and others), effects of lung disease, digestion and absorption, haemoglobin, circulatory system, heart, cardiovascular disease, transport in plants (xylem and phloem) Pupils will build on their knowledge from Y9 and Y10 to understand the importance of a mass transport systems in multicellular organisms in order to overcome smaller surface area: volume, introducing haemoglobin (builds upon unit 1 – role of Fe ²⁺) and arterioles and venules, as well as tissue fluid and hydrostatic pressure. Development of transpiration knowledge in understanding and applying the cohesion tension theory. Pupils will build on their knowledge from unit 1,2 and Y10 and describe and explain how large insoluble molecules are digested to smaller soluble molecules and their transport within and out of cells. Working scientifically In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. In addition to this, pupils will develop their skills of dissection of both plant and animal material, biological drawing, and design an experiment to show the effect of bile on lipase activity. When completing a scientific report pupils will also cite sources, process, and present data appropriately																		Unit 5 Energy transfers in and between organisms Pupils will develop their knowledge of from Y9 of food chains/webs and nutrient cycling from Y10. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Pupils will use a variety of techniques in order Pupils will also evaluate the impact of agricultural policy on ecosystems.																	
	Unit 2 Cells: This unit builds upon the knowledge and skills developed in 9B1 and 10B1 in developing knowledge of prokaryotes and eukaryotes and the functions of organelles. Pupils will also compare the advantages and disadvantages of optical and electron microscopes. Pupils will develop their knowledge from Y9 and learn in more detail about phagocytosis, the cellular response and the humoral response as well as active and passive immunity. Pupils will develop their knowledge of monoclonal antibodies by applying this to ELISA techniques. Pupils will develop their knowledge from Y10. to explain the different stages of mitosis and the manipulation of the cell cycle in treatment of cancer. Pupils will develop their knowledge from Y10 and unit 1 in the structure of the phospholipid bilayer and the fluid mosaic model of membrane structure to cover osmosis in terms of water potential and diffusion as both simple and facilitated. Building on active transport from Y9 and Y10 as facilitated by hydrolysis of ATP. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. When completing a scientific report pupils will also cite sources, process and present data appropriately. Pupils will develop their skills in Microscopy and calculations including order of magnitude, biological drawings and scale, use of microscopy to calculate mitotic indexes. Using a colorimeter. Use of percentage mass changes from known concentrations produced from a dilution series to determine the water potential of a plant tissue. Use of dilution series to determine the effect of ethanol concentration on membrane permeability. When completing a scientific report pupils will also cite sources, process and present data appropriately.																		Unit 4 DNA and classification: Unit 1 as the structure of polynucleotides and knowledge from Y11 are built upon and pupils develop a greater understanding of meiosis as a cause of genetic diversity through independent assortment and crossing over between non-sister chromatids. Build upon unit 1 when discussing the structure of eukaryotic and prokaryotic chromosomes as well as chromosomes found in the mitochondria and the chloroplasts. Pupils will learn the different stages of protein synthesis and the role of tRNA alongside mRNA and ribosomes in transcription and translation which builds upon what separate scientists will have learned in 11SB..., as well as the role of mutation in both production of protein and a cause of evolution through directional and stabilising selection. Pupils will build on their knowledge of classification from 11... by understanding the role of hierarchies and the mechanisms by which genetic and biochemical analysis has allowed us to reclassify some organisms. Pupils will build on their knowledge of ecological sampling techniques and biodiversity in by collecting data to calculate biodiversity indexes and species richness. Working scientifically In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. When completing a scientific report pupils will also cite sources, process, and present data appropriately. Pupils will be introduced to a variety of statistical tests (chi squared, t test, correlation coefficient) as well as standard deviation so they can test the significance of differences pupils will calculate these and interpret the results. Pupils will build on their knowledge of aseptic technique from 9B2 (or 10SB1 if studied separate Science) by stating the effect of antibiotics on bacterial growth as evidence for directional selection. When completing a scientific report pupils will also cite sources, process, and present data appropriately.																		Unit 7 genetics, populations, evolution, and ecosystems Pupils will develop their knowledge of investigating diversity through the close examination of ecosystems and the interactions of the biotic and abiotic factors within them, and how these have changed over time. This will provide an even more valid outcome for ecological sampling practical's. Working scientifically In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed include sampling techniques to assess the impact of human activity on the distribution of species, presentation of data through kite diagrams, evaluating methods, statistical testing and risk assessing. Pupils will attend a residential, where they will complete field work																	

Lead teacher for Chemistry is Mr Jingini supported by Miss Murray

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks					Spring 2 = 5 weeks					Summer 1= 6 weeks						Summer 2 = 7 weeks																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39																		
Year 12 Chemistry	<u>Physical Chemistry:</u> In physical chemistry pupils will learn new knowledge and skills and build on GCSE (9C1 Atoms, Elements & Compounds) ideas about the structure of the atom, the interaction of matter and energy, how to control reactions and patterns in the periodic table. Many of the topics will include mathematics calculations involving equations. Pupils will also be introduced to redox reactions and the importance of quantitative chemistry by focusing on formulae, equations, amount of substance. Pupils will also learn about the principles of operation of the modern mass spectrometer and how it is able to measure mass of atoms and molecules to a high degree of accuracy. Pupils will continue to develop their understanding of bonding, how it affects the physical and chemical properties of compounds and learn how material scientists use these principles to engineer new materials with desirable properties that have a wide range of applications in different modern technologies. Furthermore, students will learn about enthalpy change of chemical reactions, how to measure it accurately, how to calculate it using Hess’ Law and the importance of knowing these values for chemical reactions that are used as a source of heat energy in applications such as domestic boilers and internal combustion engines. As a hands-on science, pupils will carry out experiments regularly to consolidate their understanding and to build skills and confidence in completing safe and accurate practical work.																																																								
	<u>Working scientifically</u> In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Students will have opportunities to further develop their skills in safely handling solids and liquids including corrosive, irritant, flammable and toxic substances. Student will develop their skills in their use of laboratory apparatus for a variety of experimental techniques such as titration using as burette and pipette, distillation, and heating under reflux, including setting up glassware and qualitative tests for ions. Students will develop their competences in reporting calculations with equations such as ideal gas equation to an appropriate number of significant figures, given raw data quoted to varying numbers of significant figures. Students will also develop their skills in analysing and interpreting spectra.																																																								
	Students will develop their skills in discussing economic, ethical, and environmental advantages for society and for industry of developing chemical processes with a high atom economy.																																																								
	<u>Introduction to Organic Chemistry:</u> Pupils learn about the basic ideas that underpin organic chemistry with simple organic molecules such as alkanes, alkenes, halogenoalkanes, and alcohols. This builds on the work learned in 10C2-Rates of reactions & Organic Chemistry. This will include naming organic compounds using the International Union of Pure and Applied Chemistry (IUPAC) system and representing the structure or formula of molecules in various ways. Organic mechanisms are studied, which will enable pupils to explain reactions. Pupils will also learn about the analytical techniques that are fundamental to the chemical industry.																																																								
	<u>Working scientifically</u> In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Student will develop their skills in their use of laboratory apparatus for a variety of experimental techniques such as titration using as burette and pipette, distillation, and heating under reflux, including setting up glassware, qualitative tests for organic functional groups.																																																								
																				<u>Inorganic Chemistry:</u> <u>Periodicity:</u> Pupils will learn about the periodic table and how it provides chemists with a structured organisation of the known elements from which they can make sense of their chemical and physical properties. Foundations to this unit are laid in 9C1 Atoms, Elements & Compounds. Elements in group 2 and 7 and period 3 are used to explore this phenomenon. Pupils will also learn about the trends in the solubilities of the hydroxides and the sulfates of group2 elements and how these trends are linked to their uses. Barium sulfate, magnesium hydroxide and magnesium sulfate have applications in medicines whilst calcium hydroxide is used in agriculture to change soil pH, which is essential for good crop production and maintaining the food supply. Students will also learn that society assesses the advantages and disadvantages when deciding if chemicals should be added to water supplies, particularly the of chlorine in water treatment. Appreciate that the benefits to health of water treatment by chlorine outweigh its toxic effects. The historical development of the Periodic Table and models of atomic structure are explored as good examples of how scientific ideas and explanations develop over time.																																					
																				<u>Working scientifically</u> In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding.																																					

