



# St John's Curriculum Overview – Year 12



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

## 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.

## 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
<b>Term 1</b>	<p><b>Elements of Life (EL)</b></p> <p>EL 1 - Atomic structure, mass spectrometry &amp; <math>A_r</math> calculations, nuclear fusion.</p> <p>EL 2 - Wave &amp; particle models of light, absorption spectra, emission spectra, energy levels &amp; quanta</p> <p>EL 3 - Electronic structure: shells, sub-shells &amp; orbitals, electron configurations</p> <p>EL 4 - Periodicity (physical &amp; chemical properties)</p> <p>EL 5 - Covalent bonding, shapes of molecules</p> <p>EL 6 - Calculations: <math>A_r</math> &amp; <math>M_r</math>, moles, empirical formula, waters of crystallisation, % yield, balancing equations</p>	<p>End of chapter 20 minute tests:</p> <ul style="list-style-type: none"> <li>• EL 1</li> <li>• EL 2</li> <li>• EL 3&amp;4</li> <li>• EL 5</li> <li>• EL 6</li> </ul> <p><i>PAG 1 assessed against specific CPAC</i></p>	<p><b>Developing Fuels (DF)</b></p> <p>DF 1 – Exothermic &amp; Endothermic reactions, enthalpy level diagrams, standard enthalpy changes, measuring enthalpy changes</p> <p><b>PAG 3 – Determination of enthalpy of combustion (OCR 3.3)</b></p> <p>DF 2 – Enthalpy cycles &amp; Hess' law</p> <p>DF 3 – Alkanes (structures &amp; naming), shapes of molecules</p> <p>DF 4 – Bond enthalpies</p>	<p>End of chapter 20 minute tests:</p> <ul style="list-style-type: none"> <li>• DF 1</li> <li>• DF 2</li> <li>• DF 4</li> </ul> <p><i>PAG 3 assessed against specific CPAC</i></p>

	<b>PAG 1 – Determination of the composition of copper(II)carbonate basic (OCR 1.1)</b>			
<b>Term 2</b>	<b>Elements of Life (EL)</b> EL 7 - Ionic bonding, ionic compound formulae, ionic equations, metallic bonding, summary of all bonding, structure & properties <b>PAG 4 – Identifying unknowns 1 (OCR 4.1)</b> EL 8 – Ionisation energies, group 1 & 2 chemistry, thermal stability of group 2 carbonates EL 9 – Reacting masses, acids & bases, neutralisation, concentration of solutions <b>PAG 2 – Determination of the concentration of HCl (OCR 2.1)</b>	End of chapter 20 minute tests: <ul style="list-style-type: none"> <li>• EL 7</li> <li>• EL 8</li> <li>• EL 9</li> </ul> PAG 4 assessed against specific CPAC  PAG 2 assessed against specific CPAC  End of EL whole topic test (1hr)	<b>Developing Fuels (DF)</b> DF 5 – Catalysis – Heterogeneous & Homogeneous DF 6 – Alkenes – Structures & naming, electrophilic addition reactions (with Br <sub>2</sub> , HBr, H <sub>2</sub> O, H <sub>2</sub> electrophiles) σ bonds & π bonds DF 7 – Addition polymerisation DF 8 – Combustion of fuels, gas calculations, ideal gas equation DF 9 – Shapes of molecules, structural isomerism of alkanes: chain, position, FG, stereoisomerism of alkenes: E/Z isomerism, naming organic compounds DF 10 – Atmospheric pollutants & their formation, production of acid rain, photochemical smog, catalytic converters DF 11 – Alternative fuels: Biofuels, Ethanol, Biodiesel, Hydrogen	End of chapter 20 minute tests: <ul style="list-style-type: none"> <li>• DF 3 &amp; 5</li> <li>• DF 6 &amp; 7</li> <li>• DF 8</li> <li>• DF 9</li> <li>• DF 10 &amp; 11</li> </ul> End of DF whole topic test (1hr)
<b>Term 3</b>	<b>What's in a medicine? (WM)</b> WM 1 – Alcohols (properties & reactions), aldehydes, carboxylic acids, ketones WM 2 – The –OH group in different environments, phenols & carboxylic acids, esters	End of chapter 20 minute tests: <ul style="list-style-type: none"> <li>• WM 1</li> <li>• WM 2</li> </ul>	<b>Elements of the Sea (ES)</b> ES 1 – Halogens – Physical & chemical properties, displacement reactions, halide ion reactions ES 2 – Redox, oxidising & reducing agents, oxidation states, systematic names, balancing equations using oxidation states ES 3 – Electrolysis of molten compounds, electrolysis of solutions	End of chapter 20 minute tests: <ul style="list-style-type: none"> <li>• ES 1</li> <li>• ES 2</li> <li>• ES 3</li> </ul>
<b>Term 4</b>	<b>What's in a medicine? (WM)</b> WM 3 – Infrared spectroscopy, interpreting IR Spectra WM 4 – Mass spectrometry for compounds, interpreting Mass Spectra WM 5 – Principles of green chemistry, purifying organic solids – 3 main techniques <b>PAG 6 – Preparation of benzoic acid (OCR 6.2)</b>	End of chapter 20 minute tests: <ul style="list-style-type: none"> <li>• WM 3</li> <li>• WM 4</li> <li>• WM 5</li> </ul> PAG 6 assessed against specific CPAC End of WM whole topic test (1hr)	<b>Elements of the Sea (ES)</b> ES 4 – Dynamic equilibrium, equilibrium constant K <sub>c</sub> ES 5 – Risks & benefits of chlorine, iodine-thiosulfate redox titration ES 6 – Atom economy, hydrogen halides ES 7 – Le Chatelier's principle	End of chapter 20 minute tests: <ul style="list-style-type: none"> <li>• ES 4</li> <li>• ES 5</li> <li>• ES 6</li> <li>• ES 7</li> </ul> End of ES whole topic test (1hr)

<b>Term 5</b>	<b>The Ozone Story (OZ)</b> 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"> <li>• OZ 1 &amp; 2</li> <li>• OZ 3 &amp; 5</li> <li>• OZ 4</li> </ul> End of OZ whole topic test (1hr)	<b>The Ozone Story (OZ)</b> OZ 6 – Haloalkanes, intermolecular bonding <b>PAG 5 – Synthesis of haloalkane (PAG 5.1)</b> OZ 7 – Hydrogen bonding OZ 8 – Nucleophilic substitution reactions of haloalkanes (with OH <sup>-</sup> , CN <sup>-</sup> , H <sub>2</sub> O, NH <sub>3</sub> nucleophiles), carbon-halogen bond reactivity	End of chapter 20 minute tests: <ul style="list-style-type: none"> <li>• OZ 6 &amp; 7</li> <li>• OZ 8</li> </ul> <i>PAG 5 assessed against specific CPAC</i>
<b>Term 6</b>	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](http://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