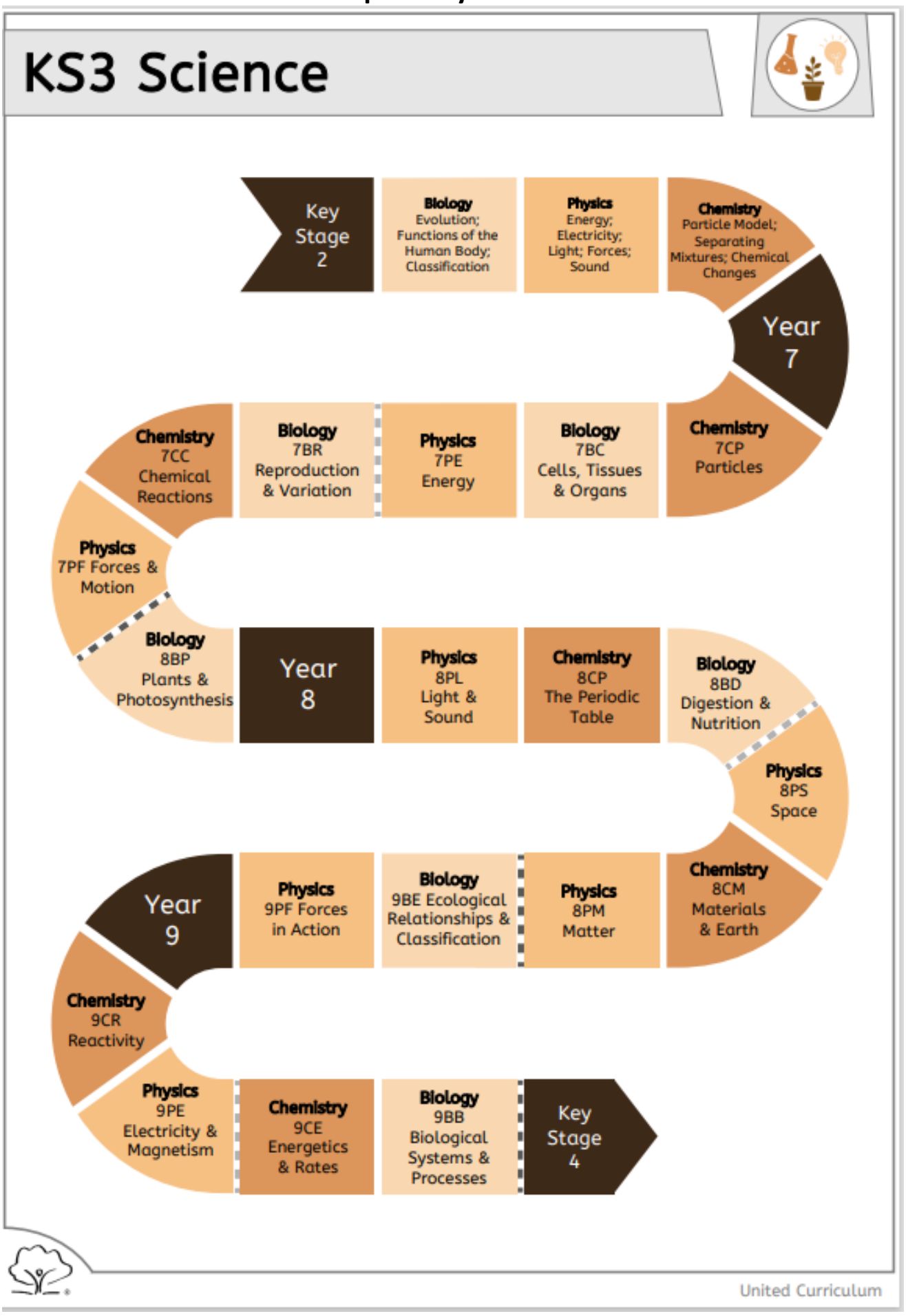
Science

Year 7 follow this curriculum pathway



Year 8 and 9 follow this curriculum pathway

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SCIENCE
Key Stage 3

Year 7		
Autumn	Spring	Summer
Particles. **7CP 1** describe the arrangement of particles in a solid, liquid and gas, and link this to their properties **7CP 2** explain changes of state in terms of the particle model **7CP 3** classify substances as pure and impure, and describe techniques to separate mixtures **(7CP 4)** Explain the differences between reversible and non-reversible reactions. **Prior Knowledge:** Use knowledge of state to decide how mixtures may be separated. Demonstrate changes of state are reversible changes.	**Reproduction and variation** **7BR 1** (SA wording) Describe the structure and function of the male and female reproductive system **7BR 2** describe the processes of menstruation and fertilisation, and identify the stages of gestation and birth **7BR 3** describe the function of each part of the flower, and explain how pollination occurs **7BR 4** evaluate different seed dispersal techniques in plants **7BR 5** identify variation between individuals of a species and state the differences between species, describing the difference between continuous and discontinuous variation **Prior Knowledge:** Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	**Forces and motion.** **7PF 1** use diagrams with correctly labelled force arrows to display a range of forces in different situations **7PF 2** interpret force diagrams to determine the motion of an object **7PF 3** calculate pressure, weight and average speed using appropriate equations **Prior Knowledge:** Explain that unsupported objects fall towards Earth because of the force of gravity. Identify the effects of air resistance, water resistance and friction.
Cells, tissues and organs. **7BC 1 (Explain how to)** use a microscope to produce an image of a cell in focus. **7BC 2** (**identify parts of)** plant and animal cells; state (**describe)** the function of the organelles; and compare plant and animal cells **7BC 3** describe the relationship between cells, tissues and organs; and describe the function of the main organ systems **Prior Knowledge:** Describe how living things are classified (micro-organisms, plants and animals). Linking to characteristics.	**Chemical reactions. (working in the lab)** **7.1.CC** identify substances as acid, alkali or neutral based on observations with indicators and the pH scale **7CC 2** describe neutralisation in terms of acids and alkalis reacting burn **Prior Knowledge:** Explain that some changes result in the formation of new materials and this is usually not reversible.	**Plants and photosynthesis** **8BP 1** describe how roots take up minerals, nutrients and water from the soil **8BP 2** describe photosynthesis in a word equation representing products and reactants **8BP 3** describe how leaves are adapted to carry out photosynthesis **8BP 4** describe the role of plants in maintaining the levels of gases in the atmosphere **8BP 5** describe the importance of pollination on food security