Lead teacher for Physics is Miss O’Grady supported by Mr James

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks						Summer 1 = 6 weeks						Summer 2 = 7 weeks																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39															
Year 12 Physics	Waves This topic links to KS3 where pupils look at different types of waves (light and sound) and 10P3 Waves. Using their prior knowledge pupils will go on to look at progressive waves, transverse and longitudinal, wave speed, polarisation, superposition, stationary waves, interference (single source and double), diffraction (diffraction gratings), refraction, reflection, refractive index, resonance, critical angle, optical fibres, total internal reflection, dispersion, and attenuation. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Pupils will investigate the effect of diffraction grating upon the transmission of coherent light, refraction, refraction index and critical angle by making careful observations, recording accurate information, processing raw data and drawing conclusions.																		Electricity Links: This topic starts in 8P3 then build upon in 10P2 electricity. This is a key topic that shows how energy can be applied to life. Circuits, current, potential difference, resistance, IV characteristics, resistivity, determine the resistivity of a wire, power, and electrical energy, e.m.f. and internal resistance, conservation of energy, charge in circuits, potential divider. Practical's: students need to be able to build and interpret different circuits. They must use multimeters for added accuracy. Working scientifically In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding																		Quantum physics This topic links to the Year 10 topic of waves. Pupils will learn about photons, the photoelectric effect, de Broglie waves and wave–particle duality.																	
	Moments In the first unit pupils will revisit standard conversion in physics as well as This topic builds upon 8P2 forces and the GCSE Y11 topic of forces. Pupils will learn about the principle of moments, couple, centre of mass, coplanar forces and stability. Working scientifically Pupils will recover many key scientific concepts such as precision, accuracy, resolution before moving on to measurements and uncertainty. Pupils will investigate stability and determine centre of mass of a regular and irregular shaped object.									Motion This topic builds upon pupils' knowledge of forces from KS3 and Y11 (11P1). Pupils will learn scalar, vector, linear motion, acceleration, motion graphs, free fall and terminal velocity, Newton's laws, conservation of momentum, momentum and safety, collisions and explosions, work, power, energy conservation, efficiency, Working scientifically In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Pupils will investigate the stability of objects, freefall, terminal velocity, density and young's modulus by making careful observations, recording accurate information, processing raw data and drawing conclusions.																		Materials This topic builds upon 9P3 particle model of matter as well aspect of the chemistry course. Pupils will continue to learn about density and pressure in solids, liquids and gases, strain, stress, tension, stored elastic energy (Hooke's law) plastic and elastic deformation. In additional to this, pupils will use Youngs modulus as a method of comparing materials. Working scientifically In this topic pupils will investigate the properties of materials for example using Hooke's law to compare force extension characteristic of springs, rubber bands and polythene strips. Youngs modulus of copper will also be determined.																										

Curriculum Overview 2025-2026 Subject: SCIENCE

The weeks highlighted in **yellow** are milestone assessments or internal examinations. Time has been built into the curriculum to account of preparation time for these assessments.

GCSE Science: Students study the three sciences separately and can achieve three separate grades one for each subject. All lessons are delivered by specialist teachers.

	Autumn 1= 8 weeks							Autumn 2= 7 weeks							Spring 1=6 weeks							Spring 2= 5 weeks					Summer 1= 6 weeks						Summer 2= 7 weeks						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 11 GCSE Biology	11SB1 Ecology In this Unit pupils will learn about cycles, global warming and pollution. They will then move on to learning about decomposition and the production of Biogas, efficiency in food chains and how this can be manipulated to improve food security.							11SB2 Genetics variation and evolution In this unit pupils will learn about the development of our understanding of genetics and genetic disorders and DNA and apply this to processes such as protein synthesis, meiosis, genetic engineering cloning and selective breeding. They will develop their understanding of evolution and link this to speciation. All of this will be used to explain the variation in and between all species of life on earth.														Year 11 Exam preparation and GCSE Examinations																	
	Working scientifically: In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding.							Working scientifically: In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed include calculating probabilities, using punnet squares and genetic cross diagrams, and graphically presenting continuous and discontinuous data, as well as evaluating genetic screening.														During the revision period the following will be covered Paper 1: Cell biology, organisation, infection and response, bioenergetics Paper 2: Homeostasis and response, inheritance, variation and evolution, ecology Examination skills will be practiced through the above topics. These include - command words - extended writing - required practicals - calculations and multistep calculations - data handling and analysis - interpreting graphical information																	

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks							Spring 2 = 5 weeks					Summer 1= 6 weeks						Summer 2 = 7 weeks																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39														
Year 11 GCSE Chemistry	11SC1 Using Resources This topic links to 8C2 Earth and atmosphere. In this unit pupils will learn how industries use the Earth’s natural resources to manufacture useful products. They will develop their understanding of how chemists operate sustainably through minimising the use of limited resources, use of energy, waste and environmental impact in the manufacture of these products. All this will be used to explain how pollution, disposal of waste products and changing land use has a significant effect on the environment, and how human activity has affected the Earth’s natural cycles, and how damaging effects can be minimised.					11SC2 Organic Chemistry This topic builds upon 8C2 Earth and atmosphere, 9C2 separating mixtures and 11SC1 Using Resources. In this unit pupils will learn about the chemistry of carbon compounds. Their sources include fossil fuels which are a major source of feedstock for the petrochemical industry. Students will develop their understanding of how chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents.								11SC3 Chemistry of the Atmosphere This topic builds upon 8C2 and students will learn about the ever-changing atmosphere of the Earth. Focusing on the composition of gases in Earth’s atmosphere, as well as being able to describe Earth’s early atmosphere and how it has changed over time. There will be a particular focus on greenhouse gases and how human activity has affected greenhouse gases as well as the effects of these and other atmospheric pollutants. This will develop their understanding of climate change and why it is being accelerated as well as understanding potential solutions to stop the acceleration of climate change.							11SC4 Chemical Analysis This topic builds upon basic ideas covered in KS3 (flame tests and purity from 7C1 Atoms, 9C3 Neutralisation gas tests demo). Pupils will learn about purity, formulations, chromatography, gas tests (H2, O2, CO2, Cl2) identifying ions (cations/anions), instrumental methods, and comparing instrumental methods with chemical tests.					Year 11 Exam preparation and GCSE Examinations During the revision period the following will be covered Paper 1: Atomic structure and the periodic table, bonding, structure and properties of matter, quantitative chemistry, chemical changes, energy changes Paper 2: Rates and extent of reactions, organic chemistry, chemical analysis, chemistry of the atmosphere, using resources Examination skills will be practiced through the above topics. These include - command words - extended writing - required practicals - calculations and multistep calculations - data handling and analysis - interpreting graphical information																											
	Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding to draw conclusions.					Working scientifically In this topic students will make observations, predictions, Recognise / draw / interpret diagrams. They will also be able to translate from data to a representation with a model. Students will also use models in explanations as well as describe and explain specified examples of the technological applications of science. Describing and evaluating, with the help of data, methods that can be used to tackle problems caused by human impacts on the environment								Working Scientifically In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding.																																							

Opening Minds & Opening Doors

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks							Spring 2 = 5 weeks					Summer 1= 6 weeks						Summer 2 = 7 weeks																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39													
Year 11 GCSE Physics	<u>11SP1 Forces and motion</u> This topic builds upon 8P2 Forces and then links to 10P3 Waves in terms of contact and non-contact forces. 10P4 Space has the key concept of gravity being balanced with nuclear fusion. Pupils will learn speed, velocity, distance time graphs, velocity time graphs, resultant forces and vector diagrams, newton’s laws of motion, investigating acceleration, contact and non-contact forces, gravity, terminal velocity, stopping distance, momentum, investigating the extension of a spring, moments and gears, atmospheric and fluid pressure. <u>Working scientifically:</u> In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Skills: Pupils are completing practicals based on acceleration and changing variables. The pupils are also rearranging multiple equations including equations with square rooted. Required practical activity 6 Investigate the relationship between force and extension for a spring. Required practical activity 7 Investigate the effect of varying the force on the acceleration of an object of constant mass and the effect of varying the mass of an object on the acceleration produced by a constant force.														<u>11SP2 Magnetism and electromagnetism</u> This topic links to 8P3 forces including magnetism. This builds upon the basic ideas of attraction and repulsion, poles and the forces interacting. It also links to 9P2 domestic electricity, this is links to electricity being transported around the UK via the national grid. Pupils will learn magnets, magnetic fields, electromagnets, motors, speakers, microphones, electromagnetic induction, and transformers. <u>Working scientifically:</u> In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding.											Year 11 Exam preparation and GCSE Examinations During the revision period the following will be covered Paper 1: Energy, electricity, particle model of matter and atomic structure Paper 2: Forces, waves, magnetism and space Examination skills will be practiced through the above topics. These include - command words - extended writing - required practicals - calculations and multistep calculations - data handling and analysis - interpreting graphical information																										

Combined Science: Trilogy: In combined science students still study the three sciences, but their scores are all combined to create their final combined grade. This course is the equivalent of two GCSEs.

