

# Triple Science: Green Pathway

## Key Stage 4: Year 10

Overall Curriculum Goals - developing the following Big Ideas:						
<ul style="list-style-type: none"> <li>• Cells carry out life processes</li> <li>• Bodies work as systems</li> <li>• Organisms interact in communities</li> <li>• Ecosystems cycle matter and energy</li> <li>• Structure determines properties</li> <li>• Reactions rearrange matter</li> <li>• Characteristics are inherited</li> <li>• Earth systems interact</li> <li>• Species show variation</li> </ul>						
WC 06/09 & 13/09		WC 20/09 & 27/09		WC 04/10 & 11/10 & 18/10	WC 01/11 & 08/11	WC 15/11 & 22/11
<b>Term 1</b> Enzymes and nutrition Enzyme action and activity Core practical – pH and enzymes (variables, conclusion)						
Review CC3 & 4 Ionic bonding CC5, 6 & 7 -Ions -Ionic bonding -Ionic compounds		Food Tests Core practical – food tests (method, results) Energy in Food		Suggested practical – burning food (method, variables, conclusion, evaluation) Assessment CB1b Close the Gap	Transporting substances Core practical – osmosis (%change, conclusion, variables) Assessment CB1c Close the Gap	Cells and Control CB2 Mitosis Percentile Growth Charts Nervous System
Review SP1 Forces and motion SP2 -Newton's first law -Weight and mass -Newton's second law		-Core practical – Investigating acceleration -- (method, calculations, conclusion) -Newton's third law -Stopping distances -Braking distance		-Metallic bonding -Bonding models Assessment CC5-7 Close the Gap	Calculations involving masses CC9 -Calculating concentration -Conservation of mass -Relative formula mass -Empirical formula	Suggested practical – calculating the empirical formula of magnesium oxide Assessment CC9 Close the Gap
Review SP1 Forces and motion SP2 -Newton's first law -Weight and mass -Newton's second law		-Core practical – Investigating acceleration -- (method, calculations, conclusion) -Newton's third law -Stopping distances -Braking distance		-Crash hazards Assessment SP2 Close the Gap	-Energy efficiency -Sankey diagrams -Insulation -Stored energies	-Non-renewable resources -Renewable resources Assessment SP3 Close the Gap
				Conservation of energy SP3 -Energy stores and transfers	Waves SP4 -Properties of waves	-Filtration and crystallisation -Distillation -Paper chromatography Core practical – investigating inks (method, conclusion) -Drinking water Assessment CC1 & 2 Close the Gap
<b>Key Vocabulary/Concepts/ideas</b>						
<b>Half Term 1</b> enzyme, biological catalyst, active site, denature, substrate, polymer, monomer, temperature, pH, substrate concentration, collision, enzyme - substrate complex, diffusion, osmosis, active transport, gradient Bonds, ions, cations, anions, electrons, electrostatic forces, ionic compounds, lattice structure, properties, melting point, boiling, anode, cathode, covalent, molecular., valency, polymer, monomer, intermolecular, allotropes, fullerenes, graphene, delocalised, metallic, malleable, conduct Scalars, vectors, speed, velocity, resultant force, balance, unbalanced, centripetal force, mass, weight, gravitational field strength, inertial mass, equilibrium, collisions, momentum, stopping distance, reaction times, crumple zone				<b>Half Term 2</b> meiosis, gametes, genome, gene, chromosome, DNA, complementary, bases, hydrogen bonds, Bonding, ionic, simple molecular, giant covalent, metallic, empirical formula, molecular formula, relative formula mass, conservation of mass, Avogadro constant, Particle model, solid, liquid, gas, physical, chemical, melting, insoluble, filtration, crystallisation, solution, solute, solvent, filtrate, residue, risk assessment, hazard, chromatography, stationary phase, mobile phase, chromatogram Distillation, mixture, evaporates, condensed, fractional distillation, precipitates, aquifers, sedimentation, chlorination, Energy, chemical, thermal, kinetic, elastic potential, gravitational potential, atomic, nuclear, conservation of energy, Sankey diagram, joules, conservation, dissipated, lubrication, insulation, conduction, thermal, convection, fluid, radiation, infrared, absorbed, emitted, thermal conductivity, kinetic, nuclear fuels, renewable Waves, transverse, sound, longitudinal, seismic, electromagnetic, frequency, hertz, period, wavelength, amplitude, velocity, refraction , interface,		
