A2 Year 1 Chemistry Course outline

Students have eight Chemistry lessons per cycle taught by two specialist Physics teachers.

Teacher A Autumn term

Term	Topic and approximate duration	Key learning areas
Autumn term	**Induction (1 week)**	Students will learn how to take concise and informative notes and how to organise their folders. Pupils will learn how to research effectively. Students will do the AQA CPAC training and get a certificate.
	Atomic Structure (6 weeks)	Students will recap ideas about atomic structure from GCSE. They will learn how to use Time of Flight Spectrometry to calculate RAM values for element. Students will learn how to wrote and draw electronic configurations for elements, and use these to describe and explain trends in ionisation energies.
	Amount of Substance (6 weeks)	Students will perform a variety of calculations. These include: moles, concentration, the ideal gas equation, determining empirical formula, yield and atom economy. Required practical 1: Make up a volumetric solution and carry out a simple acid–base titration.
	Nature of landmark assessment	Interim will be mostly shorter answer questions requiring the application of knowledge. Landmark will be MCQs, with a few short answer questions, and 1 extended response question.

Teacher B Autumn Term

Term	Topic and approximate duration	Key learning areas
Autumn term	**Induction (1 week)**	Students will learn how to take concise and informative notes and how to organise their folders. Pupils will learn how to research effectively. Students will do the AQA CPAC training and get a certificate.
	Bonding (7 weeks)	Students will describe and explain covalent, ionic and metallic bonding, drawing diagrams for each. They will relate bonding to the properties exhibited by chemical species. Students will learn shapes of molecules using rules learnt. They will be able to draw, name and predict bond angles for any covalent compound they encounter. They will also look at intermolecular forces, and describe and explain how and why these impact boiling points. They will learn about electronegativity and use this to predict the intermolecular forces present in unlearnt molecules. Students will explain the importance of hydrogen bonding.
	Kinetics (4 weeks)	Students will recap ideas about rate of reaction from GCSE. They will describe and explain factors that alter how fast a reaction is, and link these to collision theory. Students will draw and explain Maxwell-Boltzmann curves. They will learn key practical techniques associated with kinetics. Required Practical 3: Investigation of how the rate of a reaction changes with temperature.
	Organic Chemistry - Alkanes (3 weeks)	Students will name and draw alkanes. They will recap ideas about fractional distillation and cracking. They will study radical substitution reactions and apply their knowledge to write equations and reaction schemes. They will be introduced to reaction mechanisms for the first time and learn rules associated with drawing them.
	Nature of landmark assessment	Interim will be mostly shorter answer questions requiring the application of knowledge. Landmark will be MCQs, with a few short answer questions, and 1 extended response question.

Teacher A Spring term

Term	Topic and approximate duration	Key learning areas
Spring term	**Energetics (4 weeks)**	Students will learn about energy changes in reactions, initially recapping ideas about exothermic and endothermic reactions from GCSE. They will then extend their knowledge to look at calculating the energy change of a reaction using Hess' Law. They will also use bond enthalpy values to calculate the energy change. They will also complete a variety of practicals in order to calculate the energy change experimentally. These include neutralisation, combustion and displacement. Required Practical 2: Measurement of an enthalpy change.
	Chemical Equilibrium (2 weeks)	Students will learn about Le Chatelier's principle and calculate Kc values for equilibriums.
	Redox and Inorganic Chemistry (5 weeks)	Students will learn about oxidation and reduction in terms of electron transfer. They will be able to write redox and half equations for complex reactions. Students will then describe and explain trends in the periodic table, including atomic radius, ionisation energy, reactivity and melting point. We will relate these trends to atomic structure and predict trends. Students will also study Group 2 and Group 7 in depth. Required Practical 4: Carry out simple test-tube reactions to identify cations and anions
	Nature of landmark assessment	Interim will be mostly shorter answer questions requiring the application of knowledge. Landmark will be MCQs, with a few short answer questions, and 1 extended response question.

Teacher B Spring term

Term	Topic and approximate duration	Key learning areas
Spring term	Organic Chemistry – alkenes, alcohols and halogenoalkanes **(11 weeks)**	Students will describe properties of alkenes, alcohols and halogenoalkanes and draw and name each type of compound. They will draw reaction mechanisms for elimination, nucleophilic substitution and electrophilic addition reactions. They will learn about polymerisation reactions and predict products for these, naming and drawing reactants and products. We will learn about different routes to making ethanol, comparing and evaluating these methods. Students will also learn about the breakdown of ozone through radical reactions and the impact this has had on the atmosphere. They will also learn definitions for isomerism and draw and predict isomers. Required Practical 5: Distillation of a product from a reaction.
	Nature of landmark assessment	Interim will be mostly shorter answer questions requiring the application of knowledge. Landmark will be MCQs, with a few short answer questions, and 1 extended response question.

Teacher A Summer term

Term	Topic and approximate duration	Key learning areas
Summer term	**Thermodynamics – Year 2 content** (4 weeks)	Students will learn definitions for different types of enthalpy and apply these to write equations. They will then construct Born-Haber cycles to calculation enthalpy values. They will learn qualitative ideas about entropy and then quantitively calculate entropy and Gibbs' free energy to predict whether reactions are likely.
	Nature of landmark assessment	Students will have a mock exam this term focusing on everything studied this year (apart from Thermodynamics)

Teacher B Summer term

Term	Topic and approximate duration	Key learning areas
Summer term	**Chemical Analysis** (4 weeks)	Students will learn the principles of Infra-red and mass spectrometry, and apply these ideas to interpret spectra for molecules.
	Nature of landmark assessment	Students will have a mock exam this term focusing on everything studied this year