Striving For Excellence Together
GCSE Combined Science / Biology Curriculum Map

The GCSE course starts after Easter in year 9. Each unit contains an exam style end of topic assessment made up of GCSE past paper questions.

	Topics	Key Concepts	Key Vocabulary	Our Pillars	Knowledge tracking
Topic 1 (Year 10)	Cell biology	**Cell structure** Eukaryote and prokaryote Animal and plant cells Cell specialisation Cell differentiation Microscopy **Cell division** Chromosomes Mitosis and the cell cycle Stem cells **Transport in cells** Diffusion Osmosis Active transport	Eukaryote Prokaryote Plasmids Chromosome Magnification Resolution Concentration Meristem Therapeutic cloning Gene Stem cell Mitosis	Literacy and oracy	Life processes in Y7 Cells, diffusion, osmosis and active transport in year 9. Organisation, infection and response, photosynthesis and homeostasis later in the GCSE course Biological molecules and cells in Y12
Topic 2 (Year 10)	Organisation	**Principles of organisation** **Animal tissues, organs and systems** Human digestive system Heart and blood vessels Blood Coronary heart disease Health issues Effect of lifestyle Cancer **Plant tissues, organs and systems** Plant tissues Plant organ systems	Enzyme Active site Catalyse Substrate Alveoli Plasma Platelet Atrium Ventricle Cardiac Stent Transplant Malignant Benign Carcinogen Stomata Humidity Transpiration Translocation Xylem Phloem	Literacy and oracy	Life processes in year 7 Food and digestion and plants for food in year 8 Blood, heart and lungs, active transport in plants in year 9. Infection and response later in year 10 and Ecology in year 11. Exchange and support systems in year 12.

Striving For Excellence Together
GCSE Combined Science / Biology Curriculum Map

Topic 3 (Year 9 from Easter)	Infection and response	**Communicable diseases** Communicable diseases Viral diseases Bacterial diseases Fungal diseases Protist disease Human defence systems Vaccination Antibiotics and painkillers Discovery and development of drugs	Bacterium Fungicide Fungus Pathogen Protist Virus Vector Vaccination Placebo Toxicity Antigen Antibody Antibiotic	Literacy and oracy Life beyond school	Fit and healthy in year 8 Communicable and non-communicable diseases in year 9 Lung disease, immunity and response and diseases of the nervous system at A-level
Topic 4 (Year 10)	Bioenergetics	**Photosynthesis** Photosynthetic reaction Rate of photosynthesis Use of glucose from photosynthesis **Respiration** Aerobic and anaerobic respiration Response to exercise Metabolism	Concentration Chlorophyll Endothermic Chloroplast Photosynthesis Intensity Aerobic Anaerobic Mitochondria Glycogen Exothermic Fermentation Metabolism	Literacy and oracy	Plants for food in year 8 Photosynthesis and Respiration in year 9 Ecology in year 11 Photosynthesis and Respiration at A-level

Striving For Excellence Together
GCSE Combined Science / Biology Curriculum Map

Topic 5 (Year 11)	Homeostasis and response	**Homeostasis** **Nervous system** Structure and function **Hormonal coordination in humans** Human endocrine system Control of blood sugar concentration Hormones in human reproduction Contraception Use of hormones to treat fertility Negative feedback	Stimulus Effectors Receptors Synapse Reflex Endocrine Thyroxine Adrenaline Adrenal Glycogen Glycogen Insulin Follicle Fertility Infertility Oestrogen Progesterone Testes Ovaries Contraceptive	Literacy and oracy	Life processes in year 7 (organ systems and reproduction) Stimuli and response, nervous coordination and homeostasis at A-level
Topic 6 (Year 11)	Inheritance, evolution and variation	**Reproduction** Sexual and asexual reproduction Meiosis DNA and the genome Genetic inheritance Inherited disorders Sex determination **Variation and evolution** Variation Evolution Selective breeding Genetic engineering **The development of understanding of genetics and evolution** Evidence of evolution Fossils Extinction Resistant bacteria **Classification of living organisms**	Allele Chromosome Clone Dominant Recessive Fertilisation Gamete Genome Genotype Phenotype Heterozygous Homozygous Variation Mutation inbreeding Extinction Fossil Antibiotic resistance Evolution Natural selection	Literacy and oracy	Variation and Inheritance in Y7 Genetics and sex determination in Y9 Biological molecules, genetics, populations, evolution and ecosystems and the control of gene expression at A-level

Striving For Excellence Together
GCSE Combined Science / Biology Curriculum Map

Topic 7 (Year 11)	Ecology	**Adaptation, interdependence and competition** Communities Abiotic and biotic factors Adaptations **Organisation of an ecosystem** Levels of organisation How materials are cycled **Biodiversity and the effect of human interaction on ecosystems** Biodiversity Waste management Land use Deforestation Global warming Maintaining biodiversity	Ecosystem Community Abiotic Biotic Adaptation Extremophile Biodiversity Deforestation	Literacy and Oracy	Plants for food and Ecology and Environment in year 8. Environmental Chemistry in year 9. Ecosystems in year 12.