WC 3/01 & 10/01		WC 17/01 & 24/01		WC 31/01 & 07/02 & 14/02		WC 28/02 & 07/03
<b>Term 2</b> Genetics CB3 -Meiosis -Asexual and sexual reproduction -DNA Suggested practical -DNA Extraction (Method, safety)						
Acids and Alkalis CC8 -Indicators -Acids -Bases and salts -Alkalis and balancing equations		-Mendel -Alleles -Inheritance -Genetic diagram		-Inheritance of Blood Groups -Variation -Human Genome Project Assessment CB3 Close the Gap		Natural Selections and Genetic Modification CB4 -Natural Selection and Evidence for -- -Evolution -Fossil Evidence -Selective Breeding
Light and the EM Spectrum SP5 -Ray diagrams -Core practical – Investigating refraction (method, measuring angles, conclusion) -Colour		Electromagnetic spectrum -Using the long wavelength -Radiation and temperature -Core practical – Investigating radiation		-Core practical – preparing copper sulfate (method, risk assessment, conclusion) Assessment CC8 Close the Gap		-Transition metals -Reactivity series -Extraction by reduction -Electrolysis
				-Using the short wavelengths -EM radiation dangers Assessment SP5 Close the Gap	Radioactivity SP6 -Atomic models -Inside atoms -Background radiation -Types of radiation	-Tissue Culture -Genes in agriculture and medicine Assessment CB4 Close the Gap
						Health, disease and the development of medicines CB5 -Health and disease -Non-communicable disease -Measures of obesity
						Assessment CC10, 11 & 12 Close the Gap Review CC8
						-Radioactive decay -Half-life -Using radioactivity -Dangers of radioactivity
						-Radioactivity in medicine -Nuclear energy -Nuclear fusion/fission Assessment SP6 Close the Gap

Key Vocabulary/Concepts/ideas						
Term 3	<p><b>Half Term 3</b> alleles, homozygous, heterozygous, dominant, recessive, genotype, phenotype, Punnett squares, inheritance, mutation, variation, continuous, discontinuous, transcription, translation</p> <p>Aqueous solution, acidic, alkaline, neutral, pH scale, polyatomic ions, dissociate, neutralise,, state symbols, crystallization, ions, neutralisation,,titration, burette, pipette, end-point, reactivity series, effervescence, ionic equation, carbonates, precipitation, precipitate, insoluble</p> <p>Electromagnetic wave, frequencies, visible light, ultraviolet, transverse, vacuum, infrared, refraction, electromagnetic spectrum, visible spectrum, microwaves, radio waves, x-rays, gamma rays, fluorescence, gamma, radiotherapy, mutations, radiation</p>			<p><b>Half Term 4</b> evolution, fossils, binomial system, species, classification, <i>Ardipithecus ramidus</i>, <i>Australopithecus afarensis</i>, natural selection, competition, kingdom, genus, domain, eukaryote, archaea, bacteria, artificial selection, selective breeding, genetic engineering, recombinant DNA, restriction enzyme, plasmid, ligase, vector, sticky ends</p> <p>Electrolysis, electrolyte, electrodes, cations, anions, cathode, anode, oxidation, reduction, half equation, displacement, redox, native state, extraction, bioleaching, leachate, phytoextraction, corrosion, recycling</p> <p>Particle theory, elements, atoms, subatomic particles, electrons, alpha particles, nucleus, nucleons, protons, neutrons, relative mass, mass number, isotopes, electronic configuration, emission spectrum, ionization, radioactivity, ionizing radiation, penetrating radiation</p> <p>Radioactive decay, nuclear equation, becquerels, half-life, mutation, contaminated, irradiated</p>		
	WC 25/04 & 02/05	WC 09/05 & 16/05	WC 23/05	WC 06/06 & 13/06	WC 20/06 & 27/06	04/07 & 11/07
	<p>-Cardiovascular disease</p> <p>-STIs</p> <p>-Physical and chemical barriers</p> <p>-The immune system</p>	<p>MOCK EXAMINATIONS</p> <p>-Immunisation</p>	<p>-Antibiotics and drug development</p> <p>-Investigating Antibiotics and Antiseptics</p>	<p>-Core practical – aseptic technique and inhibition zones</p> <p>Assessment CB5</p> <p>Close the Gap</p>	<p>-Review Paper 1</p> <p>-CB 1,2 &amp; 3</p>	<p>Review Paper 1</p> <p>CB 1,4 &amp; 5</p>
	<p>Separate Chemistry 1</p> <p>-Calculating concentration</p> <p>-Core Practical – Titrations</p> <p>-Fertilisers</p>	<p>MOCK EXAMINATIONS</p> <p>-Industrial calculations</p> <p>Assessment Separate Chemistry 1</p> <p>Close the Gap</p>	<p>Review Chemistry Paper 1</p>	<p>Review Chemistry Paper 1</p>	<p>Review Chemistry Paper 1</p>	<p>Review Chemistry Paper 1</p>