Energy **7PE 1** describe examples of energy transfers **7PE 2** describe how thermal energy transfers from one		

place to another. **7PE 3** apply **(Describe)** the law of conservation of energy to situations involving energy transfers **7PE 4 D**istinguish between power and energy **7PE 5** compare values of energy and power using appropriate SI values **7PE 6** compare different fuels and energy resources **Prior Knowledge:** Explain that unsupported objects fall towards Earth because of the force of gravity. Identify the effects of air resistance, water resistance and friction		

Year 8		
Autumn	Spring	Summer
Ecological relationships. **8BE 1** describe feeding relationships and food webs, and explain how a changing environment may affect them **8BE 2** explain how variation allow organisms to compete, and the way this drives natural selection **8BE 3** describe how a species may become extinct **8BE 4** describe the importance of maintaining biodiversity and how gene banks can be used for preservation **8BE 5** Apply sampling techniques to describe the environment.	**Electricity and electromagnetism** **8PE 1** define current, and describe its behaviour in series and parallel circuits **8PE 2** correctly use apparatus to measure current and potential difference **8PE 3** identify conductors and insulators and calculate resistance values using appropriate units **8PE 4** explain how insulators are charged by friction, and describe the forces between charged objects **8PE 5** draw and interpret simple magnetic field diagrams **8PE 6** describe how electromagnets and direct current motors work	**Plants and photosynthesis** **9BP 1** describe how roots take up minerals, nutrients and water from the soil **9BP 2** describe photosynthesis in a word equation representing products and reactants **9BP 3** describe how leaves are adapted to carry out photosynthesis **9BP 4** describe the role of plants in maintaining the levels of gases in the atmosphere **9BP 5** describe the importance of pollination on food security
Light and space. **8PL 1** describe how light interacts with different materials **8PL 2** describe the effects of absorption of light in terms	**Materials and the Earth** **8CM 1** describe the structure and composition of the earth and link this to the rock cycle **8CM 2** explain how carbon is recycled in the Earth's	**Matter** **9PM 1** describe the factors that affect pressure in fluids **9PM 2** describe the motion of particles in different states of matter and link this to

