










Curriculum Content Map

Subject: Chemistry

Year group: 11

	TERM 1		TERM 2	TRIPLE ONLY	
Unit title & description	Electrolytic Processes; Obtaining and Using Metals; Reversible Reactions and Equilibria; Dynamic Equilibria; Chemical Cells and Fuel Cells	Groups in the periodic Table; Rates of reaction; Heat Energy Changes in Chemical Reactions	Fuels; Earth and Atmospheric Science	Hydrocarbons; Alcohols and Carboxylic Acids; Polymers	Qualitative Analysis: Tests for Ions
Knowledge 	<ul style="list-style-type: none"> Electrolysis Products from electrolysis Reactivity series Ores Oxidation and reduction Life cycle assessment and recycling Dynamic equilibrium Fertilisers and the Haber process Factors affecting equilibrium Chemical cells and fuel cells 	<ul style="list-style-type: none"> Group 1 Group 7 and Halogen reactivity Group 0 Rates of reaction Factors Affecting Rates of Reaction Catalysts and Activation Energy Exothermic and endothermic reactions Energy Changes in reactions 	<ul style="list-style-type: none"> Hydrocarbons in crude oil and natural gas Fractional distillation of crude oil The alkanes homologous series Complete and Incomplete combustion Combustible Fuels and pollution Breaking down hydrocarbons – cracking The early atmosphere The changing atmosphere The atmosphere today Climate Change 	<ul style="list-style-type: none"> Alkanes and alkenes: Structure and reactions Ethanol production Alcohols Carboxylic acids Addition polymerisation Polymer properties and uses Condensation polymers Problems with polymers 	<ul style="list-style-type: none"> Flame tests and photometry Tests for positive and negative ions Choosing materials Composite materials Nanoparticles
Skills 	<ul style="list-style-type: none"> Describing the process of electrolysis and explaining the products formed in molten substances and aqueous solutions Writing half equations for and explaining oxidation and reduction in electrolysis reactions Carrying out electrolysis reactions to investigate the difference between using inert and copper electrodes Making and recording observations Safe handling of equipment and chemicals Use of appropriate equipment and techniques Explaining the order of the reactivity series of metals and predicting the outcome of reactions Application of the reactivity series to the industrial methods for the extraction of metals Evaluation of biological methods of extracting metals Carrying out life Cycle Assessments of products Evaluating the optimum conditions for reversible reactions: Specifically, in the manufacture of ammonia and the ability to be able to apply this to unfamiliar industrial processes 	<ul style="list-style-type: none"> Describe the key feature of different groups in the periodic table Explain the reactivity trends down the groups in the periodic table Carry out tests to identify different gases produced in chemical reactions Carry out practical investigations to evaluate the effect of different factors on the rate of a chemical reaction Making and recording observations Safe handling of equipment and chemicals Use of appropriate equipment and techniques 	<ul style="list-style-type: none"> Using knowledge about properties of molecules to explain why fractional distillation can be used to separate crude oil Being able to draw analogies between molecules and use it to determine the next molecule in a homologous series Ability to draw organic molecules Balancing equations for complete and incomplete combustion Evaluating data to show why cracking is necessary Compiling data from multiple sources to evaluate climate change 	<ul style="list-style-type: none"> Carry out a practical to investigate the temperature rise produced in a known mass of water by the combustion of different fuels (alcohols) Making and recording observations Use of appropriate equipment and techniques Safe use and careful handling of equipment and chemicals Be able to identify the monomer units in a polymer and vice-versa Take data from multiple sources to evaluate the problems with polymers 	<ul style="list-style-type: none"> Carry out a practical to identify the ions in unknown salts using specific tests for cations and anions Making and recording observations Use of appropriate equipment and techniques Safe use and careful handling of equipment and chemicals Use of appropriate qualitative reagents and techniques