	Autumn 1= 8 weeks								Autumn 2= 7 weeks							Spring 1=6 weeks						Spring 2= 5 weeks					Summer 1= 6 weeks						Summer 2= 7 weeks						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 11 Trilogy Biology	11B1 Variation, genetics, and evolution In this unit pupils will learn about the development of our understanding of genetics and genetic disorders and DNA and apply this to processes such as, meiosis, genetic engineering, and selective breeding. They will develop their understanding of evolution. All of this will be used to explain the variation in and between all species of life on earth. Working scientifically: In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed include calculating probabilities, using punnet squares and genetic cross diagrams, and graphically presenting continuous and discontinuous data, as well as evaluating genetic screening.																					Year 11 Exam preparation and GCSE Examinations During the revision period the following will be covered Paper 1: Cell biology, organisation, infection and response, bioenergetics Paper 2: Homeostasis and response, inheritance, variation and evolution, ecology Examination skills will be practiced through the above topics. These include - command words - extended writing - required practicals - calculations and multistep calculations - data handling and analysis - interpreting graphical information																	
Year 11 Trilogy Chemistry	11C1 Using Resources This topic links to 8C2 Earth and atmosphere. In this unit pupils will learn how Industries use the Earth's natural resources to manufacture useful products. They will develop their understanding of how chemists operate sustainably through minimising the use of limited resources, use of energy, waste and environmental impact in the manufacture of these products. All this will be used to explain how pollution, disposal of waste products and changing land use has a significant effect on the environment, and how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding to draw conclusions.					11C2 Organic Chemistry This topic builds upon 8C2 Earth and atmosphere, 9C2 separating mixtures and 11SC1 Using Resources. In this unit pupils will learn about the chemistry of carbon compounds. Their sources include fossil fuels which are a major source of feedstock for the petrochemical industry. Students will develop their understanding of how chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding to draw conclusions					11C3 Chemistry of the Atmosphere This topic builds upon 8C2 and students will learn about the ever-changing atmosphere of the Earth. Focusing on the composition of gases in Earth's atmosphere, as well as being able to describe Earth's early atmosphere and how it has changed over time. There will be a particular focus on greenhouse gases and how human activity has affected greenhouse gases as well as the effects of these and other atmospheric pollutants. This will develop their understanding of climate change and why it is being accelerated as well as understanding potential solutions to stop the acceleration of climate change. Working scientifically In this topic students will make observations, predictions, Recognise/draw/interpret diagrams. They will also be able to translate from data to a representation with a model. Students will also use models in explanations as well as describe and explain specified examples of the technological applications of science. Describing and evaluating, with the help of data, methods that can be used to tackle problems caused by human impacts on the environment					11SC4 Chemical Analysis This topic builds upon basic ideas covered in KS3 (flame tests and purity from 7C1 Atoms, 9C3 Neutralisation gas tests demo). Pupils will learn about purity, formulations, chromatography, gas tests (H2, O2, CO2, Cl2) identifying ions (cations/anions), instrumental methods, and comparing instrumental methods with chemical tests. Working Scientifically In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding.					Year 11 Exam preparation and GCSE Examinations During the revision period the following will be covered Paper 1: Atomic structure and the periodic table, bonding, structure and properties of matter, quantitative chemistry, chemical changes, energy changes Paper 2: Rates and extent of reactions, organic chemistry, chemical analysis, chemistry of the atmosphere, using resources Examination skills will be practiced through the above topics. These include - command words - extended writing - required practicals - calculations and multistep calculations - data handling and analysis - interpreting graphical information																		
Year 11 Trilogy Physics	11P1 Force and motion This topic builds upon 7P3 forces and space 8P2 Forces and then links to 10P3 magnetism and waves in terms of contact and non-contact forces. Pupils will learn speed, velocity, distance time graphs, velocity time graphs, resultant forces and vector diagrams, newtons laws of motion, investigating acceleration, contact and non-contact forces, gravity, terminal velocity, stopping distance, momentum, investigating the extension of a spring. Working scientifically: In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Skills: Pupils are completing practicals based on acceleration and changing variables. The pupils are also rearranging multiple equations including equations with square rooted. Mock examinations 1: This will assess paper 1 content. In class aspects of the following topics will be revisited in preparation for the exam: Energy, electricity, particle model of matter and atomic structure.																					Year 11 Exam preparation and GCSE Examinations During the revision period the following will be covered Paper 1: Energy, electricity, particle model of matter and atomic structure Paper 2: Forces, waves and magnetism Examination skills will be practiced through the above topics. These include - command words - extended writing - required practicals - calculations and multistep calculations - data handling and analysis - interpreting graphical information																	

Opening Minds & Opening Doors

Due to the number of groups and staff, some classes will have a single specialist teacher who delivers the combined science: trilogy curriculum in the following order.

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks							Spring 2 = 5 weeks					Summer 1= 6 weeks							Summer 2 = 7 weeks																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39														
Year 11 Combined science: Trilogy [single teacher schedule]	11C1 Using Resources This topic links to 8C2 Earth and atmosphere. In this unit pupils will learn how Industries use the Earth’s natural resources to manufacture useful products. They will develop their understanding of how chemists operate sustainably through minimising the use of limited resources, use of energy, waste and environmental impact in the manufacture of these products. All this will be used to explain how pollution, disposal of waste products and changing land use has a significant effect on the environment, and how human activity has affected the Earth’s natural cycles, and how damaging effects can be minimised.				11B1 Variation, genetics, and evolution In this unit pupils will learn about the development of our understanding of genetics and genetic disorders and DNA and apply this to processes such as, meiosis, genetic engineering, and selective breeding. They will develop their understanding of evolution. All of this will be used to explain the variation in and between all species of life on earth. Working scientifically: In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed include calculating probabilities, using punnet squares and genetic cross diagrams, and graphically presenting continuous and discontinuous data, as well as evaluating genetic screening							11P1 Force and motion This topic builds upon 7P3 forces and space 8P2 Forces and then links to 10P3 magnetism and waves in terms of contact and non-contact forces. Pupils will learn speed, velocity, distance time graphs, velocity time graphs, resultant forces and vector diagrams, newtons laws of motion, investigating acceleration, contact and non-contact forces, gravity, terminal velocity, stopping distance, momentum, investigating the extension of a spring. Working scientifically: In this topic students will make observations and predictions, identify variables, work safely, and record accurate data and explain patterns using scientific knowledge and understanding. Skills: Pupils are completing practicals based on acceleration and changing variables. The pupils are also rearranging multiple equations including equations with square rooted.							11C3 Chemistry of the Atmosphere This topic builds upon 8C2 and students will learn about the ever-changing atmosphere of the Earth. Focusing on the composition of gases in Earth’s atmosphere, as well as being able to describe Earth’s early atmosphere and how it has changed over time. There will be a particular focus on greenhouse gases and how human activity has affected greenhouse gases as well as the effects of these and other atmospheric pollutants. This will develop their understanding of climate change and why it is being accelerated as well as understanding potential solutions to stop the acceleration of climate change. 11SC4 Chemical Analysis This topic builds upon basic ideas covered in KS3 (flame tests and purity from 7C1 Atoms, 9C3 Neutralisation gas tests demo). Pupils will learn about purity, formulations, chromatography, gas tests (H2, O2, CO2, Cl2) identifying ions (cations/anions), instrumental methods, and comparing instrumental methods with chemical tests. Working scientifically In these topics students will make observations, predictions, Recognise/draw/interpret diagrams. They will also be able to translate from data to a representation with a model. Students will also use models in explanations as well as describe and explain specified examples of the technological applications of science. Describing and evaluating, with the help of data, methods that can be used to tackle problems caused by human impacts on the environment							Year 11 Exam preparation and GCSE Examinations Biology: During the revision period the following will be covered Paper 1: Cell biology, organisation, infection and response, bioenergetics Paper 2: Homeostasis and response, inheritance, variation and evolution, ecology Chemistry: During the revision period the following will be covered Paper 1: Atomic structure and the periodic table, bonding, structure and properties of matter, quantitative chemistry, chemical changes, energy changes Paper 2: Rates and extent of reactions, organic chemistry, chemical analysis, chemistry of the atmosphere, using resources Physics: During the revision period the following will be covered Paper 1: Energy, electricity, particle model of matter and atomic structure Paper 2: Forces, waves, magnetism and space Examination skills will be practiced through the above topics. These include - command words - extended writing - required practicals - calculations and multistep calculations - data handling and analysis - interpreting graphical information																											
	11C2 Organic Chemistry This topic builds upon 8C2 Earth and atmosphere, 9C2 separating mixtures and 11SC1 Using Resources. In this unit pupils will learn about the chemistry of carbon compounds. Their sources include fossil fuels which are a major source of feedstock for the petrochemical industry. Students will develop their understanding of how chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding to draw conclusions																																																				

Curriculum Overview 2025-2026 Subject: SCIENCE

The weeks highlighted in **yellow** are milestone assessments or internal examinations. Time has been built into the curriculum to account of preparation time for these assessments.

