

Year	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
7	<p>Cook – Hot and Cold (Physical Changes)</p> <p>-States of matter, arrangement &amp; movement of particles, physical properties &amp; explanations of these.</p> <p>-Changes of state, cooling &amp; heating curves.</p>	<p>Cook – Perfect Pancakes (Chemical Changes)</p> <p>-Recognising &amp; defining chemical changes.</p> <p>--Variables, independent, dependent &amp; control.</p> <p>-Types of chemical changes.</p>	<p>Forensics – CSI (Health and Safety)</p> <p>-Recognising hazards, the risks they pose and suggesting control measures.</p> <p>-Presenting data in suitable formats.</p>	<p>Forensics – Fake (Separation Techniques)</p> <p>-Mixtures &amp; Solutions, Chromatography, sublimation, filtration, distillation, diffusion &amp; gas pressure.</p> <p>-Identification of substances using physical properties.</p>	<p>Forensics – Cold Case (Analysing Data)</p> <p>-Reliable data, accurate results, precise results, repeatable results.</p> <p>-Analysing data, anomalous results, random and systematic error.</p>	<p>Forensics – Abduction (Reactions of Acids)</p> <p>-Acids &amp; alkalis, indicators, pH scale.</p> <p>-Reactions of acids.</p> <p>-General equations and word equations.</p>
8	<p><b>Solids, Liquids and Gases Recap</b></p> <p><b>Atoms, Elements and Compounds</b></p> <p>- definitions, chemical symbols and formulae, conservation of mass, balancing chemical equations</p>	<p><b>The Periodic Table</b></p> <p>- physical &amp; chemical properties of elements, Mendeleev and the patterns in the periodic table, metals and non-metals, acidity of oxides</p>	<p><b>Fuels and Combustion</b></p> <p>- combustion, oxidation, products of combustion, combustion of fuels, thermal decomposition</p>	<p><b>Acids and Neutralisation</b></p> <p>- pH scale, neutralisation, reactions of acids with metals and carbonates, writing and balancing equations for the reactions of acids</p>	<p><b>Energy and Materials</b></p> <p>- exothermic and endothermic reactions, catalysts, reactivity and displacement, extraction of metals, ceramics and polymers</p>	<p><b>Earth and Atmosphere</b></p> <p>- structure of the Earth and it's atmosphere, different types of rock, the rock cycle, recycling of resources,</p>
9	<p><b>Atomic Structure</b></p> <p>-History of the atomic model, atomic structure, electron configurations, isotopes</p> <p><b>Pure and Mixtures</b></p>	<p><b>Periodic Table 1</b></p> <p>- patterns in the periodic table, Group 1</p> <p><b>Metals and Extraction</b></p> <p>- metals and oxidation, reactivity series, displacement reactions,</p>	<p><b>Organic Chemistry 1</b></p> <p>- crude oil and alkanes, properties of alkanes, fractional distillation, cracking, alkenes</p>	<p><b>Chemistry of the Atmosphere</b></p> <p>- Earth's early atmosphere, composition of the Earth's atmosphere, fuels and combustion, pollutants from combustion, global climate change and the</p>	<p><b>Salts and Neutralisation 1</b></p> <p>- pH and neutralisation, making salts theory</p> <p><b>Sustainable Resources</b></p>	<p><b>Structure and Bonding</b></p> <p>- states of matter recap, ionic bonding, metallic bonding, covalent bonding, polymers, allotropes of carbon, nanotechnology</p>

	- elements, compounds and mixtures, purity, separating mixtures, formulations	metal extraction, corrosion and its prevention, alloys		greenhouse effect, carbon footprint	- sustainable resources, life cycle assessments and recycling	
