

Science

Curriculum In Science, the curriculum is designed to provide specific knowledge regarding all key areas of Biology, Chemistry and Physics in line with the “10 Big Ideas” proposed by the Association for Science Education. Students will be able to use practical, analytical and mathematical skills to apply their knowledge to a range of new contexts, allowing them to evaluate information and make informed decisions about the world around them.

Year 7	C1: Matter	P1: Forces & Motion	B1: Cells & Systems		P2: Light & Space		C2: Reactions	B2: Inheritance		P3: Electricity & Magnetism	
What will students know by the end of the topic...	How to carry our practical work safely. The characteristics of solids, liquids and gases. How to separate mixtures	Different types of forces. Interpret velocity-time and acceleration-time graphs. Describe interaction of forces on motion.	Differences between cells. The function of respiratory and digestive systems		The properties and behaviour of light. Features of our solar system.		Differences between elements and compounds. Characteristics of different chemical reactions.	How features are inherited from parents. The differences between sexual and asexual reproduction		How to construct simple circuits and use the terms: potential difference, current and resistance. The properties and uses of both magnets and electromagnets.	
Year 8	B1: Photosynthesis & Respiration B5: Ecology	P1: Energy P3: Waves	C1: Periodic Table C2: Metal Reactions	P2: Particles P5: Energy Resources	B2: Adaptation & Evolution B4: Inheritance & Variation	C3: Earth's Resources C4: Environmental Chemistry	B3: Health & Disease	P4: Magnetism	C5: Maths in Chemistry		
What will students know by the end of the topic...	The processes of photosynthesis and respiration. The relationships between organisms in ecosystems.	The different energy stores and transfers. Characteristics and properties of waves.	The arrangement of elements in the Periodic Table. Metal reactivity and reactions.	How particle arrangement affects pressure and density. Pros and cons of different energy resources.	How organisms are adapted to survival and how this is related to evolution. How variation is inherited.	How different resources of the Earth are formed and used. The impact that this use has in terms of pollution and resource depletion.	The causes and transmission of disease. How disease can be treated through vaccinations and medicines.	The properties of magnets. Investigate factors affecting electromagnet strength.	How to balance symbol equations. Graph skills and maths skills. Apply these to chemical calculations.		
Year 9	B1: Cell Biology	C1: Atomic Structure & the Periodic Table	P1: Energy	P3: Particles	C2: Bonding, Structure & the properties of matter	B2: Organisation	P5a: Forces & Motion		C5: Energy Changes		
What will students know by the end of the topic...	Cell specialisation related to function. Use of microscopes. Cell growth by mitosis. Importance of stem cells. Transport into and out of cells.	Structure of the atom and properties of sub-atomic particles. Arrangement of elements in the Periodic table. Properties of Groups 1, 7 and 0.	Energy stores and transfers in systems. How to calculate energy changes. Conservation of energy and efficiency.	Changes of state, density, pressure and the particle model. Internal energy and energy transfers	How to describe and recognise ionic, covalent and metallic bonds. How bonding relates to states of matter & properties of substances.	Structure and function of digestive and respiratory systems. Non-communicable health issues. Plant tissues and transport.	Be able to calculate velocity and acceleration and interpret motion graphs. Apply Newton's Laws of motion. Describe the relationship between forces and braking.		Recognise endothermic and exothermic reactions. Calculate energy changes in a reaction.		
Year 10 Trilogy: Teacher 1	P2: Electricity		B4: Bioenergetics	B3: Infection & Response		P6: Waves		B5: Homeostasis & Response		B7: Ecology	
What will students know by the end of the topic...	Calculations involving potential difference, current, resistance, charge & energy transfer. Characteristics of different resistors. Properties of series and parallel circuits. Mains electricity: transmission and safety. How to evaluate national and global energy resources.		Processes of photosynthesis, aerobic & anaerobic respiration. Factors affecting the rate of these reactions. Effect of exercise.	Causes and transmission of named communicable diseases. Immunology. Medical treatments and drug development.		Describe properties of longitudinal and transverse waves. Describe characteristics of different electromagnetic waves and their applications.		Ways in which the body maintains optimum conditions. The structure and function of the nervous and endocrine systems.		Cycling of nutrients and flow of energy through ecosystems. Interactions between species in complex communities. Importance of biodiversity and how human activity can affect this.	
Year 10 Trilogy: Teacher 2	C4: Chemical Changes		P4: Atoms & Radiation	C9: Chemistry of the Atmosphere		C3: Quantitative Chemistry		P7: Magnetism & Electromagnetism		C10: Using Resources	