	<ul style="list-style-type: none"> Explaining how the choice of industrial route is determined by availability of raw materials and the conditions required Comparing industrial and laboratory processes Evaluating the use of hydrogen-oxygen fuel cells to power cars 				
Literacy 	<ul style="list-style-type: none"> Using scientific language Using scientific terminology correctly Defining relevant keywords Extended writing: Describing how to carry out a life cycle assessment Extended writing: Explaining how the choice of industrial route is determined by availability of raw materials and the conditions required Extended writing: Comparing industrial and laboratory processes 	<ul style="list-style-type: none"> Using scientific language Using scientific terminology correctly Defining relevant keywords Extended writing: Writing a description of the practical method to investigating the effect of different factors on the rate of reaction Extended writing: Using collision theory to explain how different factors increase the rate of reaction 	<ul style="list-style-type: none"> Using scientific language Using scientific terminology correctly Defining relevant keywords Extended writing: Describing how crude oil can be purified by fractional distillation Extended writing: Describing how the Earth's atmosphere has changed from early times to today 	<ul style="list-style-type: none"> Using scientific language Using scientific terminology correctly Defining relevant keywords Extended writing: Evaluating the environmental, social and economic impact of the different methods of producing ethanol Extended writing: Describing how polymers are formed from monomers Extended writing: Evaluating the impact of polymers on the environment 	<ul style="list-style-type: none"> Using scientific language Using scientific terminology correctly Defining relevant keywords Extended writing: Describing how to carry out chemical test to identify different ions Extended writing: Selecting and justifying the choice of material for a given use Extended writing: Evaluate the possible risks of nanoparticles
Numeracy 	<ul style="list-style-type: none"> Recognise and use expressions in decimal and standard form Use ratios, fractions and percentages Translate information between graphical and numerical form Understand that $y=mx + c$ represents a linear relationship Plot two variables from experimental or other data Determine the slope and intercept of a linear graph 	<ul style="list-style-type: none"> Recognise and use expressions in decimal form Use ratios, fractions and percentages Make estimates of the results of simple calculations Translate information between graphical and numerical form Understand that $y=mx + c$ represents a linear relationship Plot two variables from experimental or other data Determine the slope and intercept of a linear graph Draw and use the slope of a tangent to a curve as a measure of rate of change Calculate the surface area and volumes of cubes 	<ul style="list-style-type: none"> Translate information between graphical and numerical form Plot two variables from experimental or other data Use ratios, fractions and percentages Make estimates of the results of simple calculations Construct and interpret frequency tables and diagrams, bar charts and histograms Understand and use the symbols: $=, <, <<, >>, >, \infty, \approx$. Make order of magnitude calculations 	<ul style="list-style-type: none"> Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects Calculate the surface area and volumes of cubes Recognise and use expressions in decimal and standard form Use ratios, fractions and percentages Make estimates of the results of simple calculations Make order of magnitude calculations 	<ul style="list-style-type: none"> Translate information between graphical and numerical form
Enrichment Learning 	<ul style="list-style-type: none"> Local/Global issues: Understanding Life Cycle Assessment will help students have a deeper understanding of the real impact of the things we use (and waste) on the environment and become local ambassadors to reduce waste 	<ul style="list-style-type: none"> Observing chemical demonstration of the Group 1 metals and using this to work out and explain the trends in their activity Learning by doing: Carrying out an investigation as to the reactivity of the halogens with the halides 	<ul style="list-style-type: none"> World issues: The impact of burning fossil fuels on the climate Economic issues: being able to explain the importance of cracking with respect to supply and demand of fuels Exploring how the Earth changed from having a fiery, volcanic atmosphere to a place where life could be established and the steps involved in this process 	<ul style="list-style-type: none"> Learning by doing: Carrying out investigation as to which alcohol has the most energy 	<ul style="list-style-type: none"> Learning by doing: Carrying out flame tests and chemical tests for different ions
British values 	<ul style="list-style-type: none"> Evaluation of biological methods 	<ul style="list-style-type: none"> Health and safety: Understanding 	<ul style="list-style-type: none"> Understanding the impact of 	<ul style="list-style-type: none"> Personal Liberty/Rule of Law: 	<ul style="list-style-type: none"> Personal Liberty: Understanding

