



SUBJECT: Chemistry

Key Stage 5 Curriculum Content

	<u>Year 12</u>	<u>Year 13</u>
<u>HT1</u>	<p><u>Atoms and Reactions</u></p> <ul style="list-style-type: none"> ● Atoms, ions and compounds ● The mole, types of formula, gas volumes and solutions ● Chemical equations, moles and reactions ● Acids and bases, salts, water of crystallisation ● Titrations, oxidation number, redox reactions 	<p><u>Further Organic Chemistry and Analysis</u></p> <ul style="list-style-type: none"> ● Benzene, reactions of benzene, reactivity of alkenes and benzene ● Phenols, bromination & uses of phenols ● Reactions of aldehydes and ketones, testing carbonyl compounds ● Carboxylic acids, esters ● Chromatography overview, TLC, gas chromatography, GC-MS / Testing for functional groups ● Carbon-13 NMR spectroscopy, proton NMR spectroscopy
<u>HT2</u>	<p><u>Electrons, Bonding and Structure</u></p> <ul style="list-style-type: none"> ● Shells and orbitals, sub-shells, energy levels, electrons and the Periodic Table ● Ionic bonding, covalent bonding and structure ● Molecular/ionic shape, electronegativity, polarity, intermolecular forces 	<p><u>Nitrogen Compounds and Polymers</u></p> <ul style="list-style-type: none"> ● Amines and their reactions ● Amino acids, amides, optical isomerism ● Polyesters & Polyamides, addition & condensation polymerisation, breaking down polymers ● Synthesis of aliphatic/aromatic compounds, chirality in pharmaceutical synthesis
<u>HT3</u>	<p><u>Periodic Table</u></p> <ul style="list-style-type: none"> ● Periodicity ● Group 2 elements and compounds ● Group 7 elements and compounds 	<p><u>Rates, Equilibria and pH</u></p> <ul style="list-style-type: none"> ● Measuring reaction rates, orders and the rate equation, half-lives ● Orders from rate-conc graphs, initial rates, rate-determining step ● Equilibrium constants, Kc/Kp calculations, equilibrium position and Kc/Kp ● Equilibrium constant and rate constant, role of H⁺ in acids, conjugate acid-base pairs ● pH, strong and weak acids, calculating pH ● Ionisation of water, pH values of bases, buffer solutions
<u>HT4</u>	<p><u>Physical Chemistry</u></p> <ul style="list-style-type: none"> ● Exothermic & endothermic reactions, profile diagrams, standard enthalpy changes ● Determining enthalpy changes, $Q=mc\Delta T$ ● Bond enthalpies and Hess' Law ● Calculating enthalpy changes from ΔH_c^\ominus and ΔH_f^\ominus ● Rates of reaction, catalysts and Boltzmann distribution 	<p><u>Energy</u></p> <ul style="list-style-type: none"> ● Lattice enthalpy, Born-Haber cycles and calculations ● Enthalpy change of solution, hydration and lattice enthalpies ● Entropy and free energy ● Redox, cells and half cells ● Cell potentials, feasibility of reactions, storage and fuel cells, hydrogen for the

	<ul style="list-style-type: none"> ● <u>Dynamic equilibria and Kc</u> 	future
<u>HT5</u>	<p style="text-align: center;"><u>Basic Organic Chemistry</u></p> <ul style="list-style-type: none"> ● Hydrocarbons, functional groups, organic formulae, structural and skeletal formulae, isomers ● Fossil fuels, alkanes and their reactions ● Alkenes and their reactions ● Electrophilic addition in alkenes and polymerisation 	<p style="text-align: center;"><u>Transition Elements</u></p> <ul style="list-style-type: none"> ● Transition metals, properties of their compounds, catalysis and precipitation ● Complex ions, stereoisomerism, ligands, ligand substitution and stability constants ● Redox titrations and Qualitative Analysis
<u>HT6</u>	<p style="text-align: center;"><u>Alcohols, Haloalkanes and Analysis</u></p> <ul style="list-style-type: none"> ● Alcohols and their reactions ● Haloalkanes and their reactions ● Organic synthesis ● Spectroscopy 	Revision