JAMES CALVERT SPENCE COLLEGE

Curriculum Overview

BE KIND
WORK HARD
AIM HIGH

A-level Chemistry

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
12	**Nomenclature, Isomerism and Alkanes** During term 1, students will build upon their knowledge of organic chemistry acquired at GCSE and study the fundamentals of organic chemistry including nomenclature, structures and isomerism. They will then move onto Alkanes which brings the real world link to the fuel industry and consider the environmental impact, together with scientific solutions, currently in place. **Atomic structure, amount of substance and bonding** In physical chemistry students will enhance their understanding of the structure of the atom (including principles of the time of flight mass spectrometer (TOF), chemical bonding and structures, and quantitative chemical calculations. They will develop their understanding of oxidation and reduction by learning how to assign oxidation states and write equations for redox reaction.		**Alkanes, Halogenoalkanes and Alkenes** In organic chemistry the students will continue to focus on studying the alkanes and then the functional groups (halogenoalkanes, alkenes), by studying their properties, uses and reactions. **Periodicity, Group 2 and 7** In inorganic chemistry, students will enhance their knowledge of inorganic chemistry by studying periodicity, group 2 metals and group 7 halogens. **Energetics and Kinetics** In physical chemistry, they will build upon their understanding of reaction rates (and their mathematical skills) when studying reaction kinetics and learn about Hess' law.		**Alcohols and organic analysis** The final organic functional group to be studied is alcohols. Students will then move onto organic analysis which involves chemical testing as well as studying the instrumental techniques used in industry (InfraRed and mass spectrometry). Depending on progress, students will start to build on previous year 12 topics and start to study NMR, optical isomerism and more functional groups (aldehydes and ketones). **Chemical equilibria, Le Chatelier's principle and thermodynamics** In physical chemistry, students will build upon their knowledge of chemical equilibria developed in GCSE and energetics, to predict the effect of changing conditions in industrial processes. Depending on progress through the curriculum, they will then move onto thermodynamics which builds on their mathematical skills when using Born-haber cycles. *Students will also develop their practical skills in order to complete their required practical endorsement criteria throughout the year.*	
13	**Optical isomerism, Aldehydes, Ketones, Carboxylic acids and derivatives and**		**Amines, polymers, amino acids, proteins and DNA**		**Organic synthesis and chromatography** Students apply prior knowledge of	

	aromatic chemistry This year students will continue to build on their knowledge of organic chemistry.. They will study the properties, uses and reactions of aldehydes and ketones; carboxylic acids and their derivatives and benzene. **Thermodynamics, rate equations, equilibrium constant and electrochemical cells.** In physical chemistry they will further their understanding of reactions kinetics by determining rate equations and using the Arrhenius equation. Students will build upon what they already know about energetics and equilibria when learning about thermodynamics and the equilibrium constant Kp. Knowledge acquired in year 11 about fuel cells will be developed when they study electrode potentials and electrochemical cells.	Organic chemistry moves to focus on the biochemistry content of the course and links with content from the biology specification. Students will study amines, polymers, amino acids, proteins and DNA. They will look at how organic products are formed in multi-step reactions during the organic synthesis topic and how chromatography can be used as an analytical technique. **Acids and bases** In physical chemistry students will be able to explain the properties and importance of acids, bases and buffers and perform a range of calculations linked to their pH and concentration. **Transition metals** In inorganic chemistry they will learn about the properties of transition metals, their uses and the reactions of their aqueous ions.	chromatography and develop their analytical technique. Throughout the two year course, students have been synoptically developing their knowledge of organic reactions and looking at multi-step synthesis. Students will focus during this term on these skills as part of their exam preparation. **Reactions of ions in aqueous solutions and period 3 elements and their oxides** In inorganic chemistry students will learn about the properties of period 3 elements and their oxides. During this term, students will then spend time revising and preparing for exams. *Students will complete the requirements of their required practical endorsement criteria throughout the year.*