Fairfield High School for Girls

GCSE Chemistry - Year 11

Long-Term Plan 2024-2025

Calendar	Topic	Assessment	Sequencing and Coherence *concepts - themes - skills*	Literacy *reading - vocabulary - oracy - writing*
Autumn **Half Term 1**	C9 Crude Oil and Fuels: Hydrocarbons, Fractional distillation of oil, Burning hydrocarbons, Cracking hydrocarbons. C10 Organic Reactions: Reactions of the alkenes, Structure of alcohols, carboxylic acids and esters, Reactions and uses of alcohols.	C9 Online test set on Educake – instantly marked and direct question feedback through Educake. C9 End of topic test GCSE style questions FT and HT. C9, working scientifically and synoptic content from C1-C8. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised. C10 Online test set on Educake – instantly marked and direct question feedback through Educake. C10 End of topic test GCSE style questions FT and HT. C9, working scientifically and synoptic content from C1-C9. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Organic chemistry** Substantive knowledge headlines: • bonding of carbon leading to the vast array of natural and synthetic organic compounds that occur due to the ability of carbon to form families of similar compounds, chains, and rings • fractional distillation of crude oil and cracking to make more useful materials • carbon compounds, both as fuels and feedstock, and the competing demands for limited resources. Disciplinary knowledge headlines: • recognise substances that are alkenes from their names or from given formulae Link to knowledge from previous units: • KS3 knowledge of fossil fuels as a non-renewable resource • KS3 knowledge of distillation as a separation technique • KS3 combustion of compounds • GCSE Chemistry - Y10 covalent bonding Math skills: • visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects. **Further Organic chemistry** Substantive knowledge headlines: • Identify the structure and formulae of alkenes, alcohols and carboxylic acids. • Recall the reactions of alkenes, alcohols and carboxylic acids. Disciplinary knowledge headlines: • use models to represent addition polymerisation • use models to represent condensation polymerisation Link to knowledge from previous units: • GCSE Chemistry - Y10 covalent bonding Math skills: Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects	Glossaries are provided for each topic. Regular opportunities to read challenging texts as a class are provided. Strategies such as choral reading and teacher modelling of difficult to pronounce words are used. The etymology of names of chemicals such as pentane, hexane etc is studied to help pupils navigate this new lexicon. There will be opportunities for longer answer questions when we study fractional distillation. Pupils need to write in a logical sequence, without missing out key steps and also explain what happens at each stage of the process. Extended writing

Autumn **Half Term 2**	C11 Polymers: Addition and Condensation Polymerisation, Natural polymers and DNA.	C11 Online test set on Educake – instantly marked and direct question feedback through Educake. C11 End of topic test GCSE style questions FT and HT. C9, working scientifically and synoptic content from C1-C10. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Polymerisation** Substantive knowledge headlines: • recognise addition polymers and monomers from diagrams in the forms shown and from the presence of the functional group C=C in the monomers • draw diagrams to represent the formation of a polymer from a given alkene monomer • relate the repeating unit to the monomer • explain the basic principles of condensation polymerisation by reference to the functional groups in the monomers and the repeating units in the polymers • DNA (deoxyribonucleic acid) is a large molecule essential for life. DNA encodes genetic instructions for the development and functioning of living organisms and viruses. Most DNA molecules are two polymer chains, made from four different monomers called nucleotides, in the form of a double helix. • Other naturally occurring polymers important for life include proteins, starch and cellulose • Naming the types of monomers from which these naturally occurring polymers are made. Disciplinary knowledge headlines: • Use models to represent addition and condensation polymerisation. Link to knowledge from previous units C3 Structure and Bonding large covalent molecules and C10 Structure of alkenes. Math skills: Visualise and represent 2D and 3D forms including twodimensional representations of 3D objects.	Extended writing