	of extracting metals <ul style="list-style-type: none"> Personal Liberty: Armed with the knowledge from LCA's students must decide how this will impact on their own use of different products 	why group 1 metal reactions need to be demonstrated and why some metals are too reactive to use in the lab	burning fossil fuels on environment and the need for laws e.g. carbon tax and international treaties such as the Koyoto protocol to help reduce climate change	Understanding the impact of plastics in the environment and the need for laws to solve these problems	the choices to be made when developing new materials such as nanoparticles <ul style="list-style-type: none"> Rule of Law: The use of analytical techniques in forensics
Personal Development 	<ul style="list-style-type: none"> Team work and communication during practicals Self-management and self-development through independent use of revision techniques which have been modelled in class 	<ul style="list-style-type: none"> Team work and communication during practicals Self-management and self-development through independent use of revision techniques which have been modelled in class 	<ul style="list-style-type: none"> Team work and communication during practicals Self-management and self-development through independent use of revision techniques which have been modelled in class 	<ul style="list-style-type: none"> Team work and communication during practicals Self-management and self-development through independent use of revision techniques which have been modelled in class 	<ul style="list-style-type: none"> Team work and communication during practicals Self-management and self-development through independent use of revision techniques which have been modelled in class
Careers 	<ul style="list-style-type: none"> Students will learn about different industrial processes: Metal extraction, manufacture of ammonia, manufacture of sodium hydroxide and the role of industrial chemists in designing and manufacturing bulk chemicals LCA's will provide links to careers as an environmentalist 	<ul style="list-style-type: none"> Studying rates of reaction will give students insight to bulk chemical manufacture and the fine chemicals industry 	<ul style="list-style-type: none"> Studying fractional distillation, cracking, polymerisation, the product and uses of crude oil will give student insight to the petrochemical industry Evaluating the effects of burning fossil fuels on the climate will highlight the role of environmental scientists 	<ul style="list-style-type: none"> Studying polymerisation highlights jobs in the fine chemical industry Evaluating the effects of plastics on the climate will highlight the role of environmental scientists and the need for research scientists to produce biodegradable polymers 	<ul style="list-style-type: none"> Analytical techniques are used in industry for quality control and in forensics to solve crimes Students will be introduced to the cutting edge research around nanoparticles as smart materials and possible medical solutions
Assessment opportunities 	AP points End of Topic Tests Practical Assessment Mini-knowledge tests AfL in lessons DO now activities that assess knowledge recall Extended writing DIRT tasks	<ul style="list-style-type: none"> AP points End of Topic Tests Practical Assessment Mini-knowledge tests AfL in lessons DO now activities that assess knowledge recall Extended writing DIRT tasks 	<ul style="list-style-type: none"> AP points End of Topic Tests Practical Assessment Mini-knowledge tests AfL in lessons DO now activities that assess knowledge recall Extended writing DIRT tasks	<ul style="list-style-type: none"> AP points End of Topic Tests Practical Assessment Mini-knowledge tests AfL in lessons DO now activities that assess knowledge recall Extended writing DIRT tasks 	<ul style="list-style-type: none"> AP points End of Topic Tests Practical Assessment Mini-knowledge tests AfL in lessons DO now activities that assess knowledge recall Extended writing DIRT tasks
Differentiation for MA and LA	<ul style="list-style-type: none"> Individual feedback provided for students when books are marked. Individual DIRT tasks using GAP analysis A01 type questions for LA A03 type questions for MA In class support for LA students by using TAs or City years Use command words to set differentiated questions for the class 				

Bold denotes triple science only topics

Text in red is contact that should be revisited from KS3 rather than entirely new