

St John's Curriculum Overview – Year 12

Introduction

- Chemistry at St John's is studied at **A-Level, but not AS**. We cover the **OCR Chemistry B (Salters) specification (H433)**
- Students work towards **three externally assessed written exams** in A-Level Chemistry. All papers will be **synoptic** and feature the following types of questions: multiple choice, calculations, structured, closed short answer, levelled response questions and practical skills.
- Chemistry B (Salters) is '**context-led**'. Chemical concepts are introduced within a relevant context; the course being written as a series of teaching modules based on contemporary issues in chemistry.
- Students study the chemistry in a **spiral way** so that chemical ideas, introduced in an early topic, are reinforced later. The '**drip-feed**' approach to teaching and learning chemical principles allows candidates to revisit a particular topic several times during the course, each time taking their knowledge and understanding a step further.
- The OCR Chemistry B specification places a particular emphasis on an **investigational and problem-solving approach to practical work** and is supported by extensive new materials developed by the University of York Science Education Group.
- **Assessed practical work (PAGs)** will cover the requirements of the practical skills module, which is assessed in **written examinations** and through the **Practical Endorsement**. There are 12 PAGs in total, 6 in each year of the course.

Subject title	Chemistry
Setting arrangements	Mixed prior attainment within the two classes
Time allowance each fortnight	9 hours

Topics, Content and Assessment covered during the course

Term	Teacher 1 topics and content	Teacher 1 Assessment details	Teacher 2 topics and content	Teacher 2 Assessment details
Term 1	Elements of Life (EL) EL 1 - Atomic structure, mass spectrometry & A _r calculations, nuclear fusion. EL 2 - Wave & particle models of light, absorption spectra, emission spectra, energy levels & quanta EL 3 - Electronic structure: shells, sub-shells & orbitals, electron configurations EL 4 - Periodicity (physical & chemical properties) EL 5 - Covalent bonding, shapes of molecules	End of chapter 20 minute tests: <ul style="list-style-type: none"> • EL 1 • EL 2 • EL 3&4 • EL 5 • EL 6 <i>PAG 1 assessed against specific CPAC</i>	Developing Fuels (DF) DF 1 – Exothermic & Endothermic reactions, enthalpy level diagrams, standard enthalpy changes, measuring enthalpy changes PAG 3 – Determination of enthalpy of combustion (OCR 3.3) DF 2 – Enthalpy cycles & Hess' law DF 3 – Alkanes (structures & naming), shapes of molecules DF 4 – Bond enthalpies	End of chapter 20 minute tests: <ul style="list-style-type: none"> • DF 1 • DF 2 • DF 4 <i>PAG 3 assessed against specific CPAC</i>

	<p>EL 6 - Calculations: A_r & M_r, moles, empirical formula, waters of crystallisation, % yield, balancing equations</p> <p>PAG 1 – Determination of the composition of copper(II)carbonate basic (OCR 1.1)</p>			
Term 2	<p>Elements of Life (EL)</p> <p>EL 7 - Ionic bonding, ionic compound formulae, ionic equations, metallic bonding, summary of all bonding, structure & properties</p> <p>PAG 4 – Identifying unknowns 1 (OCR 4.1)</p> <p>EL 8 – Ionisation energies, group 1 & 2 chemistry, thermal stability of group 2 carbonates</p> <p>EL 9 – Reacting masses, acids & bases, neutralisation, concentration of solutions</p> <p>PAG 2 – Determination of the concentration of HCl (OCR 2.1)</p>	<p>End of chapter</p> <p>20 minute tests:</p> <ul style="list-style-type: none"> • EL 7 • EL 8 • EL 9 <p>PAG 4 assessed against specific CPAC</p> <p>PAG 2 assessed against specific CPAC</p> <p>End of EL whole topic test (1hr)</p>	<p>Developing Fuels (DF)</p> <p>DF 5 – Catalysis – Heterogeneous & Homogeneous</p> <p>DF 6 – Alkenes – Structures & naming, electrophilic addition reactions (with Br_2, HBr, H_2O, H_2 electrophiles) σ bonds & π bonds</p> <p>DF 7 – Addition polymerisation</p> <p>DF 8 – Combustion of fuels, gas calculations, ideal gas equation</p> <p>DF 9 – Shapes of molecules, structural isomerism of alkanes: chain, position, FG, stereoisomerism of alkenes: E/Z isomerism, naming organic compounds</p> <p>DF 10 – Atmospheric pollutants & their formation, production of acid rain, photochemical smog, catalytic converters</p> <p>DF 11 – Alternative fuels: Biofuels, Ethanol, Biodiesel, Hydrogen</p>	<p>End of chapter</p> <p>20 minute tests:</p> <ul style="list-style-type: none"> • DF 3 & 5 • DF 6 & 7 • DF 8 • DF 9 • DF 10 & 11 <p>End of DF whole topic test (1hr)</p>
Term 3	<p>What's in a medicine? (WM)</p> <p>WM 1 – Alcohols (properties & reactions), aldehydes, carboxylic acids, ketones</p> <p>WM 2 – The –OH group in different environments, phenols & carboxylic acids, esters</p>	<p>End of chapter</p> <p>20 minute tests:</p> <ul style="list-style-type: none"> • WM 1 • WM 2 	<p>Elements of the Sea (ES)</p> <p>ES 1 – Halogens – Physical & chemical properties, displacement reactions, halide ion reactions</p> <p>ES 2 – Redox, oxidising & reducing agents, oxidation states, systematic names, balancing equations using oxidation states</p> <p>ES 3 – Electrolysis of molten compounds, electrolysis of solutions</p>	<p>End of chapter</p> <p>20 minute tests:</p> <ul style="list-style-type: none"> • ES 1 • ES 2 • ES 3
Term 4	<p>What's in a medicine? (WM)</p> <p>WM 3 – Infrared spectroscopy, interpreting IR Spectra</p> <p>WM 4 – Mass spectrometry for compounds, interpreting Mass Spectra</p> <p>WM 5 – Principles of green chemistry, purifying organic solids – 3 main techniques</p>	<p>End of chapter</p> <p>20 minute tests:</p> <ul style="list-style-type: none"> • WM 3 • WM 4 • WM 5 	<p>Elements of the Sea (ES)</p> <p>ES 4 – Dynamic equilibrium, equilibrium constant K_c</p> <p>ES 5 – Risks & benefits of chlorine, iodine-thiosulfate redox titration</p> <p>ES 6 – Atom economy, hydrogen halides</p> <p>ES 7 – Le Chatelier's principle</p>	<p>End of chapter</p> <p>20 minute tests:</p> <ul style="list-style-type: none"> • ES 4 • ES 5 • ES 6

