# Years 12 & 13 Curriculum
## A Level: Chemistry

| Year 12 | Term 1 (Autumn) | Term 2 (Spring) | Term 3 (Summer) |
|---|---|---|---|
| | **Autumn 1 & 2** | **Between Spring 1 & Summer 2** | |
| **Topic** | **Foundations in Chemistry** | **Periodic Table & Energy** | **Core Organic Chemistry** |
| **Key Concepts** | Module 2 Chapters 2-6:<br>• Atomic structure and isotopes<br>• Relative mass<br>• Formulae and equations<br>• Amount of substance and the mole<br>• Determination of formulae<br>• Moles and volumes<br>• Reacting quantities<br>• Acids, bases and neutralisation<br>• Acid-base titrations<br>• Redox<br>• Electron structure<br>• Ionic bonding and structure<br>• Covalent bonding<br>• Shapes of molecules and ions<br>• Electronegativity and polarity<br>• Intermolecular forces<br>• Hydrogen Bonding | Module 3 Chapters 7-10:<br>• The Periodic Table<br>• Ionisation energies<br>• Periodic trends in bonding and structure<br>• Group 2<br>• The halogens<br>• Qualitative analysis<br>• Enthalpy changes<br>• Measuring enthalpy changes<br>• Bond enthalpies<br>• Hess' law and enthalpy cycles<br>• Reaction rates<br>• Catalysts<br>• The Boltzmann distribution<br>• Dynamic equilibrium and le Chatelier's principle<br>• The equilibrium constant Kc | Module 4 Chapters 14-17:<br>• Properties of alcohols<br>• Reactions of alcohols<br>• The chemistry of the haloalkanes<br>• Organohalogen compounds in the environment<br>• Practical techniques in organic chemistry<br>• Synthetic routes<br>• Mass spectrometry<br>• Infrared spectroscopy |
| | **Core Organic Chemistry** | **Physical Chemistry & Transition Elements** | |
| | Module 4 Chapters 11-13:<br>• Organic chemistry<br>• Nomenclature of organic compounds<br>• Representing the formulae of organic compounds<br>• Isomerism<br>• Introduction to reaction mechanisms<br>• Properties of alkanes<br>• Chemical reactions of alkanes<br>• Properties of alkenes<br>• Stereoisomerism<br>• Reactions of alkenes<br>• Electrophilic addition of alkenes | Module 5 Chapters 18-19:<br>• Orders, rate equations & rate constants<br>• Concentration-time graphs<br>• Rate-concentration graphs<br>• Rate-determining step<br>• Rate constants and temperature<br>• The equilibrium constant Kc<br>• The equilibrium constant Kp<br>• Controlling the position of equilibrium | • Module 5 Chapters 20-21:<br>• Bronsted-Lowry acids and bases<br>• The pH scale and strong acids<br>• The acid dissociation constant Ka<br>• The pH of weak acids<br>• pH and strong bases<br>• Buffer solutions<br>• Buffer solutions in the body<br>• Neutralisation |

# Years 12 & 13 Curriculum *(continued)*
## A Level: Chemistry

| Year 13 | Term 1 (Autumn) | Term 2 (Spring) | Term 3 (Summer) |
|---|---|---|---|
| | Autumn & Spring Terms | | Summer Term |
| **Topic** | **Physical Chemistry & Transition Elements** | **Organic Chemistry & Analysis** | **Revision & Exams** |
| **Key Concepts** | Module 5 Chapters 22-24:<br>• Lattice enthalpy<br>• Enthalpy changes in solution<br>• Factors affecting lattice enthalpy and hydration<br>• Entropy<br>• Free Energy<br>• Redox reactions<br>• Manganate (VII) redox titrations<br>• Iodine/ thiosulphate redox titrations<br>• D-block elements<br>• Formation & shapes of complex ions<br>• Stereoisomerism in complex ions<br>• Ligand substitution & precipitation<br>• Redox & qualitative analysis | Module 6 Chapters 25-29<br>• Introducing benzene<br>• Electrophilic substitution reactions of benzene<br>• The chemistry of phenol<br>• Distribution and directing groups<br>• Carbonyl compounds<br>• Identifying aldehydes and ketones<br>• Carboxylic acids<br>• Carboxylic derivatives<br>• Amines<br>• Amino acids, amides and chirality<br>• Condensation polymers<br>• Carbon-carbon bond formation<br>• Further practical techniques<br>• Further synthetic routes<br>• Chromatography and functional group analysis<br>• Nuclear magnetic resonance (NMR) spectroscopy<br>• Carbon-13 NMR spectroscopy<br>• Proton NMR spectroscopy<br>• Interpreting NMR spectra<br>• Combined Techniques | Revise for (and take) the A Level Chemistry exams |

# Years 12 & 13 Assessment
## A Level: Chemistry

**All students will sit an assessment and a mock examination in Year 12 and two mock examinations in Year 13.**

| | Year 12 | | Year 13 | | |
|---|---|---|---|---|---|
| | **Assessment** | **Mock Exam** | **Mock Exam** | **Mock Exam** | **Revision Resources** |
| | **Autumn Term** | **Summer Term** | **Autumn Term** | **Spring Term** | *Kennet Resources*<br>• Core Questions<br>• Knowledge Organisers<br>• Learning Habits<br><br>*External Resources*<br>• www.physicsandmathstutor.com<br>• www.kerboodle.com |
| **Style of Assessment** | Multiple-choice and longer answer questions | Multiple-choice and longer answer questions | Multiple-choice and longer answer questions | Multiple-choice and longer answer questions | |
| **Topics Assessed** | All topics covered:<br>• Electrons & bonding<br>• Shapes of molecules & intermolecular forces<br>• Atoms, ions & compounds<br>• Amount of substance<br>• Acids and redox<br>• Basic concepts of organic chemistry<br>• Alkanes<br>• Alkenes | • Electrons & bonding<br>• Shapes of molecules & intermolecular forces<br>• Atoms, ions & compounds<br>• Amount of substance<br>• Acids and redox<br>• Basic concepts of organic chemistry<br>• Periodicity<br>• Enthalpy<br>• Rates<br>• Alkanes<br>• Alkenes<br>• Alcohols<br>• Haloalkanes<br>• Spectroscopy (1) | **Part 1:** Summative of Year 12 topics<br><br>**Part 2:**<br>• Rates of reaction<br>• Equilibria<br>• Acids, bases & pH<br>• Aromatic chemistry<br>• Carbonyl chemistry | All topics covered. | |