

## SJBC Curriculum Termly Plan: Year 12 A-Level CHEMISTRY

Term	Topic(s) and links to other subjects	Core Knowledge	Core Vocabulary	Assessment	Resources
Autumn 1	<p><b>Topic 1. Atomic structure</b>  <u>Subject links:</u>                      Topic 2. Amount of Substance (relative atomic mass, isotopes)                      Topic 3. Bonding (electron configuration, periodic trends)                      Topic 4. Energetics (ionisation energies and lattice enthalpy)                      Topic 5. Kinetics (activation energy and electron interactions)                      Topic 7. Redox (oxidation states and electron transfer)                      Topic 8. Periodicity (ionisation energies and atomic structure trends)                      Topic 23. Transition Metals (electron configurations and d-block properties).</p>	<ul style="list-style-type: none"> <li>• Atomic structure (protons, neutrons, electrons, isotopes)</li> <li>• Relative atomic mass and isotopic abundance</li> <li>• Electron configuration and energy levels</li> <li>• Mass spectrometry</li> <li>• Amount of substance (moles, molar mass, calculations)</li> <li>• Empirical and molecular formulas</li> <li>• Ideal gas equation</li> <li>• Conservation of mass and balanced equations.</li> </ul>	Atom, Nucleus, Proton, Neutron, Electron, Atomic number (Z), Mass number (A), Isotope, Relative atomic mass ( $A_r$ ), Relative isotopic mass, Relative molecular mass ( $M_r$ ), Time of flight (TOF) mass spectrometry, Ionisation, Acceleration, Deflection, Detection, Mass spectrum, Ionisation energy, Successive ionisation energies, Electron shell, Sub-shell (s, p, d), Orbital, Electron configuration, Aufbau principle, Hund's rule, Pauli exclusion principle, Shielding, Nuclear charge, Atomic radius, Periodicity.	Weekly homework tasks- topic past paper questions  Weekly UpLearn tasks  End of topic test (50 minutes)  Topic 2. <b>RP 1</b> - Making up a volumetric solution and carrying out a titration. Research into practical and expected results- write up per CPAC criteria	AQA A Level Chemistry Student Book 1 ((by OUP, author: Ted Lister & Janet Renshaw)  AQA GCE Chemistry Specification 2015 (AQA website)  AQA Required Practicals Handbook (AQA website)  AQA GCE Chemistry Data Booklet 8CHO Advanced Subsidiary (AQA website)  Past paper questions homework booklets (produced by the department)  UpLearn  JSTOR