of energy **8PL 3** use ray diagrams to show how images are formed – such as mirrors, pinhole cameras and the human eye **8PL 4** describe the properties that affect the sizes of gravitational forces between different objects in the Solar system **8PL 5** calculate the weight of an object on different planets **8PL 6** explain why we experience seasons **8PL 7** compare the relative sizes of different astronomical structures within the universe using astronomical distances	atmosphere and link the impact of human activity to climate change **8CM 3** Recognize the need for recycling as the Earth is a source of limited resources.	different behaviours **9PM 3** compare and explain differences in density between solids, liquids and gases **9PM 4** Describe how energy can be transferred by conduction, convection and radiation and evaluate ways in which the rates of energy transfer can be varied
The periodic table **8CP 1** identify, with reasons, differences between atoms, elements and compounds **8CP 2** represent chemical reactions as word equations and apply this to the idea of conservation of mass **8CP 3** explain how an elements position in the periodic table links to its properties and reactivity (groups 1 and 7)		
Digestion and disease. **8BD 1** describe and explain the components that make up a balanced diet, describing the consequences of an imbalanced diet **8BD 2** evaluate how different lifestyles have different energy needs **8BD 3** describe the symbiotic relationship between bacteria and the human digestive system **8BD 4** describe how and explain why foods are broken down in the digestive system, in terms of enzymes **8BD 5** Identify pathogen and describe how they can be transmitted. **8BD 6** Explain how our body helps fight disease.		

Year 9		
Autumn	Spring	Summer
Forces in action. **9PF 1** define and calculate a moment, and relate this to force multipliers **9PF 2** measure extension or compression and relate this to the force applied to a spring and to Hooke's law **9PF 3** describe energy transfers and conservation of energy for the deformation of objects **9PF 4** describe balanced forces in relation to mechanical systems	**Sound** **9PS 1** compare light, mechanical and sound waves **9PS 2** describe the process of reflection, absorption and superposition (add or cancel waves) **9PS 3** compare human and animal auditory ranges using appropriate units **9PS 4** describe uses of sound and ultrasound, including industrial and medical uses.	GCSE units We will aim to cover one GCSE unit before the end of the year.
Reactivity **9CR 1** use patterns of reactivity to make predictions for chemical reactions **9CR 2** link the properties and uses of a metal to its position in the reactivity series **9CR 3** Describe reactions with acids.	**Biological systems.** **9BB 1** explain the functions of the skeleton, and describe the function of antagonistic muscle pairings **9BB 2** explain how the use of recreational drugs and smoking can affect biological systems, such as during gas exchange and gestation **9BB 3** explain the respiratory system as a mechanism of breathing and gas exchange (to allow substances to diffuse) **9BB 4** compare aerobic to anaerobic respiration, and describe the situations in which they occur **9BB 5** describe how genetic material can be inherited, and the role of Watson, Crick, Wilkins and Franklin in the discovery of DNA structure **9BB 6**. Describe the components of blood and its journey around the body.	
Energetics and rates **9CE 1** describe combustion, thermal decomposition and oxidation, representing them as symbol equations **9CE 2** describe how a catalyst affects the rate of a reaction **9CE 3** describe the differences between an exothermic and endothermic reaction, and link these to energy changes		