10	<b>Structure and Bonding</b> - states of matter recap, ionic bonding, metallic bonding, covalent bonding, polymers, allotropes of carbon, nanotechnology	<b>Quantitative Chemistry 1</b> - conservation of mass, uncertainties in measurement, A, Ar and Mr, Moles, percentage composition, using moles to balance equations	<b>Quantitative Chemistry 2</b> - Reacting masses, limiting reactants, percentage yield, atom economy	<b>Periodic Table 2</b> - History of the periodic table, Group 1, Group 7, Halogen displacement reactions, transition metals	<b>Energy and Chemical Reactions</b> - exothermic and endothermic reactions, bond energies, energy in reversible reactions	<b>Rates of Reaction</b> - measuring rates of reaction, collision theory, catalysts
11	<b>Rates of reaction</b> (cote in 2021) - measuring rates of reaction, collision theory, catalysts  <b>Salts and Neutralisation 2</b> - making salts, strong and weak acids  Potable Water - potable water, purifying water	<b>Chemical Analysis</b> - flame tests, hydroxide precipitates, testing for halides, sulfates and carbonates, instrumental methods	<b>Quantitative Chemistry 2</b> - moles in solution, titrations, titration calculations, moles of gases  <b>Organic Chemistry 2</b> - alkane and alkenes recap, alcohols, carboxylic acids, addition and condensation polymers, natural molecules and polymers	<b>Electrolysis</b> - oxidation and reduction, electrolysis of molten compounds, electrolysis of aqueous solutions, electrochemical cells and fuel cells  <b>Equilibrium and reversible reactions</b> - reversible reactions and Le Chatelier's Principle, the Haber process, NPK fertilisers	<b>Consolidation Exams</b>	
12	<b>Atomic Structure</b> -Sub atomic particles & nuclear symbols, ideas & evidence about atomic structure, A & Ar,	<b>Bonding</b> -Ionic & Metallic bonding, Covalent & dative covalent bonding, macromolecular structures,	<b>Energetics</b> -Exothermic & endothermic, Enthalpy, $\Delta H$ & $\Delta H_f$ , enthalpy changes	<b>Halogenoalkanes</b> -Naming halogenoalkanes, homolytic & heterolytic fission, nucleophiles, electrophiles and	<b>Alkenes</b> -Naming alkenes, EZ isomerism, electrophilic	<b>Rate Equations</b> -Measuring rate, graphing rate, the rate equation, iodine clock,

	<p>Mass spectrometry, Analysis of mass spectra, ionisation energies, spd notation, emission spectra.</p>	<p>comparing crystal types, electronegativity &amp; dipoles, intermolecular forces, shapes of molecules &amp; ions.</p> <p><b>Introduction to Organic Chemistry</b></p> <p>-Functional groups, homologous series, Nomenclature of alkanes, alkenes, alcohols &amp; halogenoalkanes, structural isomerism.</p>	<p>in solution, cooling corrections, Hess' law,</p>	<p>radicals, free radical substitution, the ozone layer, nucleophilic substitution, rates of nucleophilic substitution, elimination reactions.</p> <p><b>Alcohols</b></p> <p>-Naming alcohols, oxidation of alcohols, elimination from alcohols, making ethanol.</p>	<p>addition, addition polymerisation.</p>	<p>rate &amp; temperature, the rate determining step.</p>
	<p><b>Amount of Substance</b></p> <p>- relative atomic mass and relative molecular mass, the mole and the Avogadro constant, the ideal gas equation, empirical and molecular formula, balanced equations and associated calculations</p>	<p><b>Periodicity</b></p> <p>- s,p,d,f classification, physical trends across Period 3 (atomic radius, first ionisation energy, melting point)</p> <p><b>Alkanes</b></p> <p>- fractional distillation of crude oil, modification of alkanes by cracking, combustion of alkanes,</p>	<p><b>Kinetics</b></p> <p>- collision theory, Maxwell-Boltzmann distribution, effect of temperature on reaction rate, effect of concentration and pressure, catalysts</p> <p><b>Equilibria</b></p> <p>- chemical equilibria and Le Chatelier's principle, equilibrium constant <math>K_c</math> for homogeneous systems</p>	<p><b>Redox</b></p> <p>- oxidation, reduction and redox equations</p> <p><b>Group 2</b></p> <p>- trends in atomic radius, first ionisation energy and melting point, reactions with water, solubilities of the hydroxides, solubilities of the sulfates, uses of group 2 compounds.