Year 12 AS/A'Level year 1
Curriculum Overview: Chemistry (AQA)

RESPECT
COURAGE
RESPONSIBILITY
KINDNESS
RESILIENCE

Autumn Term

Topics/ content outline:	Powerful Knowledge (key concepts, skills)	What will you be assessed on?	How can you help at home?
Summer transition work consolidation. 3.1.1 Atomic structure 3.1.2 Amount of substance 3.1.3 Bonding 3.2.1 Periodicity 3.3.1 Introduction to organic chemistry 3.3.2 Alkanes 3.3.3 Halogenoalkanes 3.3.4 Alkenes	• Consolidation of key skills and concepts from KS4-KS5 • Recap of fundamental particles and introduction to the orbital model of electronic configuration. • Moles, the ideal gas equation, empirical and molecular formula and balancing equations. • Recap of KS4 bonding concepts. Shapes of molecules and bond angles. Bond polarity and intermolecular forces. • Properties of period 3 elements and trends across the period. • Nomenclature and isomerism • Alkanes – fractional distillation, cracking, combustions and halogenation. • Reactions of halogenoalkanes • Reactions of alkenes. E/Z isomerism.	Students will sit 2 summative assessments during term 1. These will be on atomic structure and bonding. Required practical 1 and 2 will also be carried out.	Encourage students to become independent learners. There is an expectation of 5 additional hours of independent study per week. Students should be reviewing their class notes to ensure a good understanding of the content covered between lessons. Question booklets will be provided with exam questions to work through and calculations to practice. Working through exam questions and self-assessing is encouraged. We also encourage students to seek help from the Chemistry department if they are stuck. There will be a centrally managed Showbie group to provide students access to revision resources.

Spring Term

Topics/ content outline:	Powerful Knowledge (key concepts, skills)	What will you be assessed on?	How can you help at home?
3.1.4 Energetics 3.1.5 Kinetics 3.3.5 Alcohols 3.3.6 Organic analysis 3.3.2 Group 2 - Alkaline earth metals	• Enthalpy of combustion and formation, calorimetry, Hess's Law and bond enthalpies. • Studying how changing conditions affects the speed of a chemical reaction, including: collision theory: Maxwell-Boltzmann distribution and the effects of pressure, concentration, etc. • Production of alcohols, uses (including as biofuels). Oxidation and elimination reactions. • Identification of functional groups using test tube reactions. Instrumental methods – Mass Spectrometry and Infra-red spectroscopy. • Trends down the group and uses of the metal compounds.	Students will sit 2 summative assessments during term 2. These will be on amount of substance and all of the organic content up to alkenes. Required practical 3, 5 and 6 will also be carried out.	Students should have developed a good independent study routine. Encouragement to work through resources and continuing to practice calculations. Students should be gaining confidence in where to look for additional resources to support their learning. Working through exam questions and self-assessing is encouraged. We also encourage students to seek help from the Chemistry department if they are stuck.

Summer Term

Topics/ content outline:	Powerful Knowledge (key concepts, skills)	What will you be assessed on?	How can you help at home?
3.1.6 Chemical equilibria, Le Chatelier's Principle and K_c. 3.1.7 Oxidation, reduction and redox equations 3.1.8 Thermodynamics (A'level content, continued in Yr13) 3.3.3 Group 7 – The Halogens 3.3.15 Nuclear Magnetic Resonance Spectroscopy (A'level content)	• Effect of changing conditions on the position of equilibrium in homogeneous reactions. Expression and calculation of K_c. • Oxidation states of elements, construction of half equations and their combination to form redox equations. • Construction of Born-Haber cycles to calculate lattice enthalpies. • Trends of the halogens including oxidising/reducing ability of the halogen/halide. Uses of chlorine and chlorate (I). • Carbon-13 and proton NMR as an analytical tool for structural elucidation and in combination with MS and IR.	Students will sit 2 Mock examinations which cover the entire AS content. Students can opt to take the external AS exam. Required practical 4 will also be carried out. There will be the opportunity to complete any outstanding required practicals for the CPAC accreditation.	Students should have developed a good independent study routine. Encouragement to work through resources and continuing to practice calculations. Students should be confident finding additional resources to support their learning. Working through exam questions and self-assessing is essential to practice content and exam technique. We also encourage students to seek help from the Chemistry department if they are stuck.