	PAG 6 – Preparation of benzoic acid (OCR 6.2)	PAG 6 assessed against specific CPAC End of WM whole topic test (1hr)		<ul style="list-style-type: none"> ES 7 End of ES whole topic test (1hr)
Term 5	The Ozone Story (OZ) OZ 1 – Gas calculations (% & ppm) OZ 2 – Wave & particle behaviour of light, interactions of radiation with matter OZ 3 – Free radical chain reactions OZ 4 – Measuring rates of reactions, collision theory, effect of temperature on reaction rate, Maxwell-Boltzmann distribution curves OZ 5 – Catalysis	End of chapter 20 minute tests: <ul style="list-style-type: none"> OZ 1 & 2 OZ 3 & 5 OZ 4 End of OZ whole topic test (1hr)	The Ozone Story (OZ) OZ 6 – Haloalkanes, intermolecular bonding PAG 5 – Synthesis of haloalkane (PAG 5.1) OZ 7 – Hydrogen bonding OZ 8 – Nucleophilic substitution reactions of haloalkanes (with OH ⁻ , CN ⁻ , H ₂ O, NH ₃ nucleophiles), carbon-halogen bond reactivity	End of chapter 20 minute tests: <ul style="list-style-type: none"> OZ 6 & 7 OZ 8 PAG 5 assessed against specific CPAC
Term 6	End of year 12 exams - 2 x 1h30 AS Chemistry papers (Foundations of chemistry and Chemistry in depth) Start year 13 content Polymers of Life (PL) and Developing Metals (DM)			

Resources Recommended for Revision and where they are available:

- OUP A-Level Salters Advanced Chemistry B textbook (discounts available through the school library)
- Use good **revision websites** (and suitable videos) to give an alternative wording to some explanations.
<http://www.physicsandmathstutor.com/chemistry-revision/a-level-ocr-b/> and www.chemguide.co.uk

Homework

- Review your class notes after each lesson using the relevant textbook pages
- Complete exam questions in the **homework booklets** and mark them using the answers
- Do the **summary questions** in the textbook and check the answers
- Revise effectively for each end of chapter review test

Additional support and help for the course

- Use the **specification checklists** to ensure you know what you do and don't know in each topic (provided at the start of the year)

- After each review test, complete **feedback homework** on your weaker areas, to get into good study habits. This enables you to build up revision material throughout the year, not just before the final exams.
- Once you know what areas of each topic you do not understand, do more past paper exam questions and revise those areas in your private study sessions.
- If you still do not understand these areas, then ask your teachers for help!
- Attend the **year 12 revision sessions** which will run from Term 1. Dates and times will vary each year, ask your teacher.
- **Redo review tests** once you have improved your understanding of the weaker areas.

Extra-Curricular:

- RSC Chemistry Olympiad
- Day trip to experience University of Bristol's chemistry laboratories
- Day trip to A Level Science Live
- Support running science club for year 7 students
- Overseas trip to the Gambia to teach science practical experiments to students in Africa