Striving For Excellence Together
GCSE Combined Science / Chemistry Curriculum Map

The GCSE course starts after Easter in year 9. Each unit contains an exam style end of topic assessment made up of GCSE past paper questions.

	Topics	Key Concepts	Key Vocabulary	Our Pillars	Knowledge tracking
Topic 1 (Year 9)	Atomic structure and the periodic table	Atoms, elements and compounds. Mixtures. The development of the model of the atom. Relative electrical charges of subatomic particles. Size and mass of atoms. Relative atomic mass. Electronic structure. The periodic table. Development of the periodic table. Metals and non-metals. Group 0. Group 1. Group 7.	Atom Element Compound Formulae Filtration Proton Neutron Electron Abundance Reactivity Properties Halogen	Literacy and oracy	Particles and Physical and chemical changes in Y7 Chemical reactions in Y8 Bonding, structure and properties of matter later in Y10
Topic 2 (Year 10)	Bonding, structure and properties of matter	Chemical bonds Ionic bonding Ionic compounds Covalent bonding Metallic bonding The three states of matter State symbols Properties of ionic compounds Properties of small molecules Polymers Giant covalent structures Properties of metals and alloys Metals as conductors Diamond Graphite Graphene and fullerenes	Ion Delocalised electron Malleable Lattice Conductivity	Literacy and oracy	Particles and physical and chemical changes in Y7 Metals and reactivity in Y8 Year 10: Atomic structure and the periodic table

Striving For Excellence Together
GCSE Combined Science / Chemistry Curriculum Map

Topic 3 (Year 10)	Quantitative Chemistry	Conservation of mass and balanced symbol equations. Relative formula Mass. Amounts of substances in equations. Moles. Concentrations of solutions. Mass changes when a reactant or product is a gas Using moles to balance equations (HT only) Amounts of substances in equations (HT only) Limiting reactants (HT only)	Conservation Concentration Excess Limiting	Literacy and oracy	Chemical reactions in Y8 Conservation of mass in Y9
Topic 4 (Year 10)	Chemical changes	Metal oxides The reactivity series Extraction of metals and reduction Oxidation and reduction in terms of electrons (HT only) Reactions of acids with metals Neutralisation of acids and salt production Soluble salts The pH scale neutralisation Strong and weak acids (HT only) The process of electrolysis Electrolysis of molten ionic compounds Using electrolysis to extract metals Electrolysis of aqueous solutions Representation of reactions at electrodes as half equations (HT only)	Displacement Extraction Electrolysis Crystallisation Neutralisation Cathode Anode	Literacy and oracy	Physical and chemical changes in Y7 Chemical reactions and metals and reactivity in Y8
Topic 5 (Year 10)	Energy changes	Energy transfer during exothermic and endothermic reactions Reaction profiles The energy change of reactions (HT only)	Exothermic Endothermic Thermal decomposition Activation energy Combustion	Literacy and oracy	Physical and chemical changes (combustion) in Y7 Endothermic and exothermic reactions in Y9
Topic 6 (Year 10)	The rate and extent of chemical change	Calculating rates of reactions Factors which affect the rates of chemical reactions Collision theory and activation energy Catalysts Reversible reactions and dynamic equilibrium The effect of changing conditions on equilibrium (HT only)	Catalyst Collision theory Activation energy Equilibrium	Literacy and oracy	Particle kinetics, collision theory and rates of reaction in Y9

Striving For Excellence Together
GCSE Combined Science / Chemistry Curriculum Map

Topic 7 (Year 11)	Chemical analysis	Pure substances Formulations Chromatography Test for Hydrogen Test for Oxygen Test for Carbon dioxide Test for Chlorine	Chromatography Precipitate Formulation Solvent	Literacy and oracy	Physical and chemical changes (testing for gases) in Y7.
Topic 8 (Year 11)	Organic chemistry	Crude oil, hydrocarbons and alkanes Fractional distillation and petrochemicals Properties of hydrocarbons Cracking and alkenes	Alkane Alkene Cracking Hydrocarbon Viscosity Functional group Homologous series Nucleotide	Literacy and oracy	Carbon chemistry in Y9.
Topic 9 (Year 11)	Chemistry of the atmosphere	The composition and evolution of the Earth's atmosphere Carbon dioxide and methane as greenhouse gases Global climate change Carbon footprints Atmospheric pollutants and their sources	Greenhouse gas Wavelength Radiation Carbon footprint Atmospheric pollutants Acid rain Particulates	Literacy and oracy	Evolution of the atmosphere in rocks topic in Y7. Greenhouse gases and pollutants in Y9
Topic 10 (Year 11)	Using resources	Using the Earth's resources and sustainable development Potable water Waste water treatment Alternative methods of extracting metals (HT only) Life cycle assessment Ways of reducing the use of resources	Renewable resources Biodegrade Potable water Bioleaching Phytomining Effluent Sterilisation	Literacy and oracy	Carbon footprint, finite and renewable resources in Y9.