GCSE Combined Science – YEAR 10

	Autumn	Spring	Summer
Bio	**Year 10 Biology B1 and B2** Prior Learning KS3 units: Cell, Tissues and Organs & Plants and Photosynthesis. B1 Explaining Cells: Cell types and structure. Cell division and stem cells. Transport in cells, diffusion, osmosis and active transport. B2 Organisation in organisms: Principles of organisation. Animal Tissues, Organs and Organ systems, including health issues and non-communicable diseases. Plant Tissues Organs and Systems	**Year 10 Biology B3** Prior Learning KS3 units: Digestion & Disease. B3 Infection and Response: Types of communicable diseases, with case studies. Human and medical defences and preventative measure for disease	**Year 10 Biology B4 and B7** Prior Learning KS3 units: Cells, Tissues and Organs, Plants and Photosynthesis, Biological systems, Ecological Relationships. B4 Bioenergetics: Photosynthesis, rate of photosynthesis and uses of glucose. Respiration and Metabolism. B7: Ecology: Adaptations, interdependence and competition. Organisation of an ecosystem. Biodiversity and the effect of human impact on ecosystems.
Chem	**Year 10 Chemistry C1 and C2** Prior Learning KS3 units: Particles, Chemical Reactions & Periodic Table. C1 Atomic Structure & Periodic Table: Models of the atom, it's structure, subatomic arrangement, masses and charges. The periodic table, its development and some key groups within it, (1, 7 and 0). C2 Bonding Structure & Properties of Matter: Chemical bonds, ionic, covalent and metallic. How bonding and structure are related to the properties of a substance. Structure and bonding of carbon.	**Year 10 Chemistry C3** Prior Learning KS3 units: Particles, Chemical Reactions and Reactivity C3 Quantitative Chemistry: Chemical measurements, conservation of mass and the quantitative interpretation of chemical equations.	**Year 10 Chemistry C4 and C5** Prior Learning KS3 units: Reactivity, Particles, Chemical Reactions and Energetics & Rates. C4 Chemical Changes: Reactivity of metals, Reactions of acids, Electrolysis. C5 Energy Changes in Chemical Reactions: Endothermic and exothermic reactions, calculating energy changes using bond energies.

Physics	**Year 10 Physics P1 and P3** Prior Learning KS3 units: Energy, Particles, Matter P1 Energy: Energy stores in a system, and the ways energy is stored before and after such changes including calculating some stores of energy. Conservation and dissipation of energy. National and global energy resources. P3 Particle Model of Matter: Changes of state and the particle model. Internal energy and energy transfers. Particle model and pressure.	**Year 10 Physics P2** Prior Learning KS3 units: Electricity & Electromagnetism. Particles. P2 Electricity: Current, Potential difference and resistance, including calculations. Series and parallel circuits. Domestic uses and safety. Electrical energy transfers including calculations.	**Year 10 Physics P4** Prior Learning KS3 units: Particles, Matter P4 Atomic Structure: Atoms and isotopes. Atoms and nuclear radiation, including types, half-life and decay equations, alongside irradiation and contamination.

GCSE Combined Science – YEAR 11

	Autumn	Spring	Summer
Bio	**Year 11 Biology B5** Prior Learning KS3: Reproduction and Variation. KS4 B1, B2 and B4	**Year 11 Biology B6** Prior Learning KS3: Reproduction and Variation: KS4: B1, B2 and B4 B6: Inheritance, Variation and Evolution: Reproduction, sexual, asexual and meiosis. Inheritance, characteristics and inherited	**Year 11 Biology Revision and GCSE Exams…** Revision of all units of Biology.
	B5 Homeostasis: Human nervous system. Hormonal coordination in humans, including reproduction and fertility. Blood glucose control and diabetes.	disorders. Variation and evolution. The development of understanding of genetics and evolution. Classification of living organisms.	

