**KS5 Chemistry**

Please note: the timing as to when topics are taught can only be an approximation year on year due to the 3:2 split of lessons between the A-level teachers

**Year Group 12:** Half Term 1

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| Number of Hours | Topic |
| 7 x 5 = 35 | Atomic structure (5.5 hours)Amount of substance (22.5 hours)Bonding (16 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * These three topics are fundamental to the understanding of Chemistry. They build on ideas first covered at GCSE and then can be extended to an AS Level, but ultimately A Level understanding.
* Atomic structure offers insight into the structure of an atom, making ions and the mass spectrometer – enhances understanding in bonding and transition metal ions.
* Amount of substance deals with the calculations associated with the mole – fundamental to chemistry
* Bonding reveals all types of bonding, physical properties, predicting shapes of molecules, bond polarity as well as the forces between molecules – a lot of these ideas connect with homologous series of compounds covered in organic chemistry
* Teaching them here ensures that the students have the skills to use these ideas when they meet them later in topics such as Energetics, Kinetics, Chemical Equilibria, Rate equations, Equilibrium constant Kp, Acids and bases, Thermodynamics.
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**Year Group 12:** Half Term 2

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| Number of Hours | Topic |
| 8 x 5 = 40 | Amount of substance continuedBonding continuedPeriodicity (2.5 hours)Introduction to organic chemistry (12.5 hours)Alkanes (7 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * Organic Chemistry is a new branch of Chemistry for GCSE students. They have only lightly brushed the topic in 4.7. The introduction topic establishes key concepts such as – homologous series, structural formula, displayed formula, skeletal formula, functional groups, IUPAC nomenclature rules, reaction mechanisms and the understanding of curly arrows, structural isomerism and stereoisomerism.
* These key concepts will be revisited through the remainder of the topics covered within Organic Chemistry and Alkanes.
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**Year Group 12:** Half Term 3

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| Number of Hours | Topic |
| 6 x 5 = 30 | Energetics (18.5 hours)Kinetics (5.5 hours)Chemical equilibria and Le Chatelier’s principle (10 hours)Halogenoalkanes (12 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * Energetics presents the opportunity to develop concept of mole when calculating the enthalpy changes within Hess’s law
* Kinetics develops GCSE ideas into the Maxwell-Boltzmann distribution
* Chemical equilibria develops GCSE ideas into Kc expression and associated calculations, as well as, recapping on concentration covered earlier.
* Halogenoalkanes supports understanding of homologous series, structural formula, displayed formula, skeletal formula, functional groups, IUPAC nomenclature rules, reaction mechanisms and the understanding of curly arrows and structural isomerism.
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**Year Group 12:** Half Term 4

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| Number of Hours | Topic |
| 5 x 5 = 25 | Oxidation, reduction and redox equations (5 hours)Group 2, the alkaline earth metals (5 hours)Alcohols (11 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * Oxidation, reduction and redox builds on writing equations from Amount of substance and provides material to be used within Group 7, Group 2, Transition metals and reactions of ions in aqueous solution
* Groups 2 uses ideas covered in Oxidation, reduction and redox reactions, periodicity and atomic structure when looking at first ionisation energy.
* Alcohols supports understanding of homologous series, structural formula, displayed formula, skeletal formula, functional groups, IUPAC nomenclature rules, reaction mechanisms and the understanding of curly arrows, structural isomerism
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**Year Group 12:** Half Term 5

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| Number of Hours | Topic |
| 5 x 5 = 25 | Group 7, the halogens (8.5 hours)Alkenes (8.0 hours)Alcohols continuedOrganic analysis (6.5 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * Groups 7 uses ideas covered in Oxidation, reduction and redox reactions, periodicity and Structure when looking at electronegativity and boiling points of elements.
* Alkenes supports understanding of homologous series, structural formula, displayed formula, skeletal formula, functional groups, IUPAC nomenclature rules, reaction mechanisms and the understanding of curly arrows, structural isomerism
* Organic analysis helps to develop an understanding of simple test tube reactions which have been already covered but now in a kinaesthetic way through RP6. Recap about mass spectroscopy and the determination of molecular mass.
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**Year Group 12:** Half Term 6

