Nobel

# Year: 12 & 13

# Subject: Chemistry

VISION: Chemistry A-Level is a course that creates chemists with a body of knowledge and the practical skills that enable them to take on chemistry in the next stage of their education and working lives. We aim to promote curiosity and an awareness of the place that chemistry plays in the world around our students. We build on the skills and knowledge from GCSE, giving a breadth and depth to their knowledge to inspire students to carry on chemistry after their A levels.

| Module/ Chapter | | Foci | Assessment | Knowledge Organiser |
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| **AS content** | | | | |
| Module 1 | Chapter 1 | This part of the course is taught through the Practical endorsement qualification. All skills are assessed across the two years of study. | OCR practical endorsement (PAG) | N/A |
| Module 2 | Chapter 2 | Atoms, ions and compounds:<br>• Atomic structure and isotopes<br>• Relative mass<br>• Formulae and equations | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 3 | Amount of substance:<br>• The mole<br>• Chemical formulae<br>• Volumes<br>• Reacting quantities | In-class assessment<br>End of topic test<br>PAG | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 4 | Acids and redox:<br>• Acids, bases and neutralisation<br>• Titrations<br>• Redox | In-class assessment<br>End of topic test<br>PAG | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 5 | Electrons and bonding:<br>• Electron structure<br>• Ionic bonding and structure<br>• Covalent bonding | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |

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| Module 2 | Chapter 6 | Shapes of molecules and intermolecular forces:<br>• Shapes of molecules and ions<br>• Electronegativity and polarity<br>• Intermolecular forces<br>• Hydrogen bonding | | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| Module 3 | Chapter 7 | Periodicity:<br>• The periodic table<br>• Ionisation energies<br>• Periodic trends in bonding and structure | In-class assessment<br>End of topic test<br>PAG | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 8 | Reactivity trends:<br>• Groups 2<br>• The halogens<br>• Qualitative analysis | | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 9 | Enthalpy:<br>• Enthalpy changes<br>• Measuring enthalpy changes<br>• Bond enthalpies<br>• Hess' law and enthalpy cycles | In-class assessment<br>End of topic test<br>PAG | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 10 | Reaction rates and equilibrium:<br>• Reaction rates<br>• Catalyst<br>• Boltzmann distribution<br>• Dynamic equilibrium and Le Chatelier's principle<br>• The equilibrium constant | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| Module 4 | Chapter 11 | Basic concepts of organic chemistry:<br>• Organic chemistry<br>• Nomenclature of organic compounds<br>• Representing the formulae of organic compounds<br>• Introduction to reaction mechanisms | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |

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| Module 4 | Chapter 12 | Alkanes:<br>• Properties of alkanes<br>• Chemical reactions of alkanes | | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 13 | Alkenes:<br>• Properties of alkenes<br>• Isomerism (moved from chapter 11) and stereoisomerism<br>• Reactions of alkenes<br>• Electrophilic addition of alkenes<br>• Polymerisation in alkenes | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 14 | Alcohols:<br>• Properties of alcohols<br>• Reactions of alcohols | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 15 | Haloalkanes:<br>• The chemistry of haloalkanes<br>• Organohalogen compound sin the environment | | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 16 | Organic synthesis<br>• Practical techniques in organic chemistry<br>• Synthetic routes | In-class assessment<br>End of topic test<br>PAG | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 17 | Spectroscopy:<br>• Mass spectroscopy<br>• Infrared spectroscopy | | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |

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| A2 Content | | | | |
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| Module 5 | Chapter 18 | Rates of reaction:<br>• Orders of reaction, rate equations and rate constants<br>• Concentration-time graphs, rate-concentration graphs and initial rates<br>• Rate-determining step<br>• Rate constants and temperature | In-class assessment<br>End of topic test<br>PAG | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 19 | Equilibrium:<br>• The equilibrium constant (continued from chapter 10)<br>• The equilibrium constant – gases<br>• Controlling the position of equilibrium | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 20 | Acids, bases and pH:<br>• Brønsted-Lowry acids and bases<br>• The pH scale and strong acids<br>• The acid dissociation constant $K_a$<br>• The pH of weak acids<br>• pH and strong bases | In-class assessment<br>End of topic test<br>PAG | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| Module 5 | Chapter 21 | Buffers and neutralisation:<br>• Buffer solutions<br>• Neutralisation | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 22 | Enthalpy and entropy:<br>• Lattice enthalpy<br>• Enthalpy changes in solution<br>• Factors affecting lattice enthalpy and hydration<br>• Entropy<br>• Free energy | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |

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| | Chapter 23 | Redox and electrode potentials:<br>• Redox reactions<br>• Manganate (VII) redox titrations<br>• Iodine/thiosulphate redox titrations<br>• Electrode potentials and prediction<br>• Storage and fuel cells | In-class assessment<br>End of topic test<br>PAG | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 24 | Transition elements:<br>• d-block elements<br>• The formation of shapes of complex ions<br>• Stereoisomerism in complex ions<br>• Ligand substitution and precipitation<br>• Redox and qualitative analysis | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| Module 6 | Chapter 25 | Aromatic chemistry:<br>• Introducing benzene<br>• Electrophilic substitution reactions of benzene<br>• The chemistry of phenol<br>• Directing groups | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 26 | Carbonyls and carboxylic acids<br>• Carbonyl compounds<br>• Identifying aldehydes and ketones<br>• Carboxylic acids and their derivatives | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| Module 6 | Chapter 27 | Amines, amino acids and polymers:<br>• Amines<br>• Amino acids and chirality<br>• Condensation polymers | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |
| | Chapter 28 | Organic synthesis<br>• Carbon-carbon bond formation<br>• Further practical techniques and synthetic routes | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |

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| Module 6 | Chapter 29 | Chromatography and spectroscopy:<br>• Chromatography and function group analysis<br>• Nuclear magnetic resonance (NMR) spectroscopy<br>• Carbon-13 NMR spectroscopy<br>• Proton NMR spectroscopy<br>• Interpreting NMR spectra<br>• Combined techniques | In-class assessment<br>End of topic test | Students are provided with a pack of knowledge organisers and knowledge checklists at the start of the course. |