Chem	**Year 11 Chemistry C6 and C7** Prior Learning KS3: Energetics and Rates KS4: C1, C2, C3, C4 C6 The Rate and Extent of Chemical Change: Rate of reaction, including factors, experimental methods, collision theory and activation energy. Reversible and dynamic equilibrium, including factors affecting the position of equilibrium and Le Chatelier's Principle. C7 Organic (carbon) Chemistry. Carbon compounds as fuels and feedstock including crude oil, separation, properties of fractions alkanes and alkenes, and cracking.	**Year 11 Chemistry C8, C9 and C10** Prior Learning KS3: Materials & The Earth. KS4: C1, C3, C4 C8 Chemical Analysis: Purity, formulations and chromatography, Identification of common gases C9 Chemistry of the Atmosphere: Composition and evolution of Earth's atmosphere. Carbon dioxide and methane as greenhouse gases. Common atmospheric pollutants and their sources. C10 Using Resources: Using the Earth's resources and obtaining potable water. Life cycle assessment and recycling.	**Year 11 Chemistry Revision and GCSE Exams…** Revision of all units of chemistry
Physics	**Year 11 Physics P5** Prior Learning KS3: Forces & Motion, Energy, Forces in Action. KS4: P1 P5 Forces: Forces and their interactions. Work done and energy transfer. Forces and elasticity. Forces and motion, including calculations, graphs and Newton's laws of motion. Momentum.	**Year 11 Physics P6 and P7** Prior Learning KS3: Light and Space, Electricity & Magnetism. KS4: P1, P2 P6 Waves: Waves in air, fluids and solids. Electromagnetic waves their properties, uses and dangers. P7 Magnetism and Electromagnetism: Permanent an induced magnetism, magnetic forces and fields. The motor effect and how to manipulate it.	**Year 11 Revision and GCSE Exams…** Revision of all units of Physics

A LEVEL BIOLOGY

	Autumn	Spring	Summer
KS5 Biology **Year 1**	**Topic 1b – Biological molecules** The Micro and Macro structures of sugars and polysaccharides. The structures of lipids, and proteins. The uses of proteins in the form of enzymes. **Topic 2a – Cell structure and division** Eukaryotic and prokaryotic cells and the similarities and differences between them. During the NEA assessment process students will learn skills of: - testing food substances for the presence of various biological molecules. - Looking at the factors that affect enzyme activity. -looking at the mitotic index of cells and the speed in which they divide. **Topic 1b – More Biological molecules** DNA structure and its replication. ATP, water and inorganic ion usage in living things. **Topic 2b – membranes and immunity** Membranes are essential to life. It builds on the content taught at KS4 but links to all other units in the A level course. Data interpretation of immunity.	**Topic 4a/b - DNA and protein synthesis and Diversity and selection** How are proteins made from the genetic code found within cells. How is genetic variation achieved in living organisms? How does the structure of DNA and environmental factors create variation amongst living organisms. Links to topic 2a with cell division and mitosis. Future links to A level content. **Topic 3a – exchange and transport systems** Surface area to volume ratio in exchange surfaces in living organisms; both plant and animal. How are the gas exchange systems structured in animals and plants and what are the similarities and differences. What are the effects of lung diseases amongst humans. Dissection of exchange transport system (heart/lungs). Data analysis of lung disease and the life style factors associated. **Topic 4c - Diversity and classification** The classification of organisms and how scientists investigate selection. How is life connected and how do genetic trees show the relationship between species. What other methods can be used to determine the closeness of species for example courtship behaviours in animals and how similar biological molecules are between different species. **Topic 3b - More exchange and transport systems**	**Maths skills for A level biology** The maths skills associated with A level Biology. Numerical computation, Data handling, Algebra, Graph analysis, geometry and trigonometry **Start of A level (year 13) content.** **Topic 5a - Photosynthesis and respiration** Photosynthesis and respiration. How do photosynthesising organisms generate their own sugars, and how do living organisms carry out aerobic and anaerobic respiration. **Topic 6a – Survival and response.** What structures are present in organisms that allow them to detect and interact with the world around them? How are neurones structured and how do they communicate with each other. How do plants respond to different stimuli?