	<p><b>Topic 2. Amount of substance</b>  <u>Subject links:</u>  Topic 1. Atomic Structure (Ar, Mr, molar mass)  Topic 3. Bonding (ionic formulas, empirical/molecular formulas)  Topic 4. Energetics (calculations using moles and enthalpy)  Topic 5. Kinetics (rates using concentration, volume, time)  Topic 6. Equilibria (Kc calculations)  Topic 11. Organic Chemistry (stoichiometry in reactions)  Topic 21. Acids, Bases, and Buffers (titration calculations)  RPs 1, 2, and 3 (quantitative work)</p> <p><b>Topic 3. Bonding</b>  <u>Subject links:</u>  Topic 1. Atomic Structure (electron arrangement and shells)  Topic 2. Amount of Substance (formula units, ionic charges)</p>	<ul style="list-style-type: none"> <li>• The mole and Avogadro's constant</li> <li>• Empirical and molecular formulae</li> <li>• Molar gas volume and ideal gas equation</li> <li>• Balanced equations and stoichiometry</li> <li>• Reacting masses and volumes (gases and solutions)</li> <li>• Atom economy and percentage yield.</li> </ul> <ul style="list-style-type: none"> <li>• Ionic, covalent, and metallic bonding</li> <li>• Shapes of molecules and ions (VSEPR theory)</li> <li>• Polarity of molecules</li> <li>• Intermolecular forces (London forces, dipole-dipole, hydrogen bonding)</li> </ul>	<p>Mole, Avogadro's constant (<math>6.022 \times 10^{23} \text{ mol}^{-1}</math>), Molar mass, Empirical formula, Molecular formula, Stoichiometry, Limiting reagent, Theoretical yield, Actual yield, Percentage yield, Atom economy, Concentration (<math>\text{mol/dm}^3</math>), Titration, Standard solution, Concordant titres, Molar volume (of gas at RTP), Room temperature and pressure (RTP), Ideal gas equation (<math>PV = nRT</math>), Pressure (Pa), Volume (<math>\text{m}^3</math>), Temperature (K), Gas constant (R).</p> <p>Ionic bonding, Covalent bonding, Metallic bonding, Lattice structure, Giant ionic lattice, Delocalised electrons, Bond enthalpy, Dative covalent bond (coordinate bond), Electronegativity, Polar bond, Dipole, Intermolecular forces, Van der Waals forces, Permanent dipole-dipole interactions,</p>		<p>Seneca</p> <p>Scientific articles</p> <p>Revision guide</p> <p>Royal Society of Chemistry</p> <p>Allery Chemistry (YouTube)</p> <p>Animations to aid conceptual understanding</p>
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	<p>Topic 4. Energetics (bond enthalpies and lattice energy)</p> <p>Topic 5. Kinetics (molecular geometry and collision orientation)</p> <p>Topic 6. Equilibria (intermolecular forces and volatility)</p> <p>Topic 8. Periodicity (trends in bonding and structure)</p> <p>Topic 11. Organic Chemistry (functional group reactivity, polarity)</p> <p>Topic 16. Organic Analysis (intermolecular forces in separation methods)</p> <p>Topic 23. The Transition metals (complex formation and the shape of complex ions)</p>	<ul style="list-style-type: none"> <li>• Properties of ionic compounds, simple molecular substances, giant covalent structures, and metals.</li> </ul>	<p>Hydrogen bonding, Molecular shape, Electron pair repulsion, Bond angle, Linear, trigonal planar, tetrahedral, trigonal bipyramidal, octahedral, bent, pyramidal, Lone pair, Bond polarity, Simple molecular structure, Giant covalent structure, Macromolecule, Electrical conductivity, Melting point, Electron pair repulsion (VSEPR theory), Delocalised electrons.</p>		
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Autumn 2	<p><b>Topic 3. Bonding</b> <i>cont.</i></p> <p><b>Topic 4. Energetics</b>  <u>Subject links:</u>  Topic 1. Atomic structure (bonding basics)  Topic 2. Amount of substance (stoichiometry in energy calculations)  Topic 3. Bonding (bond enthalpies)  Topic 5. Kinetics (activation energy)  Topic 6. Equilibria (temperature effects on equilibrium)</p> <p><b>Topic 5. Kinetics</b>  <u>Subject links:</u>  Topic 2. Amount of substance (concentration calculations)  Topic 3. Bonding (collision energy and orientation)  Topic 4. Energetics (activation energy)  Topic 6. Equilibria (rates linked to dynamic equilibrium)</p>	<p>Continue on and finish off from Autumn 1</p> <ul style="list-style-type: none"> <li>• Enthalpy changes (<math>\Delta H</math>)- formation, combustion, neutralization, reaction</li> <li>• Hess's Law and energy cycle calculations</li> <li>• Bond enthalpies and their use</li> <li>• Exothermic vs. endothermic reactions.</li> </ul> <ul style="list-style-type: none"> <li>• Rate of reaction and factors affecting rate</li> <li>• Collision theory and Maxwell-Boltzmann distribution</li> <li>• Activation energy and catalysts</li> <li>• Rate equations and determining rate constants</li> <li>• Orders of reaction and half-life</li> <li>• Initial rate method and graphs.</li> </ul>	<p>Enthalpy, Exothermic, Endothermic, Standard enthalpy change, Hess's Law, Bond enthalpy (bond dissociation energy), Activation energy, Energy profile diagram.</p> <p>Rate of reaction, Collision theory, Activation energy, Catalyst, Rate equation, Rate constant (k), Order of reaction (zero, first, second), Half-life, Initial rate.</p>	<p>Weekly homework tasks- topic past paper questions</p> <p>Weekly UpLearn tasks</p> <p>End of topic test (50 minutes)</p> <p>PPE1 test (learning to date)</p> <p>Isomer identification practice</p> <p>Mechanism drawing and curly arrow tasks</p> <p>Topic 4. <b>RP 2</b>- Determination of enthalpy change of a reaction (eg. neutralization or combustion). Research into practical and expected results- write up per CPAC criteria.</p> <p>Topic 5. <b>RP3</b>- Investigate the effect of changing concentration or</p>	<p>AQA A Level Chemistry Student Book 1 ((by OUP, author: Ted Lister &amp; Janet Renshaw)</p> <p>AQA GCE Chemistry Specification 2015 (AQA website)</p> <p>AQA Required Practicals Handbook (AQA website)</p> <p>AQA GCE Chemistry Data Booklet 8CHO Advanced Subsidiary (AQA website)</p> <p>Past paper questions homework booklets (produced by the department)</p> <p>UpLearn</p> <p>JSTOR</p> <p>Seneca</p> <p>Scientific articles</p>
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	<p><b>Topic 11. Introduction to Organic Chemistry</b>  <u>Subject links:</u>  Topic 1. Atomic Structure (covalent bonding and electrons in reactions)  Topic 2. Amount of Substance (formulae, moles, and reacting masses)  Topic 3. Bonding (shapes of molecules, polarity)  Topic 12. Alkanes  Topic 13. Halogenoalkanes  Topic 14. Alkenes  Topic 15. Alcohols  Topic 16. Organic Analysis</p>	<ul style="list-style-type: none"> <li>• Types and representations of organic compounds</li> <li>• Nomenclature</li> <li>• Isomerism (structural and stereoisomerism)</li> <li>• Reaction types and mechanisms.</li> </ul>	<p>Homologous series, Functional group, General formula, Empirical formula, Molecular formula, Displayed formula, Structural formula, Skeletal formula, Isomer, Structural isomer, Stereoisomer, E/Z isomerism, Cis-trans isomerism, Substitution reaction, Addition reaction, Elimination reaction, Reaction mechanism, Curly arrows.</p>	<p>temperature on the rate of a reaction.  Research into practical and expected results-write up per CPAC criteria.</p> <p>Topic 11. <b>RP4</b>- Test for alkenes, alcohols, and haloalkanes (organic functional group tests).  Research into practical and expected results-write up per CPAC criteria.</p> <p>Topic 11. <b>RP5</b>- Distillation of a product from a reaction.  Research into practical and expected results-write up per CPAC criteria.</p> <p>Topic 11. <b>RP6</b>- Purification of an organic liquid (eg. recrystallisation, drying).</p>	<p>Revision guide</p> <p>Royal Society of Chemistry</p> <p>Allery Chemistry (YouTube)</p> <p>Animations to aid conceptual understanding</p>
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				Research into practical and expected results- write up per CPAC criteria.	
Spring 1					

Spring 2					

Summer 1					
Summer 2					