<p>Astronomy SP7</p> <p>-The Solar System</p> <p>-Gravity and orbits</p> <p>-Life cycles of stars</p> <p>-Red-shift</p>	<p>MOCK EXAMINATIONS</p> <p>Origin of the universe</p> <p>Assessment SP7</p> <p>Close the Gap</p>	<p>Review Paper 1 (SP 1, 2, 3, 4, 5, 6, 7)</p>	<p>Energy and Forces doing work</p> <p>SP8/9</p> <p>-Work and power</p> <p>-Objects affecting each other</p>	<p>-Vector diagrams</p> <p>-Rotational forces</p> <p>Assessment SP8/9</p> <p>Close the Gap</p>	<p>Review Paper 1 (SP 1, 2, 3, 4, 5, 6, 7, 8/9)</p>	
Key Vocabulary/Concepts/ideas						
<p><b>Half Term 5</b> health, pathogen, communicable, non-communicable, deficiency, cholera, tuberculosis, chalara dieback, malaria, HIV, AIDs, bacteria, fungi, virus, protist, pathogen, cardiovascular disease, heart attack, body mass index, waist:hip ratio, artery, stroke, antihypertensives, anticoagulants, stent, lymphocyte, antibody, antigen, vaccination, barriers</p> <p>catalyst, haber process, alloy, redox, rusting, electroplating, titration, concentration, moles, yield, actual yield, theoretical yield, impurities, atom economy, raw material, industrial process, equilibrium, fertilisers, composition, molar volume.</p> <p>Asteroid, elliptical, geocentric, heliocentric, satellite, telescope, gravitational field strength, velocity, vector quantity, electromagnetic radiation, fusion reaction, main sequence star, nebula, neutron star, protostar, red giant, supernova, white dwarf, doppler effect, pitch, universe</p>			<p><b>Half Term 6</b> inhibition zone, bacteria, trial, double-blind, placebo, aseptic, antibiotic</p> <p>Energy, work done, power, watts, contact forces, non-contact forces, vectors, action-reaction forces, force field, gravitational field, magnetism, static electricity, magnet, electric field, resultant force,</p>			
CEIAG						
<p>Cultural capital sheets to introduce each unit.</p> <p>Careers displays around the whole department</p> <p>British Science week, BioBakes, BioArtAttack</p> <p>Why Study? Talks</p> <p>Medical Mavericks (PE &amp; Health&amp;Social)</p>						
Personal Development						
<p>Throughout the year the rule of law is promoted during experimental work, students are required to follow lab rules in order to keep themselves and each other safe. This also allows us to focus upon tolerance and respect whilst collaborating with others. Individual liberty and choice is acknowledged when discussing vaccination, debates are conducted respectfully. The rule of law is addressed through the age of consent. Communicable diseases such as AIDs and chlamydia are taught in a scientific yet respectful way, again the rule of law is acknowledged with regards to testing of STIs, contraception and the responsibility to inform partners of infection. Healthy diets and the impact of certain lifestyles on the NHS and society is discussed, the role of individuals within society is debated. Further debates are carried out with regards to organ donation, drug development and testing, again all opinions are respected. In physics the rule of law is addressed during the teaching of speed limits and stopping distances. When discussing theories and development of ideas students are encouraged to respect the views of others. The uses of radioactive sources and their impact on individuals and the environment is also addressed in half term 4. Students are taught the importance of making informed choices when discussing types of energy and their effects.</p>						

**Key Stage 4: Year 11**

Overall Curriculum Goals - developing the following Big Ideas:					
• Cells carry out life processes		• Bodies work as systems			
• Organisms interact in communities		• Ecosystems cycle matter and energy		• Characteristics are inherited	
• Species show variation					
WC 06/09 & 13/09	WC 20/09 & 27/09	WC 04/10 & 11/10 & 18/10	WC 01/11 & 08/11	WC 15/11 & 22/11	WC 29/11 & 06/12 & 13/12
