

KS4 Curriculum Overview (Combined SCIENCE TRILOGY)

YEAR 9

TERM 1 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<p style="text-align: center;">Biology</p> <p>Cells and organization: B1 Cell structure and transport</p> <p>Chemistry Atoms, bonding, and moles: C1 Atomic structure</p> <p style="text-align: center;">Physics</p> <p>Energy and energy resources: P1 Conservation and dissipation of energy</p>	<p style="text-align: center;">Biology</p> <p>Use of a light microscope, calculation of magnification. Link adaptations of specialized cells, to their function. Explain why osmosis, diffusion and active transport are important in living organisms.</p> <p style="text-align: center;">Chemistry</p> <p>Practical skills, e.g. selecting appropriate separating techniques Analysis of chromatograms, to analyse food colourings. Balancing equations.</p> <p style="text-align: center;">Physics</p> <p>Recall and manipulation of equations. Analysis of efficiency of energy transfers.</p> <p>Math Link – changing the subject of the formula, size and scale, orders of magnitude, units, % change. Geography Link – Sustainability.</p>	<p style="text-align: center;">Career links</p> <p>Cell biologist, Forensic pharmacist. Petroleum industry. Roller coaster designer, civil engineer, mechanical engineer</p> <p style="text-align: center;">British Values</p> <p>Mutual Respect and Tolerance: Students learn about the continual evolution of scientific ideas which occurs through the acceptance that different people have different ideas about a concept, e.g., the history of the atom. Democracy: Students work together in groups which encourages them to share views and opinions and take instructions from others.</p>

TERM 2 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<p style="text-align: center;">Biology</p> <p>Cells and organization: B2 Cell division B3 Organisation and the digestive system</p> <p style="text-align: center;">Chemistry</p> <p>Atoms, bonding, and moles: C2 The periodic table C3 Structure and bonding</p> <p style="text-align: center;">Physics</p> <p>Energy and energy resources: P2 Energy transfer by heating P3 Energy resources</p>	<p style="text-align: center;">Biology</p> <p>Evaluate the potential benefits, risks, and social and ethical issues of the use of stem cells in medical research and treatment. Graph drawing and analysis.</p> <p style="text-align: center;">Chemistry</p> <p>Appreciation of the limits of using models. Explaining trends in the periodic table and using these to make predictions.</p> <p style="text-align: center;">Physics</p> <p>Analyse the effectiveness of different types of insulation in buildings.</p> <p>Geography link – Renewable forms of energy production. Consideration of the effects of growth of the human population on the Earth and its resources.</p> <p>Food Tech Link – The Chemistry of food (proteins, carbohydrates, and fats).</p> <p>Math Link – subject of the formula.</p> <p>Chemistry Link – Rate of reactions.</p>	<p style="text-align: center;">Career links</p> <p>Pharmaceutical Sciences Manager, Biomedical Technician, Building design, builder.</p> <p style="text-align: center;">British Values</p> <p>Democracy: Opportunities to debate issues, share opinions and listen to the views of others. For example, stem cell dilemmas, therapeutic cloning.</p> <p>Democracy: Students work together practically in groups which encourages them to share views and opinions and take instructions from others.</p> <p>Mutual Respect and Tolerance: Students learn about the continual evolution of scientific ideas which occurs through the acceptance that different people have different ideas about a concept, e.g., development of the periodic table.</p>

TERM 3 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<p style="text-align: center;">Biology</p> <p>Cells and organization: B3 Organisation and the digestive system (continued)</p> <p style="text-align: center;">Chemistry</p> <p>Atoms, bonding, and moles: C3 Structure and bonding (continued)</p> <p style="text-align: center;">Physics</p> <p>Energy and energy resources: P3 Energy resources (continued)</p> <p>Particles at work: P6 Molecules and matter</p>	<p style="text-align: center;">Biology</p> <p>Graph drawing and analysis. Finding a pulse.</p> <p style="text-align: center;">Chemistry</p> <p>Dot and cross diagrams to represent structures.</p> <p style="text-align: center;">Physics</p> <p>Analysis of supply and demand data for consumers of electricity. Evaluating energy resource start-up times, in terms of base load provision. Evaluating the use of different energy resources (e.g., fossil fuels vs nuclear).</p> <p>PE Link – Diet and nutrition. Food Tech Link – Diet and nutrition. Geography Link – Global warming & climate change, effect on the environment.</p>	<p style="text-align: center;">Career links</p> <p>Gastroenterologist, endoscopy technician, dietician. Crystallographer, atomic physicist, nanotechnologist, health worker, architect. Wind turbine technician, electrician, solar panel installer.</p> <p style="text-align: center;">British Values</p> <p>The rule of law: Illegal deforestation. Students learn about laws regarding emissions and use of energy resources.</p> <p>Mutual respect and tolerance: Opportunities to debate issues where students can share their opinions and listen to the views of others. e.g., siting of wind farms and NIMBY.</p>

