Exam Board/Syllabus-AQA (7404:7405)

Year 12

Year Group	Term	Theme	Topics Teacher 1 Teacher 2	CPAC Number	Content (8 lessons a fortnight in y12)	Assessment Content
12	1	Physical chemistry 1	Atomic Structure, Bonding and Intermolecular forces and Amount of Substance.	N/A	In the first term, we review previous knowledge at GCSE of the structure of the atom, the mole and the 3 different types of bonds. We extend students understanding of the history of the atom, the mass spectrometer, the different types of intermolecular forces and their effects on physical properties. Students will develop their mathematical skills in the amount of substance topic by understanding how we use different equations to calculate moles, concentration, mass, volume, pressure and temperature.	Synoptic tests at the end of each topic ensures that students are constantly reviewing previous topics. Assessments consist of a variety of short answer/long answer questions with a set of multiple-choice questions. Year 12 PPE's
	2	Physical chemistry 1 and Organic chemistry 1	Amount of Substance, Kinetics, Introduction to organic chemistry and Energetics.	1 2	In term 2, we continue with the amount of substance topic and students use the knowledge and skills they have developed to make a standard solution and carry out an acid-base titration. In the first organic chemistry topic, we review previous knowledge from GCSE and then extend it by looking at how we name organic molecules and the different types of Isomerism. We begin the energetics topic by reviewing students understanding of exothermic and endothermic reactions, before looking at enthalpy. In the kinetics topic, students review the different factors that affect the rate of reaction and study Maxwell-Boltzmann distribution curves. The CPAC, involves students calculating the rate of a chemical reaction at different temperatures.	
	3	Physical chemistry 1 and Organic chemistry 1	Energetics, Alkanes and Haloalkanes.	3	In term 3, students look at the importance of Hess' law and use it to calculate enthalpies of reactions. The CPAC, involves students measuring temperature changes and use extrapolation methods from graphs to calculate the maximum temperature change. In the organic chemistry topics, students look at reactions involving alkanes and haloalkanes and look at how CFC's lead to the destruction of ozone through free-radical reactions.	

	4	Physical chemistry 1, Organic chemistry 1 and Inorganic chemistry 1.	Chemical Equilibria and Kc, Alkenes, Redox reactions, Alcohols, Group 2 and 7 elements.	N/A	In term 4, students review dynamic equilibrium and Le Chateliers principle from GCSE. Students use their understanding of moles from previous topics to calculate the equilibrium constant of different reactions. In the organic chemistry topics, students look at naming alkenes and alcohols and study their chemical reactions by explaining what happens through drawing mechanisms. In the inorganic chemistry topics, students review oxidation and reduction from GCSE and further develop their understanding of constructing and balancing half equations. The physical and chemical properties of both group 2 and 7 elements will be discussed.	
	5	Organic chemistry 1 and Inorganic chemistry 1.	Periodicity and Organic analysis. Review of Y12 work.	4 5 6	In term 5, students will describe and explain trends across the periodic table, including atomic radii, ionisation energy and melting and boiling points. In organic analysis, students look at the way's chemists use analytical techniques, such as test-tube reactions and spectroscopic techniques to help them identify molecules. A number of CPAC's will be conducted in this term which will help develop students understanding and skills in carrying out distillation, reflux, purification and separating organic products.	
	6	Physical chemistry 2 and Organic chemistry 2.	Begin Y13 work. Thermodynamics, Optical isomerism and Aldehydes and Ketones.	N/A	In term 6, students will begin A2 chemistry work. In thermodynamics, students will construct Born-Haber cycles and use them to calculate lattice enthalpies and lattice dissociation enthalpies. In organic chemistry, students will look at another branch of stereoisomerism and will look at identifying chiral carbons and drawing enantiomers in their 3-D structures. Students will look at naming aldehydes and ketones, key chemical reactions and test tube reactions, which are used to determine the differences between them.	

Year 13

Year Group	Term	Theme	Topics Teacher 1 Teacher 2	CPAC	Content (9 lessons a fortnight in y13)	Assessment Content
13	1	Physical chemistry 2 and Organic chemistry 2.	Thermodynamics, Carboxylic acid derivatives and Acids and Bases.	10	In term 1, students will review the work on Born-Haber cycles and then look at entropy and Gibbs free energy. Students will begin the acids and bases topic by reviewing the differences between strong and weak acids and the ion that is responsible for making a substance acidic before being able to calculate pH. In organic chemistry, students will look at the structures of both carboxylic acids and esters before looking at acylation and acyl chlorides, acid anhydrides and amides. In the CPAC, students will make an organic solid and test its purity as well as making an organic liquid.	Synoptic tests at the end of each topic ensures that students are constantly reviewing previous topics. Assessments consist of a variety of short answer/long answer questions with a set of multiple-choice questions. Y13 PPE's
	2	Physical chemistry 2	Acids and Bases, Rate equations and Electrode potentials.	7 9	In term 2, students will continue with the acid and bases topic by looking at further equilibrium constants, Ka and PKa. In the CPAC, students will carry out an acid-base titration and will construct a pH curve, which they can use to help them calculate the equivalence point, Ka and Pka. In electrochemistry, students will look at the differences between a half cell and an electrochemical cell. Electrochemical cells will be constructed and E cell calculations will allow students to calculate the potential difference across two cells relating it to redox. Students will further develop their understanding of kinetics by constructing rate equations, calculating the rate constant by using both the rate and Arrhenius equation.	
	3	Physical chemistry 2, Organic chemistry 2 and Inorganic chemistry 2.	Electrode potentials, Aromatic chemistry, Polymers and Transition metals.	8	In term 3, students will carry out a CPAC by measuring the EMF of an electrochemical cell. In organic chemistry, students will look at the structure and reactions of aromatic compounds. We will review knowledge of polymers from GCSE and will then look at condensation polymerisation including the production and disposal of polymers, such as Nylon-6,6. In inorganic chemistry, students will begin to look at the properties of transition metals including the different coloured compounds they form and the variable oxidation states they have.	

	4	Physical chemistry 2, Organic chemistry 2 and Inorganic chemistry 2.	Transition metals, Amino acids, Proteins and DNA and Equilibrium constant- Kp.	N/A	In term 4, students will look at ligand substitution reactions, the shapes of such complex ions, the formation of different coloured ions and the importance use of transition metals, particularly focusing on their uses as catalysts. In organic chemistry, students will look at the structure of amino acids and the formation of zwitter ions. They will look at the different structures of proteins and the structure of DNA and the important role hydrogen bonding plays in keeping the nucleotides together. In physical chemistry, students will study equilibria and how the equilibrium yield will be influenced by the partial pressures of gaseous reactants and products, which is important in a number of industrial processes.	
	5	Organic chemistry 2 and Inorganic chemistry 2.	Reactions of Ions in Aq solutions, NMR, Chromatography, Organic Synthesis and Properties of period 3 elements and their Oxides.	11 12	In term 5 students will further extend their knowledge of transition metals by carrying out a series of practical experiments to show and to understand how transition metal ions can be identified by test tube reactions. Students will study the reactions of period 3 elements with oxygen and the pH of the solutions formed. In organic chemistry, students will look at more analytical techniques which can help identify and name an organic molecule. Organic synthesis will allow students to use all their knowledge of key organic reactions in synthesising organic molecules via a number of different routes.	
	6	All themes.	Review of Y13 work.	N/A	Revise and review the content in the course.	