		Circulatory system and the transport of substances in plants. What are the roles of the arteries, veins and capillaries in animals and the xylem and phloem in plants?	
KS5 Biology **Year 2**	**Continuation of A level Content taught at the end of year 12.** **Topic 5a - Photosynthesis and respiration** **Topic 6a – Survival and response.** **Topic 5b – energy transfer and cycles** Farming practices and uses of fertilisers, Nitrogen and phosphorus cycles within ecosystem. How are nutrients recycled in and between ecosystems. **Topic 6b Nervous coordination** Neurones, synapses and muscle structure. How do neurones communicate with each other and how do they cause muscle contraction. **Topic 5b – energy transfer and cycles** Farming practices and uses of fertilisers, Nitrogen and phosphorus cycles within ecosystem. How are nutrients recycled in and between ecosystems. **Topic 6b Nervous coordination and homeostasis** Neurones, synapses and muscle structure. The regulation of an internal environment. How do neurones communicate	**Topic 8a – Mutations and gene expression** Genetic mutations and causes of cancer. Regulation of transcription and translation. How is cancer brought about as a result of the failed regulation of transcription and translation. Looking at the result of epigenetic expression. Links to year 12 content in DNA structure and replication. **Topic 7a/b Genetics and, populations and ecosystems** Genetic crosses and statistical analysis of potential characteristics of offspring. The result of variation in reproducing offspring. Lots of maths links to year 12. Links to KS4 genetics. **Topic 8b – genome projects** Amplifying technologies and gene therapy. What are DNA fragments and how are they amplified. Gene therapy and genetic fingerprinting. **Topic 7c – more populations and ecosystems** Variations amongst organisms in ecosystems. What are the factors that affect ecosystems and how are populations of organisms investigated?	

Chemistry	Autumn	Spring	Summer
A Level Chemistry Year 1	**<u>Atomic structure</u>** **Prior learning: C1 Atomic structure GCSE** Atomic Structure, fundamental particles, electron structure. Amount of Substance, moles, ideal gas equation, empirical formula, balanced equations and stoichiometry. **<u>Bonding</u>** **Prior learning: C2 Bonding GCSE** Ionic, covalent, dative and metallic bonding alongside the properties of the substances because of their bonding. Shapes of molecules, polarity, and forces between them. **<u>Energetics</u>** **Prior learning: C5 Chemical energetics GCSE** Enthalpy, enthalpy changes, calorimetry, Hess's Law, calculations and interpretation.	**<u>Kinetics</u>** **Prior learning: C6 Rates of reaction GCSE** Collision Theory, Maxwell Boltzmann distribution. Factors affecting rates of reaction, catalysts, temperature, pressure and concentration. **<u>Chemical equilibria, Le Chatelier's principle and K_c</u>** **Prior learning: C6 Rates of reaction GCSE** Chemical equilibria and Le Chatelier's Principle. Equilibrium constant Kc for homogenous systems. **<u>Periodicity</u>** **Prior learning: C1 Atomic structure GCSE** Classification, s,p,d,f blocks. Properties of group 2, 3 and 7 elements and the transition metals.	**<u>Introduction to organic chemistry</u>** **Prior learning: C7 Organic chemistry GCSE** Nomenclature, reaction mechanisms, isomerism, homologous series including; alkanes, haloalkanes, alkenes, polymers, alcohols, organic analysis
	with each other and how do they cause muscle contraction. How are the internal conditions of an organism monitored and regulated?		

	Autumn	Spring	Summer
A'Level Chemistry Year 2	**<u>Further organic chemistry</u>** **Prior learning: Year 1** Aromatic Chemistry and bonding. Amines, condensation compared to addition polymerisation. Amino acids and proteins, Enzymes, DNA and anticancer medications. Organic synthesis. Reaction mechanisms. .	**<u>Thermodynamics</u>** **Prior learning: Year 1** Born-Haber cycles and their calculations and enthalpy definitions. Gibbs free energy and entropy changes. **<u>Rate equations</u>** **Prior learning: Year 1** Mathematical treatment of rate equations, and orders of reaction. **<u>Equilibrium constant K_p for homogeneous systems</u>** **Prior learning: Year 1** Further study of equilibria including calculation of equilibrium constant, electrode potentials and electrochemical cells. **<u>Acids and bases</u>** **Prior learning: Year 1** Bronsted & Lowry acid base equilibria. Definition and determination of pH. Weak acids and bases. Titration curves and indicators. Buffer action. **<u>Transition metals</u>**	Targeted revision of the whole course and detailed organic analysis topic using all the information on organic chemistry to provide possible synthesis and analysis routes. NMR, IR Spectroscopy.

