Curriculum Subject: Chemistry KS5

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
YEAR 12	**Atoms, compounds, molecules & equations** **Amount of substance** **Acid–base & redox reactions** **Electrons, bonding & structure**	**Atoms, compounds, molecules & equations** **Amount of substance** **Acid–base & redox reactions** **Electrons, bonding & structure**	**The periodic table & periodicity** **Group 2 & the halogens** **Basic concepts** **Hydrocarbons** **Alkenes and haloalkanes**	**Enthalpy changes** **Reaction rates** **Alcohols**	**Qualitative analysis** **Equilibrium (qualitative)** **Organic synthesis** **Analytical techniques (IR & MS)**	**Y2 content started:** **Reaction rates** **Aromatic compounds**
	• The use of the mole as a quantitiy to measure change in reactions: including water of recrystallisation, complex calculations • How electrons are configured in different levels of organisation: shells, subshells and orbitals • Applying the fundamental concepts of bonding to data • Developing the skill of record keeping for a labbook	• The application of electron pair repulsion to understand the 3D shape of molecules • The principle of electronegativity to explain polarity • The different forces of attraction between molecules, including London forces and Hydrogen bonding	• The trends that occur across a period and the use of the concepts of shielding, nuclear charge and atomic radii to explain these • The reactivity and properties of Group 2 and Group 7 elements • The naming of carbon-based organic compounds using IUPAC nomenclature • The reactivity of the haloalkane and alkene functional groups and introduction to organic mechanisms as explantions for reaction outcomes	• The use of enthalpy data to understand the energy changes on reaction • The explanation of rates of reaction using collision theory and statsitical analysis using Boltzmann distribution curves • The reactivity of the alcohol functional group and the use of alkenes in addition polymers	• The use of K_c to quantify and explain changes to the position of equilibrium • The use of specialist organic practical technqiues to synthesise a biologically active organic solid • The analysis of organic sturtcures using infrared spectroscopy and mass spectrometry	• The methods to determine the order of each reactant in the rate equation • The importance of the rate equation for the rate determing step and its use in proposing mechanisms of reaction • The chemistry and reactivity of aromatic (benzene) containing compounds, including phenols and directing groups
	Options Round 2					
YEAR 13	**Equilibrium (quantitative)** **pH & buffers** **Carbonyl compounds** **Carboxylic acids & esters**	**Enthalpy, entropy & free energy** **Nitrogen compounds** **Polymers**	**Redox & electrode potentials** **Organic synthesis** **Chromatography & spectroscopy (NMR)**	**Transition elements** **Polymers** **PAG practicals: theory**	**Revision**	**External exams** **Paper 1: Periodic table, elements and physical chemistry** ***100 marks, 2h15, 37% of total A-level*** **Paper 2: Synthesis and Analytical Techniques** ***100 marks, 2h15, 37% of total A-level*** **Paper 3: Unified Chemistry** ***70 marks, 1h30, 26% of total A-level***
	• Calculating K_c for solutions and K_p for gases • Calculation of the pH of acids, alkalis and buffer solutions • The chemistry of the C=O carbonyl group and corresponding functional groups: esters, carboxylic acids; acid chlorides	• The chemistry of nitrogen based functional groups: amines and amides • The formation and hydrolysis of condensation polymers • The use of Born-Harber diagrams for enthalpy calcualtions • The concepts and calculations of enthalpy and entropy and their unification in Gibbs Free Energy	• Devising multi-step synthetic routes from a starting material to a product • Use of ^{1}H and ^{13}C NMR to deduce the structure of simple molecules • Use of redox chemistry to induce a voltage by the formation of electrochemical cells	• The chemistry of transition metals and the use of ligands to bind with transition metals to form complexes • The chemistry of tranisition metal complexes • The key practical theory covered in the PAG practicals over the 2 year course	• Synoptic spaced practice with an emphasis of Paper 3: unififed Chemistry • How to decipher exam questions • Revsiting key challenging concepts: calcualtions • Applying knowledge to new scenarios (AO3)	

St Bede's Curriculum Design Principles

Within subjects: depth, relevance, sequencing, spacing

Between subjects: breadth, cultural capital, coherence, progression, interlinking