Long Term Plan: Chemistry Year 10

ARCHBISHOP SENTAMU ACADEMY
CHURCH OF ENGLAND

Half term	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Link to subject ethos and driver (rename)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers	SMSC & British Values	Cultural Capital	Career Link
One	Quantitative Chemistry	Mass, Mr and Moles Concentration of Solution (HT Only) Calculating reaction masses Balancing Equations using moles % Yield and Atom Economy	Changing the subject of an equation Calculating percentage Using ratios Interpreting data presented in both graphical and tabular form. Using laboratory equipment and glassware Recording accurate data		The difference between g/dm and mol/dm Students often struggle to identify when they need to use molar coefficients in a calculation and when they don't Calculating the Mr of of diatomic molecules, particularly in reaction mass calculations	At KS3 students have studied the mechanics of chemical reactions and have also been introduced to the idea of conservation of mass and balanced equations. Students have also studied neutralisation reactions which builds directly into titration	Quantitative chemistry forms the basis of much of the work done during physical chemistry during A-Level.	Higher prior attainments can be challenged to work through multi-step problems involving different equations	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios	As the central science, Chemistry opens doors to a wide range of STEM field careers.

			Calculating a mean Identifying anomalous and concordant results. Converting units								
Two	Energy Changes	Endothermic and Exothermic Reactions Reaction pathways Bond Energy and bond energy calculations (Triple Only) Fuel cells	Interpreting data presented in both graphical and tabular form. Using laboratory equipment and glassware Recording accurate data Calculating a mean Changing the subject of an equation Using data to evaluate and compare		Mislabeling of the activation energy and overall energy change on reaction profile diagrams. Students often miscalculate bond energies by doing products - reactants rather than reactants - products	This unit builds directly from the energetics unit, studied in year 8; extending students prior knowledge of endothermic and exothermic reactions to explore why this is the case.	Students at A-Level will study energetics in more detail, looking calorimetry, Hess' Law and more complex enthalpy calculations	Students may be challenged to find a missing bond enthalpy if given the overall energy change for a reaction.	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios	As the central science, Chemistry opens doors to a wide range of STEM field careers.

Three	Rate and Extent of Chemical Change	Measuring and calculating the rate of a chemical reaction The effect of temperature, pressure, concentration, surface area and presence of a catalyst on the rate of reaction Reversible Reactions and dynamic equilibria, including making predictions about changing yield when environmental conditions change	Interpreting data presented in both graphical and tabular form. Using laboratory equipment and glassware Recording accurate data Calculating a mean Changing the subject of an equation Using data to evaluate and compare Drawing tangents to a graph		Students often struggle to link dynamic equilibria with changing environmental conditions. Students often do not talk about collisions when explaining the effect of various factors on the rate of reaction	Students have previously studied the basic concept of "rate of reaction" and how a catalyst affects this.	At A-Level students will study kinetics in more detail, looking at rate constants and rate equations.	Higher prior students can be challenged to suggest compromise conditions for industrial process that utilize reversible equations given the enthalpy change and balanced equation for the reaction	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios	As the central science, Chemistry opens doors to a wide range of STEM field careers.
Four	Organic Chemistry	The structure and properties of alkanes and alkenes Fractional Distillation and Cracking	Using and deriving the general formula of a homologous series Predicting the properties of a		Students often confuse alkanes and alkenes	Students have previously looked at chemical equations as the rearrangements of atoms throughout	At A-Level students will study organic chemistry in more detail, forming most of the content of Paper Two	Explaining the properties of organic compounds linking to their structure.	The environmental impact of fossil fuels and crude oil use. Discussion of the benefits and	The social, economic and environmental impact of the oil industry world wide. A deeper understanding	As the central science, Chemistry opens doors to a wide range of STEM field careers.

		Complete and incomplete combustion (Triple Only) The structure and properties of alcohols, carboxylic acids, esters and polymers.	compound Writing and balancing chemical equations			KS3			disadvantages of the oil industry in the UK	of how many modern materials are derived from oil.	
Five	Chemical Analysis	Pure and impure substances Chromatography Gas Testing (Triple Only) Flame testing, ion testing and spectroscopy	Following written methods and flow charts Interpreting chromatograms and other experimental results Writing scientific methods Measuring and recording accurate results Safe use of laboratory equipment and glassware. Presenting and		Students often confuse the results of the various ion tests. Students often describe spectroscopy as being more "accurate" or "Reliable" as opposed to more "Sensitive" or "Precise"	Students have studied the idea of pure and impure substances, mixtures vs compounds and separation techniques at KS3. This unit extends this by introducing deeper analysis - not just separating mixtures but identifying their components.	Organic Analysis is studied in further depth at A-Level, where students will look at more complex spectroscopic methods, such as IR and MS spectroscopy.	Students could be presented with complex mixtures or a number of different solutions and challenged to produce viable methods of identification.	Safe working in the lab, and respect for others workspaces.	The use of spectroscopic methods in real life applications, such as quality assurance and forensic investigation	As the central science, Chemistry opens doors to a range of STEM Field careers

			interpreting data in both tabular and graphical form.								
Six	Half Term Six is dedicated revision of content covered so far, preparation for PPEs, PPEs and DIRT/Improvement Work										