What will students know by the end of the topic...	How to use metal reactivity to predict reactions and explain methods of metal extraction by reduction & electrolysis. Describe reactions of acids with metals, alkalis & bases. Relate pH to acid strength. The process of electrolysis.	Structure of an atom. Radioactive decay and nuclear radiation. How to write nuclear equations.	The composition and evolution of the Earth's atmosphere. How human activities affect greenhouse gases, global climate change and atmospheric pollution.	How to calculate changes in a reaction using balanced symbol equations and formulae masses. Apply the terms moles and concentrations. How to describe uncertainty.	Properties of permanent and induced magnets. Describe the motor effect.	How resources can be used sustainably. How water is made potable and how waste water is treated. Alternative methods of metal extraction. Life cycle assessment and recycling.			
Year 11 Trilogy: Teacher 1	B6: Inheritance, Variation & Evolution		C7: Organic Chemistry	C8: Chemical Analysis		Revision			
What will students know by the end of the topic...	How characteristics are inherited. Importance of mutations and meiosis in creating variation which enables evolution to through natural selection. Intervention of genetic inheritance through selective breeding, cloning and genetic engineering.	Characteristics and uses of carbon compounds. Role of fractional distillation and cracking.		The definition of formulations. How to separate mixtures by chromatography. How to test for gases.					
Year 11 Trilogy: Teacher 2	C6: Rate & Extent of Chemical Change	P5b- Forces and Interactions		P8 – Space (separate science only)		Revision			
What will students know by the end of the topic...	Factors affecting rate of reactions.	Difference between vector and scalar. Types of forces. Calculating resultant forces. Calculations relating to work done, weight and elasticity.		The components of our solar system. Orbital motion & satellites. Life cycle of a star. Red shift and the Big Bang theory.					
Year 12 Biology	Biological Molecules, Nucleic Acids	Cell Structure, Transport Across Membranes, Cell Recognition & the Immune System		Exchange, Mass Transport		DNA, genes & protein synthesis, Genetic Diversity, Biodiversity			
Year 13 Biology	Photosynthesis, Respiration, Energy & ecosystems	Response to Stimuli, Nervous Coordination & muscles, Homeostasis		Inherited Change, Populations & evolution, Populations in ecosystems		Gene expression, Recombinant DNA technology			
Year 12 Chemistry	Physical Chemistry 1: atomic structure, Amount of substance, Bonding, Energetics, Kinetics, Equilibria, Oxidation, reduction & redox reactions		Inorganic Chemistry 1: Periodicity, Group 2 – alkaline earth metals, Group 7 - halogens		Organic Chemistry 1; Introduction to organic chemistry, alkanes, halogenoalkanes, alkenes, alcohols, organic analysis				
Year 13 Chemistry	Physical Chemistry 2: Thermodynamics, Kinetics, Equilibrium constant, Electrode potentials & electrochemical cells, Acids, bases & buffers		Inorganic Chemistry 2: Periodicity, Transition metals, Reactions of inorganic compounds in aqueous solutions		Organic Chemistry 2: Nomenclature & isomerism, Compounds containing the carbonyl group, Aromatic chemistry, Amines, Polymerisation, Amino acids, proteins & DNA, Organic synthesis & analysis, Structure determination, Chromatography				
Year 12 Physics	Working as a Physicist	Mechanics		Materials		Electric Circuits	Waves & the Particle Nature of Light		
Year 13 Physics	Working as a Physicist	Further Mechanics	Electric & Magnetic Fields	Nuclear & Particle Physics	Thermodynamics	Nuclear Radiation	Gravitational Fields	Space	Oscillations
Year 12/13 Applied Science	Unit 1: Principles & Applications of Science		Unit 2: Practical Scientific Procedures & Techniques		Unit 3: Science Investigative Skills		Unit 12: Diseases & Infection		

Key Stage Four Specification Links	Key Stage Five Specification Links
Combined Science Trilogy: https://www.aqa.org.uk/subjects/science/gcse/combined-science-trilogy-8464/specification-at-a-glance	Biology: https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402/specification-at-a-glance
Separate Science Biology: https://www.aqa.org.uk/subjects/science/gcse/biology-8461/specification-at-a-glance	Chemistry: https://www.aqa.org.uk/subjects/science/as-and-a-level/chemistry-7404-7405/specification-at-a-glance
Separate Science Chemistry: https://www.aqa.org.uk/subjects/science/gcse/chemistry-8462/specification-at-a-glance	Physics: https://qualifications.pearson.com/en/qualifications/edexcel-a-levels/physics-2015.html
Separate Science Physics: https://www.aqa.org.uk/subjects/science/gcse/physics-8463/specification-at-a-glance	BTEC Applied Science – Extended Certificate https://qualifications.pearson.com/en/qualifications/btec-nationals/applied-science-2016.html

<p>What will students see in their books or folders?</p> <p>Theory notes Annotated diagrams Model answers Worked examples Extended answers Self, peer & teacher assessed work Quizzing</p>	<p>This subject supports students' reading and writing through...</p> <p>Emphasis on the correct use of subject specific vocabulary The development of extended writing Reading articles about familiar and unfamiliar scientific topics Summarising material that has been read</p>	<p>This subject supports students' numeracy through...</p> <p>Using mathematical skills to process data e.g. calculating means and rates of reaction Plotting & interpreting graphs including determining slope and intercept Using & rearranging equations Using angular measurement Calculating area and surface area</p>	<p>This subject promotes the following revision strategies as the most effective means of retaining content...</p> <p>Flash cards Mind maps Look, say, cover, write, check Practising past exam questions</p>	<p>Opportunities for exploring this subject further are available through ...</p> <p>STEM activities Science club Recommended websites Science in the News</p>
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