<p>Exchange and transport in animals CB8</p> <p>-Efficient transport and exchange</p> <p>-Diffusion and the alveoli</p> <p>-The circulatory system</p>	<p>-The heart</p> <p>-Suggested practical – heart dissection (risk assessment)</p> <p>-Cellular respiration</p>	<p>-Core practical – respiration rates (method, variables, conclusion)</p> <p>Assessment CB8</p> <p>Close the Gap</p>	<p>Animal coordination, control and homeostasis CB7</p> <p>-Hormones</p> <p>-Hormones and the menstrual cycle</p> <p>-Control of blood glucose</p>	<p>-Type 2 diabetes</p> <p>Suggested practical – testing for glucose (method, conclusion)</p> <p>Assessment CB7</p> <p>Close the Gap</p>	<p>Plant structures and their functions CB6</p> <p>-Photosynthesis and leaf adaptations</p> <p>-Factors that affect photosynthesis</p> <p>Review Paper 1</p>
<p>Groups in the periodic table CC13,14 &amp; 15</p> <p>-Group 1</p> <p>-Group 7</p> <p>-Halogen reactivity</p> <p>-Group 0</p>	<p>-Rates of reaction</p> <p>-Factors affecting reaction rates</p> <p>-Core practical – investigating reaction rates (method, calculations, conclusion)</p>	<p>-Catalysts and activation energy</p> <p>-Exothermic and endothermic reactions</p> <p>-Dynamic equilibria</p> <p>Assessment CC13, 14 &amp; 15</p> <p>Close the Gap</p>	<p>Fuels CC16</p> <p>-Hydrocarbons in crude oil and natural gas</p> <p>-Homologous series</p>	<p>-Alcohols</p> <p>-Carboxylic acids</p>	<p>-Addition polymerisation</p> <p>-Condensation polymerisation</p> <p>-Fractional distillation of crude oil</p>
<p>Electricity and circuits SP10/11</p> <p>-Symbols and circuits</p> <p>-Current</p> <p>-Potential difference</p> <p>-Current, charge and energy</p>	<p>-Resistance</p> <p>-Core practical – investigating resistance (method, calculations, conclusion)</p> <p>-Transferring energy</p> <p>-Power</p>	<p>-Transferring energy by electricity</p> <p>-Electrical safety</p> <p>-Charges and static electricity</p> <p>-Dangers and uses of static electricity</p> <p>-Electric fields</p> <p>Assessment SP10/11</p> <p>Close the Gap</p>	<p>Magnetism SP12/13</p> <p>-Magnets and magnetic fields</p> <p>-Electromagnetism</p> <p>-Magnetic forces</p>	<p>-Electromagnetic induction</p> <p>-The national grid</p>	<p>-Transformers and energy</p> <p>Assessment SP12/13</p> <p>Close the Gap</p> <p>Review Paper 4</p>
<b>Key Vocabulary/Concepts/ideas</b>					
<p><b>Half Term 1</b> gas exchange, respiration, aerobic, anaerobic, alveoli, plasma, platelets, lymphocytes, erythrocytes, hemoglobin, antibodies, atria, ventricle, artery, capillary, vein, cardiac output, stroke volume</p> <p>Periodic table, alkali metals, reactivity, halogens, diatomic, salts, halide, displacement, redox, oxidation, reduction, noble gases, inert, rate of reaction, activation energy, exothermic, endothermic, catalysts, protein, active site, denature, neutralization, displacement</p> <p>Atom, nucleus, protons, neutrons, electrons, shells, current, series, parallel, circuit, amperes, ammeter, potential difference, voltage, volts, charge, coulombs, resistance, ohms, diodes, energy transfer, power watts, national grid, mains electricity, direct voltage, alternating voltage,</p>			<p><b>Half Term 2</b> hormones, endocrine, pituitary, thyroid, adrenal, pacers, testes, ovaries, metabolic rate, thyroxine, adrenaline, menstrual cycle, FSH, oestrogen, LH, progesterone, ovulation, menstruation, diabetes, insulin, pancreas, glucose, glycogen, glucagon, homeostasis</p> <p>Crude oil, natural gas, hydrocarbons, fractional distillation, evaporate, condense, viscosity, ignite, alkanes, homologous, molecular formulae, structural formulae, combustion, complete, incomplete, alcohols, carboxylic acids, addition polymerisation, condensation polymerisation, fermentation</p> <p>Safety, circuit breakers, magnet, magnetic fields, plotting compasses, electromagnet</p>		
WC 03/01 & 10/01	WC 17/01 & 24/01	WC 31/01 & 07/02 & 14/02	WC 28/02 & 07/03	WC 14/03 & 21/03	-WC 28/03 & 04/04
<p>-Core practical – light intensity and photosynthesis (method, variables, conclusion, calculating rate)</p> <p>-Absorbing water and mineral ions</p>	<p>-Transpiration and translocation</p> <p>-Plant hormones</p> <p>Assessment CB6</p> <p>Close the Gap</p>	<p>-Ecosystems and material cycles CB9</p> <p>-Ecosystems</p> <p>-Abiotic factors and communities</p> <p>-Core practical – Quadrats and transects (method, calculations)</p> <p>-Biotic factors and communities</p>	<p>-Biotic factors and communities</p> <p>-Parasitism and mutualism</p> <p>-Biodiversity and humans</p>	<p>-Preserving biodiversity</p> <p>-Water cycle</p> <p>-Carbon cycle</p>	<p>-Decomposition</p> <p>Assessment CB9</p> <p>Close the Gap</p>