Pupils following the **ASPIRE PATHWAY** will study a **GCSE in BIOLOGY, CHEMISTRY and PHYSICS**. Pupils are taught the three sciences by specialist teachers. At the end of the course pupils will achieve 3 separate GCSE grades.

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks				Spring 2 = 5 weeks					Summer 1= 6 weeks					Summer 2 = 7 weeks																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39												
Year 10 GCSE Biology	10SB1 Cells and organisation In this unit pupils will build on their knowledge of specialised cells, tissues, organs and organ systems from KS3 to study the finer points of the circulatory, respiratory and digestive systems and show how these are linked together. They will study how cells divide and how they can be used in treatment of diseases (stem cells). They will study the impact of non-communicable diseases and how they affect human health. They will also develop awareness of the role of cells in causes, diagnosis and treatment of disease building on Y9 topic infection and response through the study of plant diseases and defences, culturing micro-organisms and the use of monoclonal antibodies. Working scientifically Pupils will develop their microscopy skills from Y7 and Y9 through the (optional) preparation and observing of blood smears. They will also develop their safe and ethical dissection skills when learning about the structure of the heart. They will build upon their ability to follow a method and draw conclusions and the use of a control when studying food tests and surface area:vol. They will apply their knowledge of osmosis (Y9) to investigate the effect of different concentrations of solution on the mass of potatoes. They will build upon their understanding of variables in the enzymes practicals and apply knowledge of validity, precision and accuracy in the enzymes and the bile practicals. They will evaluate the use of stem cells to treat diseases. Pupils will learn aseptic techniques when investigating the effectiveness of antibiotics when treating bacterial infections.																	10SB2 Homeostasis and response In this topic pupils will build upon their knowledge of the nervous system from Y8 through learning about the role of synapses and investigating the factors that affect reaction time, as well as the eye and the brain. They will then learn about the role of the endocrine system alongside that of the nervous system in the control of homeostasis (control of temperature water ions and glucose) and human reproduction. Negative feedback mechanisms will be taught to show how the body controls the internal conditions of the cells. Responses in plants builds on this, using plant hormones to explain plant responses to stimuli in the, in terms of how the plant grows to aid photosynthesis. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed include research for information and scientific literacy, evaluating different methods of contraception and the IVF process.																	10SB3 Ecology In this topic pupils will develop their knowledge of adaptations to improve competitive ability and therefore survival and reproduction chances. They will develop knowledge of food chains and predator prey-interactions to determine the importance of interactions between the living and non-living components of an ecosystem. They will also learn about the effect of the human population growth's impact on ecosystems including how the natural cycling of materials is disrupted by land use and pollution of the land, air and water. Pupils will also link these to loss of biodiversity and how we are trying to overcome this issue. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed in this topic include ecological sampling techniques, validity, and collecting data. In addition, pupils will evaluate methods of controlling the loss of biodiversity and the importance of balancing the needs of society and of the ecosystem.																

	Autumn 1 = 8 weeks							Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks					Summer 1= 6 weeks						Summer 2 = 7 weeks							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 10 GCSE Chemistry	10SC1 Neutralisation reactions In 7C2 Acids and Alkalis, 8C1 Chemical reactions and 9C3 Chemical reactions pupils learn about chemical reactions. In this topic pupils will focus upon acids, alkalis, neutralisation, and salts (making and separating).							10SC2 Bonding This unit builds upon knowledge acquired in 7C1 Atoms, 8C1 Chemical reactions and 9C3 Chemical reactions. In this topic pupils will learn about theories of structure and bonding and will be using them to explain the physical and chemical properties of materials. They will then analyse different structures to see how atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures (ionic, covalent, and metallic). Using the theories of bonding pupils will explain how atoms are held together in these structures. They will then explore how scientists use this knowledge of structure and bonding to engineer new materials with desirable properties.								10SC3 Electrolysis In this unit pupils build upon their knowledge acquired in 7C1 Atoms, 8C1 Chemical reactions, 9C3 Chemical reactions and 10SC2 Bonding. They will learn about electrolysis through ionic compounds which when either melted or dissolved in water, are able to conduct electricity. They will also learn about electrolysis as a method of metal extraction. Pupils will also learn about electricity generation from chemicals. Great emphasis is placed on the sustainability of chemical reactions through calculations of energy of reactions, percentage yield and atom economy.						10SC4 The Mole This unit builds upon knowledge acquired in 7C1 Atoms, 8C1 Chemical reactions, 9C3 Chemical reactions and 10SC4 Neutralisation. Pupils will learn how to use quantitative analysis and the use of the mole as a unit to measure the amount of substance to determine the formulae of compounds and the equations for reactions. Given this information, pupils can then use quantitative methods such as titrations to determine the purity of chemical samples and to monitor the yield from chemical reactions.					10SC5 Rates of reaction In 7C2 Acids and Alkalis, 8C1 Chemical reactions and 9C3 Chemical reactions pupils learn about chemical reactions. Pupils will learn about the many variables that can be manipulated to speed them up or slow chemical reactions through the collision theory. This will include reversible reactions and the effect of different variables on the yield of desired product. They will then learn about Le Chatelier’s principle and how it is applied by chemical engineers when they determine the effect of different variables on reaction rate and yield of product. Pupils will also learn that compromises are made to the optimisation processes to ensure that enough product is produced within a sufficient time, and in an energy-efficient way.												

Opening Minds & Opening Doors

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks					Summer 1= 6 weeks							Summer 2 = 7 weeks									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39				
Year 10 GCSE Physics	Gas pressure This short unit builds upon pupils' knowledge of 8P2 forces, 9P3 changes of state. Pupils will learn about pressure and how gas pressure changes with altitude and water pressure changes with depth and density.			10SP1 Atomic structure This topic builds upon 7C1, 9C1 and the concept of the atoms. Pupils will continue to develop their knowledge of the structure of the atom and the various models used to describe it. They will then go on to learn about alpha, beta, and gamma radiation their properties (penetrating power, ionising power, distance travelled through air), half-life, applications of radioactive, and their hazards, including irradiation and contaminations. Pupils will also learn about nuclear fission, nuclear fusion and their applications in terms of generating electricity in nuclear power stations.											10SP2 Electricity This topic builds upon 7P1 Energy, 8P3 Electricity, 9P1 Energy transfers, 9P2 Domestic electricity and elements from chemistry in terms of atomic structure and the electron. Pupils will further develop their knowledge of charge including static electricity, circuits, and electricity in terms of flow of charge, resistance in series and parallel, current voltage graphs, thermistors, and light dependent resistors. Required practicals: Pupils will investigate resistance in series and parallel circuits as well as the resistance of a wire and the relationship between current and potential difference for a range of components.											10SP3 Waves This topic builds upon 7C1 Atoms, 7P1 Energy, 7P2 Sound, 8P1 Light, 8P2 Forces (pressure), 8P2 Magnetism (as a component of electromagnetic waves), 8P3 Electricity (as a component of electromagnetic waves), 9C1 Atoms, 9P1 Energy transfer, 9P3 Change of state (particle model of matter). Pupils will use their prior knowledge to develop a deeper understanding of transverse and longitudinal waves, their properties (reflection and refraction), characteristics, and applications which include lenses (converging and diverging), ultrasound and the understanding of the Earth's structure using seismic waves. Pupils will also learn the different regions of the electromagnetic spectrum including their medical and non-medical uses as well as the hazards associated with each region. Required practical: Pupils will investigate the speed of waves in liquids and solids and the effect of surface conditions on the absorption and emission of thermal radiation.											10SP4 Space This topic builds upon 7P3 Forces and space as well as 10SP3 waves. Pupils will use their prior knowledge to learn about why objects remain in orbit, application of different satellites and the evidence which supports the big bang theory.						

Pupils following the **AMBITION PATHWAY** will study **COMBINED SCIENCE: TRILOGY**. Students are taught each subject concurrently by specialist teachers.