TERM 4 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<p style="text-align: center;">Biology</p> <p>Cells and organization: B4 Organising animals and plants.</p> <p style="text-align: center;">Chemistry</p> <p>Atoms, bonding, and moles: C3 Structure and bonding (continued) Chemical reactions and energy changes: C5 Chemical changes</p> <p style="text-align: center;">Physics</p> <p>Particles at work: P6 Molecules and matter (continued)</p>	<p style="text-align: center;">Biology</p> <p>Estimation. Making a stomata peel. Measuring transpiration rates using a potometer.</p> <p style="text-align: center;">Chemistry</p> <p>Predicting displacement reactions. Practical skills: making salts from metals.</p> <p style="text-align: center;">Physics</p> <p>Understanding of resolution and range when selecting measuring instruments. Practical skills: taking measurements to determine specific latent heats. Making predictions involving pressure and temperature of a gas.</p> <p>PE Link – fitness, exercise, and respiration. Math Link – calculating means and volume, subject of the formula.</p>	<p style="text-align: center;">Career links</p> <p>Medical profession, exercise physiologist, nurse hairdresser. Chrome plater, telecommunications industry. Paint chemist, aerospace engineer, shipping industry, gas engineer.</p> <p style="text-align: center;">British Values</p> <p>Individual Liberty: Opportunities to debate issues where students can share their opinions and listen to the views of others e.g., the ethics of medical interventions such as artificial hearts and pacemakers Opportunities for students to work independently and make choices in a safe environment when carrying out investigations.</p>

TERM 5 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<p style="text-align: center;">Biology</p> <p>Cells and organization: B4 Organising animals and plants (continued). Disease and bioenergetics: B5 Communicable diseases</p> <p style="text-align: center;">Chemistry</p> <p>Chemical reactions and energy changes: C5 Chemical changes (continued)</p> <p style="text-align: center;">Physics</p> <p>Particles at work: P7 Radioactivity</p>	<p style="text-align: center;">Biology</p> <p>Interpreting graphs; correlation and cause.</p> <p style="text-align: center;">Chemistry</p> <p>Predicting displacement reactions. Practical skills: making salts from metals. Obtaining a pH curve.</p> <p style="text-align: center;">Physics</p> <p>Identification of alpha, beta, and gamma radiation emission. Evaluate the dangers of exposure to radioactivity. Peer review. Undertaking half-life calculations.</p> <p>History Link – History of medicine. Math Link - Drawing and interpreting graphs, half-life calculations. Geography Link – global factors affecting malnutrition. Food Tech Link – Nutrition.</p>	<p style="text-align: center;">Career links</p> <p>Health Sector e.g., doctor, public health nurse, microbiologist. Nuclear Medicine Radiologist, Radiocarbon dating e.g., archaeologist, historian, forensic scientist.</p> <p style="text-align: center;">British Values</p> <p>Mutual Respect and Tolerance: Students learn about scientific discoveries from a diverse range of people from our culture and other cultures, e.g., Ignaz Semmelweis and Louis Pasteur, Curie, Becquerel, Rutherford, and Bohr. Students learn about the continual evolution of scientific ideas which occurs through the acceptance that different people have different ideas about a concept, e.g., spread of disease and the model of the atom. Opportunities to consider conflict between religious beliefs and scientific understanding with respect and acceptance of people's values, e.g., HIV/AIDS.</p>
TERM 6 TOPIC/s	*Key Skills/Subject Links	*Career links & BV

<p style="text-align: center;">Biology</p> <p>Disease and bioenergetics: B5 Communicable diseases (continued) B6 Preventing and treating disease.</p> <p style="text-align: center;">Chemistry</p> <p>Chemical reactions and energy changes: C5 Chemical changes (continued) C6 Electrolysis</p> <p style="text-align: center;">Physics</p> <p>Particles at work: P7 Radioactivity (continued)</p>	<p style="text-align: center;">Biology</p> <p>Stages involved in testing and trialing new drugs.</p> <p style="text-align: center;">Chemistry</p> <p>Evaluate suitable methods of extraction of metals based on the reactivity series of metals.</p> <p style="text-align: center;">Physics</p> <p>Identification of alpha, beta, and gamma radiation emission. Evaluate the dangers of exposure to radioactivity. Peer review. Undertaking half-life calculations.</p> <p>Geography Link – Sustainability and environmental pollution. Math Link - Drawing and interpreting graphs, half-life calculations.</p>	<p style="text-align: center;">Career links</p> <p>Nursing, Healthcare, pharmaceutical industry, drug development. Chemical industry e.g., production of soaps and textiles, electroplater. Nuclear Medicine Radiologist, Radiocarbon dating e.g., archaeologist, historian, forensic scientist.</p> <p style="text-align: center;">British Values</p> <p>Individual liberty: Enforced/voluntary Isolation to prevent the spread of communicable diseases, e.g., Ebola, cholera, covid.</p> <p>Rule of Law: Regulations regarding safe storage and disposal of radioactive waste and development and use of new drugs.</p> <p>Individual liberty: Students learn about the continual evolution of scientific ideas which occurs through the acceptance that different people have different ideas about a concept e.g., vaccination, herd immunity.</p> <p>Mutual respect and tolerance: There are opportunities to consider conflict between religious beliefs and scientific understanding with respect and acceptance of people's values e.g., vaccinations, antibiotics, and pain killers.</p>
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