<p>-Complete and incomplete combustion</p> <p>-Combustible fuels and pollution</p>	<p>-Breaking down hydrocarbons</p> <p>-Fuel cells</p> <p>-Core Practical: Investigate the temperature rise produced in a known mass of water by the combustion of alcohols</p>	<p>Evolution of the atmosphere</p> <p>Climate change</p> <p>Assessment CC16&amp;17</p> <p>Close the Gap</p>	<p>Separate Chemistry 2</p> <p>-Tests for cations</p> <p>-Tests for anions</p> <p>-Flame photometry</p> <p>-Core Practical: Identifying Ions</p>	<p>Materials and their uses</p> <p>Assessment Separate Chemistry 2</p> <p>Close the Gap</p>	<p>Review Chemistry Paper 1</p>
<p>Particle model &amp; matter CP14/15</p> <p>-States of matter</p> <p>-Density</p> <p>Core practical – investigating densities (method, calculations)</p>	<p>-Energy changes and changes of state</p> <p>-Core practical – investigating water (method, calculations)</p>	<p>-Gas temperature and pressure</p> <p>-Gas pressure and volume</p> <p>-Bending and stretching</p>	<p>-Core practical – investigating springs (method, calculations, conclusion)</p> <p>-Pressure in fluids</p> <p>Assessment SP14/15</p> <p>Close the Gap</p>	<p>Review SP 1, 2, 3, 4, 5</p>	<p>Review SP 6, 7, 8/9, 10/11</p> <p>Review SP 12/13, 14/15</p>
<b>Key Vocabulary/Concepts/ideas</b>					
<p><b>Half Term 3</b> photosynthesis, glucose, biomass, producer, chloroplast, endothermic, stomata, guard cell, limiting factors, inverse square law, root hair cell, diffusion, osmosis, active transport, xylem, phloem, transpiration, translocation</p> <p>Crude oil, natural gas, hydrocarbons, fractional distillation, evaporate, condense, viscosity, ignite, alkanes, homologous, molecular formulae, structural formulae, combustion, complete, incomplete, alcohols, carboxylic acids, addition polymerisation, condensation polymerisation, fermentation</p> <p>sublimation, states of matter, kinetic theory, compressed, density, thermal energy, specific heat capacity, specific latent heat, pascals, kelvin, elastic, inelastic, extension, linear relationship, directly proportional, spring constant, work done</p>			<p><b>Half Term 4</b> ecosystem, community, population, habitat, interdependent, abundance, quadrat, belt transect, biotic, abiotic, competition, predation, mutualism, parasitism, eutrophication, indigenous, non-indigenous, biodiversity, conservation, water cycle, desalination, potable, carbon cycle, nitrogen cycle, crop rotation</p> <p>cation, insoluble, precipitate, ammonia, irritant, toxic, nichrome, anion, blue litmus paper, line spectrum, photometry, instrumental analysis, nanoparticles, nanometres, polymers, ceramics, metals, composites, clay, glass, tensile</p> <p>sublimation, states of matter, kinetic theory, compressed, density, thermal energy, specific heat capacity, specific latent heat, pascals, kelvin, elastic, inelastic, extension, linear relationship, directly proportional, spring constant, work done</p>		

	WC 25/04	WC 02/05	WC 09/05	WC 16/05	WC 23/05	WC 06/06	WC 13/06	WC 20/06	WC 27/06	WC 04/07	WC 11/07	WC 18/07
<b>Term 3</b>	<b>Revision GCSE Exams</b>											
	<b>Key Vocabulary/Concepts/ideas</b>											
	Half Term 5						Half Term 6					
<b>CEIAG</b>												
Cultural capital sheets, careers displays, visits, speakers												
<b>Personal Development</b>												
<p>Throughout the year the rule of law is promoted during experimental work, students are required to follow lab rules in order to keep themselves and each other safe. This also allows us to focus upon tolerance and respect whilst collaborating with others.</p> <p>Individual liberty and the freedom of choice is discussed during the teaching of contraception and assisted reproductive technology. Healthy diets and the impact of certain lifestyles on the NHS and society is discussed, the role of individuals within society is debated.</p> <p>In chemistry discussions are centered around climate change and the responsibility of individuals towards the planet. Reducing pollution and the development of renewable energy resources are debated.</p>												