Year 10 Trilogy Biology	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks				Spring 2 = 5 weeks				Summer 1= 6 weeks				Summer 2 = 7 weeks																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39												
	10B1 Cells and organisation In this unit pupils will build on their knowledge of specialised cells, tissues, organs and organ systems from KS3 to study the finer points of the circulatory, respiratory and digestive systems and show how these are linked together. They will study how cells divide and how they can be used in treatment of diseases (stem cells). They will study the impact of non-communicable diseases and how they affect human health.																	10B2 Homeostasis and response In this topic pupils will build upon their knowledge of the nervous system from Y8 through learning about the role of synapses and investigating the factors that affect reaction time. They will then learn about the role of the endocrine system alongside that of the nervous system in the control of homeostasis (control of temperature water ions and glucose) and human reproduction. Negative feedback mechanisms will be used to show how the body controls the internal conditions of the cells.																	10B3 Ecology In this topic pupils will develop their knowledge of adaptations to improve competitive ability and therefore survival and reproduction chances. They will develop knowledge of food chains and predator prey-interactions to determine the importance of interactions between the living and non-living components of an ecosystem. They will also learn about the effect of the human population growth's impact on ecosystems including how the natural cycling of materials is disrupted by land use and pollution of the land, air and water. Pupils will also link these to loss of biodiversity and how we are trying to overcome this issue.																
	Working scientifically Pupils will develop their microscopy skills from Y7 and Y9 through the (optional) preparation and observing of blood smears. They will also develop their safe and ethical dissection skills when learning about the structure of the heart. They will build upon their ability to follow a method and draw conclusions and the use of a control when studying food tests and surface area:vol. They will apply their knowledge of osmosis (Y9) to investigate the effect of different concentrations of solution on the mass of potatoes. They will build upon their understanding of variables in the enzymes practicals and apply knowledge of validity, precision and accuracy in the enzymes and the bile practicals. They will evaluate the use of stem cells to treat diseases.																	Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed include research for information and scientific literacy, evaluating different methods of contraception and the IVF process.																	Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed in this topic include ecological sampling techniques, validity, and collecting data. In addition, pupils will evaluate methods of controlling the loss of biodiversity and the importance of balancing the needs of society and of the ecosystem.																
	Required practical activity Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue. Required practical activity Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include Benedict's test for sugars; iodine test for starch; and Biuret reagent for protein Required practical activity Investigate the effect of pH on the rate of reaction of amylase enzyme																	Required practical: Plan and carry out an investigation into the effect of a factor on human reaction time.																	Required practical: Measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.																

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks						Summer 1= 6 weeks						Summer 2 = 7 weeks							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
Year 10 Trilogy Chemistry	10C1 Neutralisation reactions In 7C2 Acids and Alkalis, 8C1 Chemical reactions and 9C3 Chemical reactions pupils learn about chemical reactions. In this topic pupils will focus upon acids, alkalis, neutralisation, and salts (making and separating).								10C2 Bonding This unit builds upon knowledge acquired in 7C1 Atoms, 8C1 Chemical reactions and 9C3 Chemical reactions. In this topic pupils will learn about theories of structure and bonding and will be using them to explain the physical and chemical properties of materials. They will then analyse different structures to see how atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures (ionic, covalent, and metallic). Using the theories of bonding pupils will explain how atoms are held together in these structures. They will then explore how scientists use this knowledge of structure and bonding to engineer new materials with desirable properties.													10C3 Electrolysis and the Mole In this unit pupils build upon their knowledge acquired in 7C1 Atoms, 8C1 Chemical reactions, 9C3 Chemical reactions and 10SC2 Bonding. They will learn about electrolysis through ionic compounds which when either melted or dissolved in water, are able to conduct electricity. They will also learn about electrolysis as a method of metal extraction. Pupils will also learn about electricity generation from chemicals. Great emphasis is placed on the sustainability of chemical reactions through calculations of energy of reactions, percentage yield and atom economy.										10C4 Rates of reaction In 7C2 Acids and Alkalis, 8C1 Chemical reactions and 9C3 Chemical reactions pupils learn about chemical reactions. Pupils will learn about the many variables that can be manipulated to speed them up or slow chemical reactions through the collision theory. This will include reversible reactions and the effect of different variables on the yield of desired product. They will then learn about Le Chatelier’s principle and how it is applied by chemical engineers when they determine the effect of different variables on reaction rate and yield of product. Pupils will also learn that compromises are made to the optimisation processes to ensure that enough product is produced within a sufficient time, and in an energy-efficient way.									

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks					Summer 1= 6 weeks						Summer 2 = 7 weeks									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39			
Year 10 Trilogy Physics	10P1 Atomic Structure This topic builds upon 7C1, 9C1 and the concept of the atoms. Pupils will continue to develop their knowledge of the structure of the atom and the various models used to describe it. They will then go on to learn about alpha, beta, and gamma radiation their properties (penetrating power, ionising power, distance travelled through air), half-life, applications of radioactive, and their hazards, including irradiation and contaminations.										10P2 Electricity This topic builds upon 7P1 Energy, 8P3 Electricity, 9P1 Energy transfers, 9P2 Domestic electricity and elements from chemistry in terms of atomic structure and the electron. Pupils will further develop their knowledge of circuits and electricity in terms of flow of charge, resistance in series and parallel, current voltage graphs, thermistors, and light dependent resistors. Required practicals: Pupils will investigate resistance in series and parallel circuits as well as the resistance of a wire and the relationship between current and potential difference for a range of components.													10P3 Waves This topic builds upon 7C1 Atoms, 7P1 Energy, 7P2 Sound, 8P1 Light, 8P2 Forces (pressure), 9C1 Atoms, 9P1 Energy transfer, 9P3 Change of state (particle model of matter). Pupils will use their prior knowledge to develop a deeper understanding of transverse and longitudinal waves, their properties, characteristics, and applications. Pupils will learn the different regions of the electromagnetic spectrum including their medical and non-medical uses as well as the hazards associated with each region. Required practical: Pupils will investigate the speed of waves in liquids and solids and the effect of surface conditions on the absorption and emission of thermal radiation.										10P4 Magnetism This topic builds upon 8P2 Magnetism, 8P3 Electricity (as a component of electromagnetic waves), 9P1 Energy transfer. Pupils will use their prior knowledge to develop a deeper understanding of magnetism. Pupils will learn the difference between permanent magnets and electromagnets including advantages, disadvantages and at higher level their applications (motors).								

Opening Minds & Opening Doors

Curriculum Overview 2025-2026 Subject: SCIENCE

Due to the number of groups and staff, some classes will have a single specialist teacher who delivers the combined science: trilogy curriculum in the following order.