Striving For Excellence Together
GCSE Combined Science / Physics Curriculum Map

The GCSE course starts after Easter in year 9. Each unit contains an exam style end of topic assessment made up of GCSE past paper questions.

	Topics	Key Concepts	Key Vocabulary	Our Pillars	Knowledge tracking
Topic 1 (Year 9 from Easter)	Energy	**Energy changes in a system, and the ways energy is stored before and after such changes** Energy stores and systems. Changes in energy Energy changes in systems Power **Conservation and dissipation of energy** Energy transfers in a system Efficiency **National and global energy resources**	Efficiency Dissipated Electrostatic System Conductivity Absorb/ emit Renewable Reliability Geothermal Hydroelectric Biofuel	Literacy and oracy	Energy topic in Y7 Heat transfer topic in Y8 Finite and renewable resources in Y9 Chemistry Leading onto forces, waves and electromagnetism in Year 11
Topic 2 (Year 10)	Electricity	**Current, potential difference and resistance** Standard circuit diagram symbols Electrical charge and current Current, resistance and potential difference Resistors Series and parallel circuits **Domestic uses and safety** Direct and alternating potential difference Mains electricity **Energy transfers** Power Energy transfers in everyday appliances The National Grid	Ampere Coulomb Current Potential difference resistance Alternating Transformer	Literacy and oracy Life beyond school	Electricity and magnetism in Y8 Circuits, resistance and electrical power in Y9 Electromagnetism later in Y11
Topic 3 (Year 10)	Particle model of matter	**Changes of state and the particle model** Density of materials Changes of state **Internal energy and energy transfers** Internal energy Temperature changes in a system and specific heat capacity Changes of state and specific latent heat **Particle model and pressure** Particle motion in gases	Condensation Density Evaporation Fusion Specific latent heat sublimation Vaporisation	Literacy and oracy	Particles and physical and chemical changes in Y7. Atomic structure and Waves in Y11.

Striving For Excellence Together
GCSE Combined Science / Physics Curriculum Map

Topic 4 (Year 10)	Atomic structure	**Atoms and isotopes** The structure of an atom Mass number, atomic number and isotopes The development of the model of the atom (common content with chemistry) **Atoms and nuclear radiation** Radioactive decay and nuclear radiation Nuclear equations Half-lives and the random nature of radioactive decay Radioactive contamination	Alpha Activity Background radiation beta Chain reaction contamination Fission Fusion Gamma Geiger-Müller tube half-life Ionisation Irradiation Isotope Spontaneous	Literacy and oracy	Atomic structure and the periodic table from Y10 Chemistry
Topic 5 (Year 11)	Forces	**Forces and their interactions** Scalar and vector quantities Contact and non-contact forces Gravity Resultant forces **Work done and energy transfer** **Forces and elasticity** **Forces and motion** Distance and displacement Speed Velocity The distance–time relationship Acceleration Newton's 3 laws Stopping distance Reaction time Factors affecting braking distance **Momentum (HT only)** Momentum is a property of moving objects Conservation of momentum	Contact force Resultant Scalar Vector Moment Displacement Inertia Velocity Acceleration Terminal velocity	Literacy and oracy	Forces topic in Y7 Forces and motion topic in Y8 F=ma in Y9

Striving For Excellence Together
GCSE Combined Science / Physics Curriculum Map

Topic 6 (Year 11)	Waves	**Waves in air, fluids and solids** Transverse and longitudinal waves Properties of waves **Electromagnetic waves** Types and properties of EM waves Uses and applications of EM waves	Transverse Longitudinal Amplitude Wavelength Frequency Period Hertz Electromagnetic Infrared Ultraviolet X ray Gamma ray Refraction Reflection Sievert	Literacy and oracy	Waves and heat transfer in Y8 Waves in Y9
Topic 7 (Year 11)	Magnetism and electromagnetism	**Permanent and induced magnetism, magnetic forces and fields** Poles of a magnet Magnetic fields **The motor effect** Electromagnetism Fleming's left-hand rule (HT only) Electric motors (HT only)	Induced magnetism Attract and repel 'Magnetic field' Electromagnet Solenoid 'Magnetic flux density'	Literacy and oracy	Electricity and magnetism in Y8 Electricity topic in Y10