		Prior learning: Year 1 Transition, (d) block elements and their reactions, including catalysis and formation of complex ions **<u>Reactions of ions in aqueous solution</u>** **Prior learning: Year 1** Reactions of transition metals and their complex ions.	

Physics

	Autumn	Spring	Summer
A level Physics Year 1	**<u>Measurements and their errors</u>** *Prior knowledge: Students learnt in GCSE about working scientifically, they learned how to calculate means, uncertainties and recognise random and systematic errors.* • A working knowledge of the specified fundamental (base) units of measurement. • Awareness of the nature of measurement errors and of their numerical treatment. • The ability to carry through reasonable estimations is a skill that is required throughout the course and beyond. • Uncertainties and errors are looked at in depth across a range of experiments. • **<u>Particles and radiation</u>** *Prior knowledge: In GCSE unit C1 and P4 students learnt about atomic structure, the properties of electrons, protons and neutrons and how these are arranged in the Bohr model of the atom. In P6 they students learnt about electromagnetic waves.* • Fundamental properties of matter. • Electromagnetic radiation and quantum phenomena. • Importance of international collaboration in the development of new experiments and theories in this area of fundamental research. •	**<u>Mechanics</u>** *Prior knowledge: From the GCSE forces unit students were introduced to scalars and vectors and simple methods of resolving forces. Equations of motion were used in simple situations.* • Vectors and their treatment are introduced. • Knowledge and understanding of forces, energy and momentum. Required practical 4: Determination of g by free fall **<u>Electricity</u>** *Prior: From GCSE unit P2 students made simple circuits, and used equations to calculate resistance, potential difference, power and current in simple problems.* • Opportunities for the development of practical skills at an early stage in the course. • Study of the many electrical applications that are important to society. • New ideas like resistivity, EMF, internal resistance and potential dividers are examined. Required practical 5: Resistivity Required practical 6: EMF of a cell	**<u>Materials</u>** *Prior knowledge: In GCSE forces Hookes law was introduced and the equation used to determine the extension of a spring.* • Study of materials considered in terms of their bulk properties and tensile strength. • Youngs modulus is introduced and studied in depth. Required practical 7: Youngs modulus

	<u>Waves</u> *Prior knowledge: GCSE studies of wave from unit P6 extended* • Knowledge of the characteristics, properties. • Applications of travelling waves and stationary waves. Topics treated include refraction, diffraction, superposition and interference. Required practical 1: wave on a string Required practical 2: Photoelectric effect		

A level Physics Year 2	**<u>Further mechanics and thermal physics</u>** Prior Knowledge: The earlier study of mechanics in year 1 is further advanced. • Consideration of circular motion • Simple harmonic motion (the harmonic oscillator). • Thermal properties of materials, the properties and nature of ideal gases, and the molecular kinetic theory to be studied in depth. Required practical 8: Gas laws Fields and their consequences Prior knowledge: In GCSE unit 1 gravitational potential energy is taught. • The ideas of gravitation, electrostatics and magnetic field theory are developed within the topic to emphasise this unification. • Practical applications considered include: planetary and satellite orbits, capacitance and capacitors, their charge and discharge through resistors, and electromagnetic induction. These topics have considerable impact on modern society. Required practical 9: Flux linkage Required practical 10: Force on a wire carrying a current	**<u>Nuclear physics</u>** *Prior knowledge: This section builds on the work of Particles and radiation.* • Link the properties of the nucleus to the production of nuclear power through the characteristics of the nucleus. • The properties of unstable nuclei, and the link between energy and mass. Required practical 11: Inverse square law with radiation **<u>Turning points in physics</u>** *Prior knowledge: This unit draws scientific knowledge from across the 2 years and places it in a historical context.* This unit is intended to enable key concepts and developments in physics to be studied in greater depth than in the core content. • Students will be able to appreciate, from historical and conceptual viewpoints, the significance of major paradigm shifts for the subject in the perspectives of experimentation and understanding. Many present-day technological industries are the consequence of these key developments and the topics in the option illustrate how unforeseen technologies can develop from new discoveries.	