	Autumn 1 = 8 weeks					Autumn 2 = 7 weeks					Spring 1 = 6 weeks					Spring 2 = 5 weeks					Summer 1= 6 weeks					Summer 2 = 7 weeks																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39																
Year 10 Combined science: Trilogy [single teacher schedule]	10B1 Cells and organisation In this unit pupils will build on their knowledge of specialised cells, tissues, organs and organ systems from KS3 to study the finer points of the circulatory, respiratory and digestive systems and show how these are linked together. They will study how cells divide and how they can be used in treatment of diseases (stem cells). They will study the impact of non-communicable diseases and how they affect human health. Working scientifically Pupils will develop their microscopy skills from Y7 and Y9 through the (optional) preparation and observing of blood smears. They will also develop their safe and ethical dissection skills when learning about the structure of the heart. They will build upon their ability to follow a method and draw conclusions and the use of a control when studying food tests and surface area:vol. They will apply their knowledge of osmosis (Y9) to investigate the effect of different concentrations of solution on the mass of potatoes. They will build upon their understanding of variables in the enzymes practicals and apply knowledge of validity, precision and accuracy in the enzymes and the bile practicals. They will evaluate the use of stem cells to treat diseases. Required practical activity 2 Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue. Required practical activity 3 Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include Benedict’s test for sugars; iodine test for starch; and Biuret reagent for protein Required practical activity 4 Investigate the effect of pH on the rate of reaction of amylase enzyme					10C1 Neutralisation reactions In 7C2 Acids and Alkalis, 8C1 Chemical reactions and 9C3 Chemical reactions pupils learn about chemical reactions In this topic pupils will focus upon acids, alkalis, neutralisation, and salts (making and separating). Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Required practical activity 1 Preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate					10P1 Atomic Structure This topic builds upon 7C1, 9C1 and the concept of the atoms. Pupils will continue to develop their knowledge of the structure of the atom and the various models used to describe it. They will then go on to learn about alpha, beta, and gamma radiation their properties (penetrating power, ionising power, distance travelled through air), half-life, applications of radioactive, and their hazards, including irradiation and contaminations. Working scientifically During the topic, you will understand the decisions made by scientists based upon experimental knowledge, evidence and understanding, collect accurate data based upon careful observations and apply mathematical concepts and calculate results. You will then interpret data and graphs to draw conclusions and evaluate data.					10B2 Homeostasis and response In this topic pupils will build upon their knowledge of the nervous system from Y8 through learning about the role of synapses and investigating the factors that affect reaction time. They will then learn about the role of the endocrine system alongside that of the nervous system in the control of homeostasis (control of temperature water ions and glucose) and human reproduction. Negative feedback mechanisms will be used to show how the body controls the internal conditions of the cells. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Student will develop their understanding of representations of two-dimensional representations of 3D objects in terms of ionic compounds, covalent compounds, metals and alloys and use these models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. Required practical: Plan and carry out an investigation into the effect of a factor on human reaction time.					10C2 Bonding This unit builds upon knowledge acquired in 7C1 Atoms, 8C1 Chemical reactions and 9C3 Chemical reactions. In this topic pupils will learn about theories of structure and bonding and will be using them to explain the physical and chemical properties of materials. They will then analyse different structures to see how atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures (ionic, covalent, and metallic). Using the theories of bonding pupils will explain how atoms are held together in these structures. They will then explore how scientists use this knowledge of structure and bonding to engineer new materials with desirable properties. Working Scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Student will develop their understanding of representations of two-dimensional representations of 3D objects in terms of ionic compounds, covalent compounds, metals and alloys and use these models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.					10P2 Electricity This topic builds upon 7P1 Energy, 8P3 Electricity, 9P1 Energy transfers, 9P2 Domestic electricity and elements from chemistry in terms of atomic structure and the electron. Pupils will further develop their knowledge of circuits and electricity in terms of flow of charge, resistance in series and parallel, current voltage graphs, thermistors, and light dependent resistors. Working scientifically During this topic students will have the opportunity plan a practical method, make observations and predictions, identify variables, work safely, record accurate data and explain patterns using scientific knowledge and understanding. They will also have an opportunity to evaluate results and methods and suggest possible improvements. Required Practical: Use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include: •the length of a wire at constant temperature •combinations of resistors in series and parallel.					10B3 Ecology In this topic pupils will develop their knowledge of adaptations to improve competitive ability and therefore survival and reproduction chances. They will develop knowledge of food chains and predator prey-interactions to determine the importance of interactions between the living and non-living components of an ecosystem. They will also learn about the effect of the human population growth's impact on ecosystems including how the natural cycling of materials is disrupted by land use and pollution of the land, air and water. Pupils will also link these to loss of biodiversity and how we are trying to overcome this issue. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Skills developed in this topic include ecological sampling techniques, validity, and collecting data. In addition, pupils will evaluate methods of controlling the loss of biodiversity and the importance of balancing the needs of society and of the ecosystem.					10C3 Electrolysis and the Mole In this unit pupils build upon their knowledge acquired in 7C1 Atoms, 8C1 Chemical reactions, 9C3 Chemical reactions and 10SC2 Bonding. They will learn about electrolysis through ionic compounds which when either melted or dissolved in water, are able to conduct electricity. They will also learn about electrolysis as a method of metal extraction. Pupils will also learn about electricity generation from chemicals. Great emphasis is placed on the sustainability of chemical reactions through calculations of energy of reactions, percentage yield and atom economy. Working scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Required practical activity 3 Investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving developing a hypothesis.					10P3 Waves This topic builds upon 7C1 Atoms, 7P1 Energy, 7P2 Sound, 8P1 Light, 8P2 Forces (pressure), 8P2 Magnetism, 8P3 Electricity (as a component of electromagnetic waves), 9C1 Atoms, 9P1 Energy transfer, 9P3 Change of state (particle model of matter). Pupils will use their prior knowledge to develop a deeper understanding of transverse and longitudinal waves, their properties, characteristics, and applications. Pupils will learn the different regions of the electromagnetic spectrum including their medical and non-medical uses as well as the hazards associated with each region. Working scientifically During this topic students will have the opportunity plan a practical method, make observations and predictions, identify variables, work safely, record accurate data and explain patterns using scientific knowledge and understanding. They will also have an opportunity to evaluate results and methods and suggest possible improvements. Required practical activity 20 Make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements. Required practical activity 21 Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.					10C1 Rates of reaction In 7C2 Acids and Alkalis, 8C1 Chemical reactions and 9C3 Chemical reactions pupils learn about chemical reactions. Pupils will learn about the many variables that can be manipulated to speed them up or slow chemical reactions through the collision theory. This will include reversible reactions and the effect of different variables on the yield of desired product. They will then learn about Le Chatelier’s principle and how it is applied by chemical engineers when they determine the effect of different variables on reaction rate and yield of product. Pupils will also learn that compromises are made to the optimisation processes to ensure that enough product is produced within a sufficient time, and in an energy-efficient way. Working Scientifically In this topic students will make observations and predictions, identify variables, work safely and record accurate data and explain patterns using scientific knowledge and understanding. Students will have opportunities to calculate the mean rate of a reaction from given information about the quantity of a reactant used or the quantity of a product formed, and the time taken. Students will also draw and interpret graphs showing the quantity of product formed or quantity of reactant used up against time, draw tangents to the curves on these graphs and use the slope of the tangent as a measure of the rate of reaction. Higher students will be able to calculate the gradient of a tangent to the curve on these graphs as a measure of rate of reaction at a specific time. Required practical activity 5 Investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity. This should be an investigation involving developing a hypothesis					10P4 Magnetism This topic builds upon 7P1 Energy, 8P2 Forces, 8P2 Magnetism, 8P3 Electricity (as a component of electromagnetic waves). In magnetism pupils will learn the difference between permanent magnets and electromagnets including advantages, disadvantages and at higher level their applications (motors). Working scientifically During this topic students will have the opportunity plan a practical method, make observations and predictions, identify variables, work safely, record accurate data and explain patterns using scientific knowledge and understanding. They will also have an opportunity to evaluate results and methods and suggest possible improvements. Working scientifically Pupils will have the opportunity to investigate factors affecting the strength of an electromagnet. As well as the opportunity to build a simple motor [higher only].				

Opening Minds & Opening Doors

A small number of students will follow the schools **ACCELERATE PATHWAY** and study **ENTRY LEVEL SCIENCE**. They will be taught the following units in this order by specialist science teachers.

		Autumn 1 = 8 weeks							Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks						Summer 1= 6 weeks						Summer 2 = 7 weeks						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 10 Entry Level Science		Component 1 Biology: The Human Body This topic builds upon 7B2 cells and systems, 7B3 reproduction, 8B1 microbes and disease, 8B2 health, 9B1 cells and microscopy, 9B2 infection and response and 9B3 bioenergetics. Pupils will continue to learn about key processes including reproduction, digestions, response to environmental change, respiration and response to infection. They will also study the levels of organisation; from cells to systems, how the body works; respiration to healthy lifestyles, how the body response to infection; role of vaccinations and drug development, and how the body is coordinated; nervous and endocrine systems Working scientifically There are lots of opportunities for the development of practical and investigative skills in this component. Pupils will investigate... ...energy released from various crisps ...factors affecting heart rate ...effectiveness of disinfectants and antibiotics ...reflex action Through practical activities pupils will identify variables, carry out safe procedures, make careful observations, present results as tables and graphs, write conclusions based upon their results and evaluate the practical procedures.																			Component 5 Physics: Energy, forces and the structure of matter This topic build upon 7P1 energy, 7P3 force and space, 8P2 forces, 9P1 energy and 9P3 change of state. Pupils will continue to learn about energy stores and transfers, efficiency, contact and non-contact forces. In addition to this pupil will describe the motion of objects in terms of their speed, distance, stopping distance; and the factors that affect it. Like the content from units 3, pupils will learn about atoms and nuclear decay which includes alpha, beta and gamma and their properties. Working scientifically There are lots of opportunities for the development of practical and investigative skills in this component. Pupils will investigate... ...thermal insulation ...effect of surfaces on friction ...effect of gradient on speed ...factors affecting reaction time Through practical activities pupils will identify variables, carry out safe procedures, make careful observations, present results as tables and graphs, write conclusions based upon their results and evaluate the practical procedures.																			
		Component 3 Chemistry: Elements, mixtures and compounds This topic builds upon 7C1 atoms, 8C1 chemical reactions, 9C1 atoms, 9C2 separation techniques, 9C 3 chemical reactions. Pupils will continue to learn about atoms and elements, the periodic table and how the structure of matter affects the properties of the matter, which includes differences between metals and alloys and polymers. They will also deepen their knowledge of separation techniques to include filtration, distillation, crystallisation and chromatography. Working scientifically There are lots of opportunities for the development of practical and investigative skills in this component. Pupils will investigate... ...difference in melting points for different substances ...the pigments present in different samples using chromatography. ...density of different materials ...compare the rate of conduction from different metals ...comparing different polymers Through practical activities pupils will identify variables, carry out safe procedures, make careful observations, present results as tables and graphs, write conclusions based upon their results and evaluate the practical procedures.																				Component 2 Biology: Environment, evolution and inheritance This topic builds upon 7B1 ecology, 7B2 cells, 8B3 variation and 9B4 plants. Pupils will continue to learn about photosynthesis and the ways organisms interact with their environment; food chains, food webs and decay, the reasons why some organisms survive, and others do not; competition, and environmental factors, and evolution of life. Working scientifically There are lots of opportunities for the development of practical and investigative skills in this component. Pupils will investigate... ...rate of photosynthesis ...distribution of organisms using choice chambers ...the temperature during decomposition of grass Through practical activities pupils will identify variables, carry out safe procedures, make careful observations, present results as tables and graphs, write conclusions based upon their results and evaluate the practical procedures.																		