</p>	<p><b>Group 7</b></p> <p>- trends in properties, uses of chlorine and chlorate</p> <p><b>Analysis</b></p> <p>- Infra-red, mass spectroscopy</p>	<p><b>Acids and Bases</b></p> <p>- Bronsted Lowry acid bases, definition and determination of pH, the ionic product of water, weak acids and bases, <math>K_a</math> for weak acids, pH curves, titrations and indicators, buffer action</p>
13	<p><b>Acids and Bases</b></p> <p>- Bronsted Lowry acid bases, definition and determination of pH, the ionic product of water, weak acids and bases, <math>K_a</math> for weak acids, pH</p>	<p><b>Properties of Period 3 elements and their oxides</b></p> <p>- formation of period 3 oxides, trend in melting point of period 3 oxides, of the oxides with water</p>	<p><b>Amines</b></p> <p>- preparation, base properties, nucleophilic properties</p> <p><b>Polymers</b></p> <p>- condensation polymers, biodegradability</p>	<p><b>Thermodynamics</b></p> <p>- Born-Haber cycles, Gibb's free energy change and entropy change</p> <p><b>Reactions of Ions in Aqueous Solutions</b></p>	<p><b>Consolidation and Exams</b></p>	

	<p>curves, titrations and indicators, buffer action</p>	<p><b>Equilibria: K<sub>p</sub></b>          - partial pressures and mole fractions, K<sub>p</sub> expression, determination of K<sub>p</sub>, qualitative effects of changes in condition on the position of equilibrium and the value of K<sub>p</sub></p>	<p>and disposal of polymers</p> <p><b>Biological Molecules</b>          - amino acids, proteins, enzymes, DNA, action of anticancer drugs,</p> <p><b>Chromatography</b>          - thin layer chromatography, column chromatography, gas chromatography, calculating R<sub>f</sub> values</p>	<p>- formation of hexa-aqua ions, acidity of hexa-aqua ions, substitution reactions, colour of complexes.</p>		
	<p><b>Nomenclature &amp; Isomerism</b>          -Recap of nomenclature, nomenclature with two functional groups, isomerism recap, optical isomerism, thalidomide.</p> <p><b>Carbonyl chemistry 1</b>          -Physical properties of aldehydes &amp; ketones, oxidation of alcohols &amp; aldehydes recap, nucleophilic addition.</p>	<p><b>Carbonyl chemistry 2</b>          - Physical properties of carboxylic acids, B-L acid behaviour of carboxylic acids, esterification, acid &amp; base hydrolysis of esters &amp; triglycerides, biodiesel, acylation &amp; nucleophilic addition-elimination.</p> <p><b>Aromatic chemistry</b>          -Ideas &amp; evidence for structure of benzene, chemical properties of benzene, electrophilic substitution.</p> <p><b>Aspirin synthesis</b>          -Synthesis, purification by recrystallisation and mp analysis of aspirin.</p>	<p><b>NMR</b>          -<sup>1</sup>H &amp; <sup>13</sup>C NMR principles, analysis of spectra &amp; identification of unknowns from spectroscopic data.</p> <p><b>Organic synthesis</b>          - Organic reaction pathways, identification of mechanism &amp; reaction types, identification of reagents &amp; conditions.</p> <p><b>Electrode potentials</b>          -Redox recap, definitions, SHE, electrochemical series, electrochemical cells, changing conditions and emf.</p>	<p><b>Transition metals</b>          -definitions &amp; electron configuration recap, complexes, variable oxidation states, redox titrations, hetero &amp; homogeneous catalysis, autocatalysis, cis-platin</p>	<p><b>Consolidation and Exams</b></p>	