Cambridge Technical Year 1	**Unit 1 – Science Fundamentals** LO1 – Understand the chemical structures of elements and compounds – looks at atomic structure and sub-atomic particles, the organisation of the periodic table and types of bonding LO2 – Understand reactions in chemical and biological systems – studies how chemicals interact and react with each other, including oxidation/reduction, addition and substitution; factors that affect rate of reaction. L03 – Understand cell organisation and structures - Builds on knowledge from KS4 to look at types of cells, cell organelles and tissue types **Unit 6 – Control of hazards in the laboratory** LO1 – Understand the types of hazard that can be encountered in a laboratory – studies the types of hazard found in laboratories as well as the principles of disease causing organisms LO2 – Be able to use health and safety procedures to minimise the risk presented by hazards in a laboratory – students will look into safe working practices in the lab when working with biohazardous substances	**Unit 1 – Science Fundamentals** LO4 – Understand the principles of carbon chemistry – learners study the different compounds, molecules and isomers that carbon can make. LO5 – Understand the importance of inorganic chemistry in living systems -the study of elements and compounds that do not contain carbon-hydrogen bonds such as metal ions LO6 – Understand the structures, properties and uses of materials – a study of the mechanical, physico-chemical and electrical properties of different materials **Unit 6 – Control of hazards in the laboratory** LO3 – Be able to design a safe functioning laboratory to manage the risk presented by hazards – studies a variety of different laboratories and the legislation the governs H&S within them	**Unit 18 – Microbiology** LO1 - Be able to classify and identify microorganisms - Learners should be able to identify microorganisms from samples of photographs applying identification techniques appropriately. LO2 - Understand the use of microorganisms in agriculture - Breeding programmes are used to improve animal and plant species. Learners should discuss the ethics of the use of microbiology in crop production.

Cambridge Technical Year 2	**Unit 18 – Microbiology** LO3: Be able to use microbiology in food production - Learners will describe the use of microbes in food production and produce a microbiological food product under optimum conditions and describe the preservation processes to keep food safe from microbes and evaluate their effectiveness LO4: Understand the action of antimicrobials on microorganisms - Bacterial infections can cause many symptoms but in most cases can be treated. Learners should be able to describe a range of bacterial infections and explain in detail how an infection can be treated, emphasising the benefits of the treatment. **Unit 2 – Laboratory Techniques** LO1 - Understand the importance of health and safety and quality systems to industry – Studies the importance of using good laboratory practise throughout all practicals including assessing risks and calibrating equipment. LO2 - Be able to separate, identify and quantify the amount of substances present in a mixture – students investigate techniques used to separate and identify substances present in a mixture i.e. chromatography and electrophoresis LO3 - Be able to determine the concentration of an acid or base using titration – students learn the correct titration procedure, as well as comparing that to alternative techniques	**Unit 2 – Laboratory Techniques** LO5 - Be able to identify cations and anions in samples – Learners will study the techniques required to identify anions and cations in samples LO6 - Be able to use aseptic technique – Students will follow standard aseptic techniques to perform a range of laboratory tasks. Revision and Exam **Unit 21 – Product testing techniques** LO1 - Understand the influence of regulatory bodies on development of consumer products - Evidence must include reference to the regulations or legislation relevant to the testing technique and the product LO2 - Understand how product testing determines the development of consumer products - The learner might consider, for example, whether anything affected the validity and reliability of results during testing	**Unit 21 – Product testing techniques** LO3 - Be able to use quantitative titration techniques on consumer products - Carry out a titrimetric investigation of a consumer product to determine the concentration of different substances that it contains and record the findings. LO4 - Be able to use extraction and separation techniques on consumer products - Learners should use solvent extraction to separate and determine the mass of the active ingredient of a consumer product and record the findings.

	LO4 - Be able to examine and record features of biological samples – students learn techniques used to examine and record features of biological samples i.e. microscopy, x-ray and ultrasound		