	C12 Chemical Analysis: Pure substances and mixture, Analysing chromatograms, Testing for gases, Tests for positive and negative ions, Instrumental Analysis.	C12 Online test set on Educake – instantly marked and direct question feedback through Educake. C12 End of topic test GCSE style questions FT and HT. C12, working scientifically and synoptic content from C1-C11. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Chemical Analysis** Substantive knowledge headlines: • identification of common gases • distinguishing between pure and impure substances • separation techniques for mixtures of substances: filtration, crystallisation, chromatography, simple and fractional distillation Disciplinary knowledge headlines: • use melting point and boiling point data to distinguish pure from impure substances • identify formulations given appropriate information • explain how paper chromatography separates mixtures • suggest how chromatographic methods can be used for distinguishing pure substances from impure substances • interpret chromatograms and determine Rf values from chromatograms • use chemical tests to identify the ions in unknown single ionic compounds (Triple Science only) • interpret an instrumental result given appropriate data in chart or tabular form, when accompanied by a reference set in the same form, limited to flame emission spectroscopy (Triple Science only). Link to knowledge from previous units: • KS3 Analysis of chromatograms in Y7 and revisited in Y9 C1 separation techniques. Math skills: • recognise and use expressions in decimal form • use ratios, fractions, and percentages • make estimates of the results of simple calculations • provide answers to an appropriate number of significant figures.	Glossaries will be provided in the learning journey. The distinction between scientific meanings and everyday meanings of words in this topic such as pure and impure will be explicitly taught. Extended writing

Spring **Half Term 3**	C13 The Earth's Atmosphere: History of the atmosphere, evolution of the atmosphere, Greenhouse gases, Global climate change, Atmospheric pollutants. C14 The Earth's Resources: Finite and renewable resources, Water safe to drink, Extracting metals from ores, Life Cycle Assessments, Reduce, Reuse, recycle.	C13 Online test set on Educake – instantly marked and direct question feedback through Educake. C13 End of topic test GCSE style questions FT and HT. C13, working scientifically and synoptic content from C1-C12. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised. C14 Online test set on Educake – instantly marked and direct question feedback through Educake. C14 End of topic test GCSE style questions FT and HT. C14, working scientifically and synoptic content from C1-C13.Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Atmosphere and resources** Substantive knowledge headlines: • evidence for composition and evolution of the Earth's atmosphere since its formation • evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change • potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate • common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates, and their sources • the Earth's water resources and obtaining potable water • life cycle assessment and recycling to assess environmental impacts associated with all the stages of a product's life • the viability of recycling of certain materials. Disciplinary knowledge headlines: • recognise the importance of peer review of results and of communicating results to a wide range of audiences • extract and interpret information about resources from charts, graphs, and tables • 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 • recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative • evaluate methods and suggest possible improvements and further investigations. Link to knowledge from previous units: • KS3 reactivity of metals • KS3 use of simple distillation to separate salt and water. • GCSE Chemistry – last unit links to chemical changes in Y10 Math skills: • recognise and use expressions in decimal form • use ratios, fractions, and percentages • translate information between graphical and numeric form.	Glossaries provided in the learning journeys. Opportunities for extended reading tasks from up to date news articles on climate change. Opportunities for extended writing practice on 6 mark questions, for example, the greenhouse effect. Reinforcing level 3 vocabulary. Oracy opportunities when discussing life cycle assessments and evaluating the impact of certain products on the planet. Also, when discussing reuse, recycle, reuse as solutions to plastic problems. Opportunities for pupils to write a method for the required practical which could be a 6 mark question. Teacher explains the different "levels" that examiners use to mark these longer answer questions.

Spring **Half Term 4**	C15 Using our Resources: Rusting, use of alloys, Properties of Polymers, Glass, ceramics and composites, Making ammonia – the Haber Process, Making fertilisers in the laboratory and in industry.	C15 Online test set on Educake – instantly marked and direct question feedback through Educake. C15 End of topic test GCSE style questions FT and HT. C14, working scientifically and synoptic content from C1-C14.Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	**Using Earth's Resources** Substantive knowledge headlines: Alloys as useful materials • Corrosion and its prevention • Ceramics, polymers and composites • The Haber Process • Production and uses of NPK fertilisers. Disciplinary knowledge headlines: • Investigate the conditions for rusting • Compare the properties of thermosetting and thermosoftening polymers • Preparation of an ammonium salt. Link to knowledge from previous units: Math skills: • Recognise and use expressions in decimal form • Use ratios, fractions and percentages.	Oracy opportunity to discuss the how knowledge for Topic 7 on Energy and Topic 8 on reversible reactions can be applied to the Haber Process.
Summer **Half Term 5**	GCSE Revision Programme	Use of Mastery Booklets and past papers to assess progress.	Reteaching key concepts from paper 1 on the run up to the first May exam, including the 4 Required Practicals for Separate Sciences per subject. There will also be a specific focus on Working Scientifically skills in this period. Focus will then move to paper 2 topic content and the remaining Required Practicals for this paper.	Extended writing