Fairfield High School for Girls

GCSE Combined Science – Chemistry - Year 10 Long-Term Plan 2024-2025

Calendar	Topic	Assessment	Sequencing and Coherence *concepts - themes - skills*	Literacy *reading - vocabulary - oracy - writing*
Autumn **Half Term 1**	C4 Chemical Calculations: Formula Mass and Relative Formula Mass, Percentage by Mass, Conservation of Mass, Expressing concentration HT – Balanced equations, Moles and mole calculations	C4 Online test set on Educake – instantly marked and direct question feedback through Educake. C4 End of topic test GCSE style questions FT and HT. C4, working scientifically and synoptic content from C1-C5. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Quantitative chemistry** Substantive knowledge headlines: • conservation of mass and balanced chemical equations, ionic equations, and state symbols • determination of empirical formulae from the ratio of atoms of different kinds • use of amount of substance in relation to masses of pure substances. Disciplinary knowledge headlines: • recognise the importance of scientific quantities and understand how they are determined • whenever a measurement is made, there is always some uncertainty about the result obtained Link to knowledge from previous units: • KS3 conservation of mass in in Y8 Link to knowledge in future units: • GCSE Chemistry – fundamental idea can be examined anywhere in GCSE Math skills: • recognise and use expressions in decimal form • use an appropriate number of significant figures • understand and use the symbols: =, <>, >, ∝, ~ • change the subject of an equation • use the relative formula mass of a substance to calculate the number of moles in a given mass of that substance and vice versa • substitute numerical values into algebraic equations using appropriate units for physical quantities • interconvert units • use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano).	Include details of challenging texts and reading strategies, keyword glossary sheets, oracy opportunities and key disciplinary writing tasks. All pupils are issued with a learning journey which includes a glossary of keywords for each topic. Bilingual science specific dictionaries are available for EAL pupils in Arabic, Spanish, Ukrainian. Extended writing

Autumn **Half Term 2**	C5 Chemical Changes: The Reactivity Series, Displacement Reactions, Extracting Metals, Salts from metals, Salts from insoluble bases, Making more salts, Neutralisation and the pH scale, strong and weak acids.	C5 Online test set on Educake – instantly marked and direct question feedback through Educake. C5 End of topic test GCSE style questions FT and HT. C5, working scientifically and synoptic content from C1-C3. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Chemical Changes** Substantive knowledge headlines: • reduction and oxidation in terms of loss or gain of oxygen • the chemistry of acids; reactions with some metals and carbonates • pH as a measure of hydrogen ion concentration and its numerical scale Disciplinary knowledge headlines: • apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment • carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. Link to knowledge from previous units: • KS3 Acid reactions; Metal reactions Link to knowledge in future units: • GCSE Chemistry – essential knowledge for Paper 1 and for study in y11. Math skills: • make order of magnitude calculations.	Extended writing
Spring **Half Term 3**	C6 Electrolysis: Electrolysis of molten and aqueous compounds, extraction of aluminium	C6 Online test set on Educake – instantly marked and direct question feedback through Educake. C6 End of topic test GCSE style questions FT and HT. C6, working scientifically and synoptic content from C1-C5. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Electrolysis** Substantive knowledge headlines: • electrolysis of molten ionic liquids and aqueous ionic solutions Disciplinary knowledge headlines: • carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations • make and record observations and measurements using a range of apparatus and methods. Link to knowledge from previous units: • KS3 link to endothermic reactions in Y8	Extended writing

Spring **Half Term 4**	C7 Energy Changes: Exothermic and endothermic reactions, Using energy transfers, Reaction profile diagrams, Bond energy calculations.	C7 Online test set on Educake – instantly marked and direct question feedback through Educake. C7 End of topic test GCSE style questions FT and HT. C7, working scientifically and synoptic content from C1-C6.Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Energy Changes** Substantive knowledge headlines: • measurement of energy changes in chemical reactions (qualitative) • bond breaking, bond making, activation energy and reaction profiles (qualitative) Disciplinary knowledge headlines: • use scientific theories and explanations to develop hypotheses. • plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. • apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. • carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. • make and record observations and measurements using a range of apparatus and methods. • evaluate methods and suggest possible improvements and further investigations. Link to knowledge from previous units: • KS3 Chemical reactions Link to knowledge in future units: • GCSE Chemistry – rates and equilibrium in Y11 Math skills: • recognise and use expressions in decimal form • use an appropriate number of significant figures • find arithmetic means • translate information between graphical and numeric form • plot two variables from experimental or other data.	Twinkle article and questions on endothermic and exothermic reactions Etymology of 'endo', 'exo', and 'thermic' discussed. Oracy 21 activity on reaction profile diagrams

Summer **Half Term 5**	C8 Rates of Reaction: Methods to monitor the rate of a reaction, Collision theory and the effects of surface area, the effects of temperature, the effects of concentration and using a catalyst,	C8 Online test set on Educake – instantly marked and direct question feedback through Educake.	**The rate and extent of chemical change** Substantive knowledge headlines: • factors that influence the rate of reaction: varying temperature or concentration, changing the surface area of a solid reactant or by adding a catalyst • factors affecting reversible reactions. Disciplinary knowledge headlines: • predict and explain using collision theory the effects of changing conditions of concentration, pressure, and temperature on the rate of a reaction • Apply Le Chatelier's principle to reversible reactions Link to knowledge from previous units: • KS3 Y8 Chemical reactions Link to knowledge in future units: • GCSE Chemistry – this concept could be examined wrt to unknown reactions in Paper 2 chemistry. Math skills: • calculate the mean rate of a reaction from given information about the quantity of a reactant used or the quantity of a product formed, and the time taken • draw, and interpret, graphs showing the quantity of product formed or quantity of reactant used up against time • draw tangents to the curves on these graphs and calculate the gradient of a tangent to the curve as a measure of rate of reaction at a specific time Link to knowledge in future units: • GCSE Chemistry – link back to structure and bonding and forward to energy changes • Math skills: • recognise and use expressions in decimal form • use ratios, fractions, and percentages • use an appropriate number of significant figures.	Extended writing

Summer **Half Term 6**	C8 contd…reversible reactions, dynamic equilibrium and altering conditions.	C8 End of topic test GCSE style questions FT and HT. C8, working scientifically and synoptic content from C1-C7. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.		Extended writing