

St John's Curriculum Overview – Year 13

Introduction

- Chemistry at St John's is studied at **A-Level, but not at 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 | Developing Metals (DM) DM 1 – Introduction to Transition Metals (TM), electron configurations, variable oxidation states, redox titrations PAG 12(a) – Research skills (Investigating iron tablets) (OCR 12.1) DM 6 – Shapes of complexes, ligand substitution reactions/ chelation DM 2 – Catalytic activity | End of chapter 20 minute tests: <ul style="list-style-type: none"> • DM 1 • DM 6 • DM 2 & 3 <i>PAG 12(a) assessed against specific CPAC</i> | Polymers of Life (PL) PL 1 – Carboxylic acids, phenols, esters & polyesters, condensation reactions PL 2 – Amines, acyl chlorides, formation of amides PL 3 – Hydrolysis of esters, hydrolysis of amides PL 4 – Amino acids, peptides & proteins, zwitterions, optical stereoisomerism, formation of peptide bonds, hydrolysis of proteins | End of chapter 20 minute tests: <ul style="list-style-type: none"> • PL 1 • PL 2 & 3 • PL 4 & 5 |

| | | | | |
|---------------|---|--|---|--|
| | DM 3 – Colours in TM compounds, TM complexes, ligands etc, colorimetry | | | |
| Term 2 | <p>Developing Metals (DM) DM 4 – Redox reactions (displacement), electrochemical cells, electrode potentials PAG 8 – Electrochemical cells (OCR 8.1) DM 5 – Rusting & its prevention</p> <p>The Chemical Industry (CI) CI 1 – Nitrogen chemistry, testing for nitrate ions, testing for ammonium ions, redox reactions in soil & the lab CI 2 – Equilibrium constant, K_c, effect of changes in conditions on eq. CI 3 – Measuring rates of reaction CI 4 – Rate equations, rate constant & calculating units, orders of reactions, Arrhenius equation, (finding E_a & A) PAG 10 – Rates of reaction – initial rates method (iodine clock) (OCR 10.1)</p> | <p>End of chapter 20 minute tests: • DM 4 & 5 <i>PAG 8 assessed against specific CPAC</i></p> <p>End of DM whole topic test (1hr)</p> <p>End of chapter 20 minute tests: • CI 1 • CI 2 • CI 3 & 4 <i>PAG 10 assessed against specific CPAC</i></p> | <p>PL 5 – Protein structure (1°, 2° & 3° structures only) PL 6 – Catalytic behaviour of enzymes PL 7 – Interactions between drugs & receptor sites PL 8 – DNA and RNA (structure & function), protein synthesis (transcription & translation) PL 9 – Mass Spectrometry (High-res.), fragmentation, NMR, interpreting ^{13}C NMR & ^1H NMR spectra, bringing together all spectroscopic techniques (MS, NMR & IR)</p> <p>Colour by Design (CD) CD 1 – Coloured organic molecules, conjugation</p> | <p>End of chapter 20 minute tests: • PL 4 & 5 • PL 6 & 7 • PL 8 • PL 9</p> <p>End of PL whole topic test (1hr)</p> <p>End of chapter 20 minute tests: • CD 1 & 2</p> |
| Term 3 | <p>The Chemical Industry (CI) CI 5 – Finding orders of reactions using half-life method, rate determining steps PAG 9 – Rates of reaction - continuous monitoring method (decomposition of H_2O_2) (OCR 9.1) CI 6 – Costs of production, co-products & by-products, efficiency & costs, health & safety legislation, risks vs benefits</p> <p>Oceans (O) O 1 – Lattice enthalpy & enthalpy level diagrams, enthalpy change of hydration, enthalpy change of solvation, enthalpy change of solution O 5 – Entropy changes</p> | <p><i>PAG 9 assessed against specific CPAC</i></p> <p>End of chapter 20 minute tests: • CI 5 & 6</p> <p>End of CI whole topic test (1hr)</p> <p>End of chapter 20 minute tests: • O 1 • O 5 <i>PAG 11 assessed against specific CPAC</i></p> | <p>Colour by Design (CD) CD 2 – Delocalisation evidence, comparing models of benzene CD 3 – Naming arenes CD 4 – Electrophilic substitution reactions of arenes, bromination & chlorination, Friedel-Crafts alkylation & acylation CD 5 – Nitration & sulfonation, azo compounds, coupling reactions CD 6 – Dye-fibre interactions</p> | <p>End of chapter 20 minute tests: • CD 1 & 2 • CD 3 & 4 • CD 5 & 6</p> |

| | | | | |
|---------------|--|---|---|---|
| | PAG 11 – pH measurements (Find K_a of a weak acid) | | | |
| | March - Advance Notice article released for Paper 2 Scientific literacy in Chemistry. Studied and analysed in lesson. Links to chemistry topics are shared and specific revision suggested. Predicted questions are produced for students to practice. | | | |
| Term 4 | Mock week Paper 1 – Fundamentals of chemistry Paper 3 - Practical skills | | | |
| | Oceans (O) O 2 – Greenhouse effect, acids & bases (Bronsted-Lowry theory), the pH scale & calculating pH values O 3 – Buffer solutions & calculating pH O 4 – Solubility equilibria & products | End of chapter 20 minute tests: • O 3 & 4 • O 5 End of Oceans whole topic test (1hr) | Colour by Design (CD) CD 7 – Structure of triglyceride molecules CD 8 – GLC: how it works, using GLC to analyse mixtures CD 9 – Reactions & mechanisms of: aldehydes & ketones CD 10 – Functional group reactions, tests for functional groups, functional group interconversions in synthesis CD 11 – Classifying organic reactions, devising synthetic routes PAG 12(b) – Research skills (Analysis of some inorganic and organic unknowns) | End of chapter 20 minute tests: • CD 7 & 8 • CD 9 • CD 10 & 11 End of CD whole topic test (1hr) |
| Term 5 | Revision Past paper questions to practice exam technique. Paper 2 mock exam | | | |
| Term 6 | External exams Paper 1 - Fundamentals of Chemistry 2h15. Synoptic questions. Paper 2 - Scientific literacy in Chemistry 2h15. Synoptic questions. Includes the pre-release Advance Notice article worth 20 to 25 marks. Paper 3 - Practical skills in Chemistry 1h30. Synoptic questions with an emphasis on practical skills. A practical insert is included. | | | |

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 13 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