Year 13 A'Level year 2
Curriculum Overview: Chemistry (AQA)

RESPECT
COURAGE
RESPONSIBILITY
KINDNESS
RESILIENCE

Autumn Term

Topics/ content outline:	Powerful Knowledge (key concepts, skills)	What will you be assessed on?	How can you help at home?
3.1.8 Thermodynamics (continued) 3.1.9 Rate of reaction 3.1.10 Equilibrium constant Kp for homogeneous systems 3.1.11 Electrode potentials and electrochemical cells. 3.3.7 Optical isomerism 3.3.8 Aldehydes and ketones 3.3.9 Carboxylic acids and derivatives 3.3.10 Aromatic chemistry 3.3.11 Amines 3.3.12 Polymers	• Calculation of Gibb's free energy change and entropy change in reactions. • The mathematical relationship between rate of reaction and concentration. Use of practical measurements to calculate rates of reaction. • Calculations of the effect of partial pressure on equilibrium yield using Kp • Redox reactions in electrochemical cells including commercial applications. • Stereoisomerism in compounds with asymmetric carbon atoms. • Nucleophilic attack on carbonyl containing compounds • Formation and uses of Esters. Fats, oils and biodiesel. Acylation reactions – addition-elimination mechanism. • The structure of benzene and its substitution reactions. • Preparation of amines. Amines and bases and nucleophiles. • Condensation polymerisation with a focus on Terylene, Nylon and Kevlar.	Students will sit an assessment on Thermodynamics and NMR early in the term. In the second half of the term there will be assessments on Equilibria and organic content covered. Required practical 7, 8 and 10 will also be carried out.	The difficulty of the course content increases in year 13. Consolidation of lesson content is essential. Students should continue to practise exam questions and to seek help from the chemistry department If they are struggling with any particular concepts. It is important that students are confident in the year 12 content as this will form the foundation upon which year 13 concepts are built.

Spring Term

Topics/ content outline:	Powerful Knowledge (key concepts, skills)	What will you be assessed on?	How can you help at home?
3.1.12 Acids and bases 3.3.13 Amino acids, proteins and DNA 3.3.14 Organic synthesis 3.3.16 Chromatography 3.2.5 Transition metals 3.2.6 Reactions of ions in aqueous solutions	• Definition of pH, calculation of pKa. pH curves, titrations and indicators and buffers. • Acidic and basic properties of amino acids. Bonding and structure of proteins and DNA. Cisplatin as an example of anti-cancer drugs. • Formation of new organic substances by multi-step synthesis via reaction mechanisms across the specification. • Chromatography as a tool for the separation and identification of organic substances. • Properties and uses of transition metals. Complexes, oxidation states and ligand substitution reactions. • Reactions of transition metals in solutions and use of test tube reactions for identification.	Students will sit 2 Mock examinations covering all content to date Required practical 9 and 12 will also be carried out	The difficulty of the course content increases in year 13. Consolidation of lesson content is essential. Students should continue to practise exam questions and to seek help from the chemistry department If they are struggling with any particular concepts. It is important that students are confident in the year 12 content as this will form the foundation upon which year 13 concepts are built. Post mock exams, students should have a good idea of the areas on which they need to focus. They should also have found the revision strategies which work best for them

Summer Term

Topics/ content outline:	Powerful Knowledge (key concepts, skills)	What will you be assessed on?	How can you help at home?
3.2.5 Transition metals (cont.) 3.2.6 Reactions of ions in aqueous solutions (cont.) Revision – The course content will be completed ahead of the beginning of the external exam series.	• Properties and uses of transition metals. Complexes, oxidation states and ligand substitution reactions. • Reactions of transition metals in solutions and use of test tube reactions for identification. • This allows time for revision, consolidation and exam question practice prior to study leave.	Final external examinations will be undertaken in May/June consisting of 3 papers. Required practical 11 will also be carried out. There will be the opportunity to complete any outstanding required practicals for the CPAC accreditation.	Revision should be ongoing. Encourage students to follow a timetable and to continue to seek help where needed.