Year 12 Chemistry Curriculum Map

Overview	Chemistry is split into three branches which students will learn about more or less in parallel. Year 12 Physical Chemistry begins with a more in depth look at the structure of the atom which affects the chemical properties of elements. Mass spectrometry relies on differing masses of atoms and is introduced as an analytic tool at this point. When chemists measure out an amount of a substance, they use an amount in moles. Year 12 students learn how to perform a range of mole calculations. The physical and chemical properties of compounds depend on the ways in which the compounds are held together by chemical bonds and by intermolecular forces. Theories of bonding explain how atoms or ions are held together in these structures. Materials scientists use knowledge of structure and bonding to engineer new materials with desirable properties. These new materials may offer new applications in a range of different modern technologies. The enthalpy change in a chemical reaction can be measured accurately, this is linked to ideas about bond energies and Hess cycles. The study of kinetics enables chemists to determine how a change in conditions affects the speed of a chemical reaction. In contrast with kinetics, a study of equilibria indicates how far reactions will go, what the yields will be and how these can be affected by conditions. Redox reactions involve a transfer of electrons from the reducing agent to the oxidising agent, students will learn how to represent this in balanced equations. In Inorganic Chemistry we start with the chemical and physical properties of period 3 elements, this is linked back to atomic structure. The focus then shifts to the Halogens and then the Alkali earth metals. Year 12 Organic Chemistry begins with the correct naming and drawing of different organic molecules and then moves on to the idea ofIsomerism. The first class of molecules studies is the alkanes followed by halogenoalkanes and alkenes. The study of alcohols builds upon the chemistry of the earlier molecules. The final topic of Analysis links together the earlier organic chemistry. The Summer term finishes with an early start on the second year topics of Carbonyl Chemistry and Kinetics.					
Year 12	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Atomic Structure Periodicity Amount of Substance	Energetics Bonding	Intro to Organic Alkanes Kinetics	Haloalkanes Alkenes REDOX Halogens	Alcohols Analysis Group 2 Equilibrium	Nomenclature and Isomerism Carbonyl Chemistry Kinetics 2
Knowledge	Fundamental particles Mass number and isotopes Electron configuration	Enthalpy change Calorimetry	Nomenclature Reaction mechanisms	Free radical substitution Ozone decomposition	Alcohol production Oxidation of Alcohols	Nomenclature Optical isomerism

	Classification of elements on the periodic table Physical properties of Period 3 elements Relative atomic mass and relative molecular mass The mole and the Avogadro constant The ideal gas equation Empirical and molecular formula Balanced equations and associated calculations	Hess' Law Bond energies Covalent, ionic and metallic bonding Physical properties Shapes of molecules Polarity and forces between molecules	Isomerism Fractional distillation Cracking Combustion Collision theory Maxwell -Boltzmann Factors affecting rate	Nucleophilic substitution Elimination Structure, bonding and reactivity of alkenes Addition reactions Addition polymers Oxidation and Reduction REDOX equations Trends in properties of the Halogens Uses of Chlorine	Elimination Test tube reactions to identify functional groups Mass spectrometry Infrared Spectrometry The trends in the solubilities of the group 2 hydroxides and the sulfates, linked to uses Chemical equilibria and le Chatelier's principle Equilibrium constant, kc	Aldehydes and ketones Carboxylic acids and esters Acylation mechanism Rate equations Arrhenius equation
Skills	Use appropriate significant figures Calculate weighted means, Students interpret and analyse spectra Standard form Calculated results can only be reported to the limits of the least accurate measurement Students construct and/or balance equations using ratios Uncertainty	Students could be asked to find ΔH for a reaction by calorimetry Carry out Hess's law calculations Find ΔH for a reaction using Hess's law and calorimetry, then present data in appropriate ways Find the type of structure of unknowns by experiment Deduce the shape according to valence shell electron pair repulsion (VSEPR) principles	When given the structure of one isomer be able to draw further isomers. Various representations could be used to give the opportunity to identify those that are isomeric Investigate the effect of temperature on the rate of reaction of sodium thiosulfate and hydrochloric acid by an initial rate method Investigate the effect of changing the concentration of acid on the rate of a reaction of calcium carbonate and hydrochloric acid by a	Carry out test-tube hydrolysis of halogenoalkanes to show their relative rates of reaction Prepare a chloroalkane, purifying the product using a separating funnel and distillation Investigate the role of chemists in the introduction of legislation to ban the use of CFCs and in finding replacements Test organic compounds for unsaturation using bromine water and record their observations Investigate the treatment	Carry out the preparation of a carboxylic acid and aldehyde by the oxidation of a primary alcohol Carry out the preparation of cyclohexene from cyclohexanol, including purification using a separating funnel and by distillation Carry out test-tube reactions in the specification to distinguish alcohols, aldehydes, alkenes and carboxylic acids Testing for group 2 ions	Could be asked to recognise the presence of a chiral centre in a given structure in 2D or 3D forms. They could also be asked to draw the 3D representation of chiral centres in various species Carry out test-tube reactions of Tollens' reagent and Fehling's solution to distinguish aldehydes and ketones Make esters by reacting alcohols with carboxylic acids, purifying the product using a separating funnel and by distillation

			continuous monitoring method.	of drinking water with chlorine Combine half-equations to give an overall redox equation.	as well as the solubility of the group 2 Hydroxides and Sulfates. Carry out test-tube equilibrium shifts to show the effect of concentration and temperature	Identify an ester by measuring its boiling point, followed by hydrolysis to form the carboxylic acid, which is purified by recrystallisation, and determine its melting point. Determine the order of reaction for a reactant in the iodine clock reaction