The weeks highlighted in **yellow** are milestone assessments. Time has been built into the curriculum to account of preparation time for these assessments.

In Year 9 pupils will be taught the following topics. However, due to logistics and availability of equipment, pupils may start on 9B1, 9C1 or 9P1. All units within the subject areas will be taught in order, all units 1s completed before moving onto unit 2s, 3s or 4s. Some classes may have more than one specialist teacher, where logistically possible each teacher will deliver different topics.

	Autumn 1 = 8 weeks							Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks					Summer 1 = 6 weeks					Summer 2 = 7 weeks								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 9	9B1 Cells and microscopy In this topic pupils continue to build on their knowledge of cells through practical microscopy. They will also learn about prokaryotes and eukaryotes. Alongside this pupil's will develop their knowledge of diffusion from Y7 and pupils will also develop this knowledge when being introduced to osmosis and active transport as a means of transport of substances in and out of cells.				9C1 Atoms, elements, compounds, and mixture In Y7 pupils looked at classifying materials as atoms, elements, compounds, or mixtures. This topic continues to develop these key concepts by looking at the different models of the atom, the periodic table, electron configuration and groups 0, 1 and 7.			9P1 Energy transfer Pupils will continue to develop the idea of energy stores and transfers looking at examples such as kinetic energy, potential energy, efficiency, work, power and the transfer thermal energy by conduction, convection, and ways to reduce its transfer using insulation.				9B2 Infection and response In this topic pupils will continue to build on their knowledge of microbes and disease from Y8. Diseases caused by 4 types of pathogens will be learned in detail. Vaccination will be re-visited and developed in terms of the wider roles of white blood cells and how they work. Development and testing of drugs knowledge will be introduced and the importance of these discoveries assessed in terms of impact on society.			9C2 Separating mixtures. Pupils understanding of compounds and mixtures is developed through practical investigations that allow them to identify and / or separate these substances. Emphasis is placed on that Chemical reactions are the only way to separate compounds and that mixtures can be separated by physical processes. These include Filtration, Crystallisation, Distillation and Chromatography.			9P2 Domestic electricity Pupils will learn about the different ways electricity is produced (renewable and non-renewable energy), how we access electricity in the home, and how it is distributed via the national grid.			9B3 Bioenergetics In this topic pupils will develop their knowledge of respiration from Y7 through linking this to the effects of exercise through practical experimentation. Anaerobic respiration in yeast, plants and animals and the applications of this in industry will be explored through practical experimentation.			9C3 Chemical reactions Pupils have learned about acids and alkalis in Y7 and identifying chemical reactions in Y8. In this topic pupils will focus upon acids, alkalis, neutralisation, and salts (making and separating). This leads onto oxidation, reduction, reactivity, and displacement (linked to 9C1). Building on this knowledge pupils will continue to develop key concepts in identifying different types of chemical reaction, explaining how different chemicals react together, to establish patterns and to make predictions about the behaviour of other chemicals.			9P3 Changes of state Pupils will continue to develop the ideas of the particle model by applying their understanding to what happen when substance change state. This will include particle motion, density, specific latent heat, and specific heat capacity.			9B4 Plants In this topic pupils will develop their knowledge of plants applying structure to function of both familiar and unfamiliar plant cells and tissues, using knowledge of xylem and phloem and root hair cells in the processes of transpiration and translocation. Further to this, pupils will gain knowledge of metabolism through discovering how a plant uses glucose.			Contingency weeks for enrichment days and science weeks within the academic year.						

Working Scientifically: In Year 9 pupils will continue to build upon Working Scientifically from Year 7 and 8. Pupils will be able to independently identify variables in an investigation and formulate their own predictions based on existing subject knowledge. Pupils will be able to follow written procedures selecting the most appropriate equipment to use for a given context and construct their own tables (choosing appropriate headings, units and number of repeats) to record their observations and / or measurements. Pupils will be able to identify the most suitable chart or graph to present their data; xy-scatter graph with line of best fit for continuous data and bar charts for discontinuous data. Pupils will be able to independently write conclusions using the A.P.E.E. structure (Answer, Pattern, Example and Explanation) and, with guidance and scaffolding as appropriate, write evaluations based upon results, identifying anomalies and suggest improvements to the procedure followed. For example, in the following topics pupils will...

9B1 Cells and microscopy... students will make observations, work safely and record accurate data as biological drawings. Pupils will also have opportunities to evaluate the validity of data and methods, as well as practicing substitution calculations and orders of magnitude. Pupils will follow written methods to preparing slides and use microscopes. They will then calculate the sizes of cells from biological drawings. While investigating diffusion / osmosis pupils will have the opportunity to identify variables and draw conclusions from their observations.

9C1 Atoms, elements, compounds and mixture...pupils carry out displacement reaction in terms of halogens and use observations to devise an order of reactivity linking it to their knowledge of the periodic table (trend and patterns).

9P1 Energy... students will make observations, collect data and work safety when investigating elastic potential energy and gravitational potential energy. Pupils will also evaluate using secondary sources, the effectiveness of different methods of insulating the home.

9B2 Infection and response... students will research the usefulness of sources, and data interpretation and evaluation in terms of the effectiveness of vaccinations and the use of antibiotics. Pupils will develop an understanding of the peer review process in terms of drug trials and testing.

9C2 Separating mixtures...pupils will develop key skills in the safe use of a range of equipment to separate chemical mixtures; filtration, evaporation, distillation and chromatography.

9P2 Domestic electricity...pupils will evaluate the effectiveness and impact of different methods of generating electricity; renewable and non-renewable energy. Pupils will use their knowledge of graphs to interpret trends and patterns in supply and demand of domestic electricity including daily and seasonal changes.

9B3 Bioenergetics...pupils will investigate the effect of exercise upon heart rate. They will draw conclusions based upon their results and explain any patterns using their knowledge of aerobic and anaerobic respiration

9C3 Chemical reactions...pupils will make observations using indicators to determine the pH of a range of substances, they will then evaluate to use of universal indicator verse a pH probe, follow written procedures to make soluble salts then apply this knowledge to writing their own methods. Pupils carry out displacement reaction in terms of metals and use observations to devise an order of reactivity linking it to their knowledge of the periodic table (trend and patterns). Pupils will investigate the factors affecting rusting by identifying variables, drawing conclusions and evaluate method of preventing rusting. Finally pupils will take measurements of temperature using appropriate apparatus and units. This will be used to calculate temperature change to determine whether a reaction is exothermic or endothermic. Pupils will then evaluate the accuracy of the measurements.

9P3 Change of state...pupils will follow written procedures to carry out a series of practical to calculate the density of regular objects, irregular objects and liquids. Pupils will then determine the energy needed to increase the temperature of water and also find the specific heat capacity of a metal block. Pupils will evaluate their results based upon known values and suggest improvements to the method used.

9B4 Plants...pupils will investigate the factors affecting the rate of photosynthesis. They will identify variables, make prediction and take accurate measurements using these to draw conclusion and explain using their knowledge of photosynthesis. Pupils will the evaluate the method used suggesting improvements.

Opening Minds & Opening Doors

The weeks highlighted in **yellow** are milestone assessments. Time has been built into the curriculum to account of preparation time for these assessments.

Week 10 (highlighted in **blue**) pupils will complete activities based around Tomorrow's Engineers Week. Time has been built into the curriculum to account for the activities.

Week 25 highlighted in **green** pupils will complete activities based around British Science Week. Time has been built into the curriculum to account for the activities.

In Year 8 pupils will be taught the following topics in this order. 8Sc1 reinforces the scientific skills introduced in Year 7.

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks					Summer 1 = 6 weeks						Summer 2= 7 weeks						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 8	8Sc1	8B1 Microbes & Disease This topic builds upon pupils’ knowledge of cells and respiration from Y7. Pupils will learn about the different types of microbes, how they can cause disease and how they can be useful to us. Pupils will then explore how our immune system protects us from microbes and how vaccinations and antibiotics can support our immunity when extra help is needed.				8P1 Light In this topic pupils will explore the properties of light as a transverse wave and how it can be reflected, refracted, and dispersed. Pupils will then apply their knowledge to understand practical application of light in the context of filters, mirrors, lenses, and cameras. This topic builds upon the previous topics of energy and sound.				8C1 Chemical Reactions Pupils will apply their knowledge of atoms, elements, compounds, and mixtures from Year 7 to learn more about chemical reactions such as displacement, precipitation, reversible, exothermic, and endothermic reactions. Pupils will investigate the factors which affect the rate of chemical reactions.					8B2 Health Pupils will learn about the fundamental principles of health and nutrition. In this topic pupils will look at health including balanced diets, diseases of affluence, diseases of deficiency and the use and misuse of drugs. Pupils will investigate the composition of every day foods using food tests.			8P2 Forces In Year 7 pupils learned about contact and non-contact forces in the context of space. In this unit, pupils will further develop their knowledge of forces to include friction, speed, power, levers and moments, density, pressure and magnetism.				8C2 Earth & Atmosphere Climate change and emission targets are significant issues which will fundamentally affect pupils within their lifetime. This topic, pupils will explore the structure and composition of our earth and atmosphere. Pupils will learn about the rock cycle, the composition of our atmosphere and how human activities impact the world around us.				8B3 Variation This topic builds upon knowledge of cell structure, sexual reproduction, and adaptations. In Year 6 pupils learned about evolution and inheritance in simple terms but were not expected to understand how genes and chromosomes work. In this topic pupil consolidate these key concepts to understand why living things produce offspring with similar but varied characteristics then apply this knowledge to natural selection, evolution, and extinction.				8P3 Electricity In Year 7 pupils learned about the different methods of generating electricity including renewable and non-renewable sources. In this topic, pupils gain a deeper understanding the introductory concepts of electricity encountered in Key Stage 2, investigating components, series and parallel circuits, current, potential difference and resistance.						Contingency weeks for enrichment days and science weeks within the academic year.			

Working scientifically is embedded in all topics taught across science. In year 8 pupils revisit and build upon the scientific method introduced during Year 7. In Year 8 pupils will build upon Working Scientifically from Year 7. They will use hypotheses and write predictions based upon their scientific knowledge and identify the independent, dependent variable and key control variables. Pupils will be able, with support, to construct their own tables including headings, appropriate units and number of repeats. Pupils will start to appreciate the importance of repeated readings and with support, carry out simple statistical analyses such as calculating mean averages to improve accuracy. Pupils will also be introduced to different types of error (systematic and random). Pupils will develop their used of complex data handling skills; identifying anomalies in their results. Pupils will use their results to write conclusions (scaffolding provided and withdrawn over time as required) and, with support, begin to evaluate results and methods. For example, in the following topics pupils will...

8B1 Microbes and disease...Investigate the condition required for decomposition and draw conclusion based upon observations

8P1 Light...investigate the law of reflection by taking measurements using appropriate equipment and evaluate the constructions and use of pinhole cameras

8C1 Chemical reactions...investigate the conservation of by making observations and taking measurements and drawing conclusions on reactivity of metal based upon observations of displacement reactions, also take measurements using appropriate equipment to determine if a chemical reaction is exothermic or endothermic.

8B2 Health...use chemical analysis to determine the nutrients in food samples (food tests) and then use this knowledge of food test to write a procedure; carry out simple calorimetry procedures to compare the energy content of different foods

8P2 Forces...investigate the relationship between weight of an object and the friction when pulled across a surface, use practical measurements to calculate power, investigate the relationship between force and extension of a spring (Hooke's law) and use graphs to demonstrate the relationship, investigate the relationship between force and distance when calculating moments, use measurements of mass and volume (using appropriate equipment) to calculate the density of a variety of objects, investigate the factors that affect the strength of an electromagnet by taking repeat measurements and drawing conclusions.

8C2 Earth and atmosphere...make observations to identify different rock types based upon the chemical and physical properties, use observations to determine whether combustion is complete or incomplete, use observations and measurements to conclude which is the most used plastic (polymer) in recyclable packaging

8B3 Variation...investigate continuous and discontinuous variation representing each in appropriate graphical form (xy scatter graphs and bar charts)

8P3 Electricity...investigate the effect of the number of cells and bulbs on the current flowing through a simple series circuit, investigate the effect of series and parallel circuits on the current and potential difference

Opening Minds & Opening Doors

Curriculum Overview 2025-2026 Subject: SCIENCE

The weeks highlighted in **yellow** are milestone assessments. Time has been built into the curriculum to account of preparation time for these assessments.

Week 10 (highlighted in **blue**) pupils will complete activities based around Tomorrow's Engineers Week. Time has been built into the curriculum to account for the activities.

Week 25 highlighted in **green**) pupils will complete activities based around British Science Week. Time has been built into the curriculum to account for the activities.

In Year 7 pupils are taught the following topics in sequence.

	Autumn 1 = 8 weeks								Autumn 2 = 7 weeks							Spring 1 = 6 weeks						Spring 2 = 5 weeks					Summer 1 = 6 weeks						Summer 2 = 7 weeks						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Year 7	7Sc1 Introduction to Science Introducing pupils to the fundamentals of scientific investigations including scientific method, risk assessments and laboratory routines.			7C1 Atoms, elements compounds and mixtures Pupils will learn what atoms are and how they can be arranged as elements, compounds, and mixtures. Pupils understanding of compounds and mixtures is developed through practical investigations that allow them to identify and / or separate these substances.					7P1 Energy Pupils will learn about the different stores of energy and how energy can be transferred from one place to another. Pupils will apply this knowledge to understand how we generate electricity, and the problems associated with the various methods.				7B1 Ecology Pupils will learn about how organisms are classified and the physical and behavioural adaptations of animals and plants that allow them to survive in some of the harshest habitats on earth. Pupils will explore the interactions between organisms and their environment and investigate how organisms are tracked and monitored within a particular habitat.			7P2 Sound Pupils will apply their knowledge of the particle model to explain how sound travels in solids, liquids, and gases. Pupils will explore the practical applications of sound including ultrasound, echo location and sonar.				7C2 Acids and Alkalis In this topic pupils will encounter chemical reactions for the first time. They will learn about acids, alkalis, the pH scale, neutralisation reactions and their applications. Pupils will also learn how to represent chemical reactions as word equations.			7B2 Cells and Systems Pupils will learn about the structure and function of different types of cells including animal cells, plant cells and specialised cells. Pupils will then explore the organisational structure of living things (cells, tissues, organs, organ systems and ultimately organisms).			7P3 Forces and Space Pupils will be introduced to the concept of contact and non-contact forces in the context of space science. Pupils will understand how knowledge of forces allows scientists to unravel the mysteries of our solar system and beyond. The topic will build upon key stage 2 knowledge of Earth, Sun, Moon, and the seasons.				7B3 Reproduction Pupils will apply their knowledge of cells and systems to learn about the male and female reproductive systems including the menstrual cycle, fertilisation, pregnancy, and birth. Pupils will use their knowledge to draw comparisons with plant reproduction.				Contingency weeks for enrichment days and science weeks within the academic year.					

Working scientifically is embedded in all topics taught across science. In Year 7 pupils will be introduced to the different aspects of a scientific investigation (identifying patterns, using secondary sources, carrying out an investigation, observing over time, identifying, classifying and grouping) and are introduced to the key concepts of accuracy and precision. Pupils will be given hypotheses and develop the ability to predict outcomes (write predictions) based upon their existing scientific knowledge. They be able to identify, with support, key variables; independent, dependent and main control variables, and follow a simple written procedures, making simple observations and taking measurements using apparatus provided. Pupils will record data in pre-prepared tables and present data as simple charts (scaffolded approach using pre-drawn scales and modelling via Visualiser as appropriate). Pupils will also be introduced to writing scaffolded conclusions (A.P.E. Answer, Pattern, Examples) based upon observations and measurements. For example, in the following topics pupils will...

7Sc1 Introduction to science...be introduced to the scientific method with a focus on identifying variables, making accurate measurements and observations and drawing conclusions

7C1 Atoms, elements, compounds and mixtures...make observation and interpret results to identify the composition of substance (flame tests and chromatography) and follow procedures to separate mixtures (filtration, evaporation and distillation).

7P1 Energy...investigate the relative thermal conductivity of different materials, and the effect of increasing the number of blades on the output of a wind turbine

7B1 Ecology...investigate the effect of surface area on the rate of cooling (huddling penguins), and the use of quadrat to estimate the distribution of organisms in a particular habitat

7P2 Sound...investigate the speed of sound in solids, liquid and gases, and determine which material is the best at reducing the transmission of sound waves (soundproofing)

7C2 Acids and alkalis...use indicator to determine the pH of common household substances, evaluate the use of natural indicators and apply knowledge of neutralisation to evaluate antacids

7B2 Cells and systems...use microscopes effectively to observe different cell types and record observations via biological drawings using standard conventions; pupils will also investigate the relative strength of bone shapes and the effect of exercise on heartrate

7P3 Forces and space...investigate the relationship between mass and weight, make measurements to evaluate a model of the expanding Universe

7B3 Reproduction...investigate aerial seed dispersal methods employed by some trees and other plants

Opening Minds & Opening Doors