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| Number of Hours | Topic |
| 7 x 5 = 35 | Equilibrium constant *Kp* (10 hours)Rate equations (12.5 hours) |
| As available | Revision Work |
| Reasons behind order of topic in this half term |
| * Equilibrium constant *Kp* develops earlier ideas from Chemical equilibria into partial pressures, mole fractions, *Kp*calculations and a revisit of units.
* Rate equations develops earlier ideas from Kinetics into rate equations, order of reactions, Arrhenius equation with associated graph work and how to determine the rate equation. Plenty of opportunity to revisit units, moles and many mathematical skills.
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**Year Group 13:** Half Term 1

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| Number of Hours | Topic |
| 7 x 5 = 35 | Version one of 3:2 split | Version two of 3:2 split |
| Rate equations continuedAcids and bases (14 hours)Optical isomerism (2 hours)Aldehydes and ketones (3 hours)Aromatic Chemistry (6 hours) | Rate equations continuedOrganic synthesis (5 hours)Nuclear magnetic resonance spectroscopy (10 hours)Acids and bases (14 hours)Optical isomerism (2 hours)Aldehydes and ketones (3 hours)Carboxylic acids (17.5 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * Rate equations develops earlier ideas from Kinetics into rate equations, order of reactions, Arrhenius equation with associated graph work and how to determine the rate equation. Plenty of opportunity to revisit units, moles and many mathematical skills.
* Acids and bases is here to further develop understanding about moles, concentration, balancing equations, units, equilibrium ideas covered previously.
* Optical isomerism develops, completes and revisits earlier ideas about isomerism
* The other organic topics build on previous organic material in order to consolidate understanding of organic chemistry
 | * Rate equations develops earlier ideas from Kinetics into rate equations, order of reactions, Arrhenius equation with associated graph work and how to determine the rate equation. Plenty of opportunity to revisit units, moles and many mathematical skills.
* Acids and bases is here to further develop understanding about moles, concentration, balancing equations, units, equilibrium ideas covered previously.
* Optical isomerism develops, completes and revisits earlier ideas about isomerism
* The other organic topics build on previous organic material in order to consolidate understanding of organic chemistry
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**Year Group 13:** Half Term 2

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| Number of Hours | Topic |
| 8 x 5 = 40 | Version one of 3:2 split | Version two of 3:2 split |
| Amines (4.5 hours)Amino acids, proteins and DNA (7.5 hours)Organic synthesis (5 hours)Nuclear magnetic resonance spectroscopy (10 hours)Aldehydes and ketones continuedCarboxylic acid (17.5 hours) | Nuclear magnetic resonance spectroscopy continuedChromatography (3 hours)Transition metals (28 hours)Carboxylic acids continuedAromatic Chemistry (6 hours)Amines (4.5) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * The organic topics build on previous organic material in order to consolidate understanding of organic chemistry
 | * The other organic topics build on previous organic material in order to consolidate understanding of organic chemistry
* Transition metals are covered to build on ideas covered in Periodicity, Group 2, Group 7, Structure and bonding, writing balanced equations, catalysts from kinetics, titrations covered in Amount of substance and Acids and bases.
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**Year Group 13:** Half Term 3

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| --- | --- |
| Number of Hours | Topic |
| 6 x 5 = 30 | Version one of 3:2 split | Version two of 3:2 split |
| Nuclear magnetic resonance spectroscopy continuedChromatography (3 hours)Transition metals (28 hours)Carboxylic acids continuedPolymers (3.5 hours) | Transition metals continuedAmines continuedPolymers (3.5 hours)Amino acids, proteins and DNA (7.5 hours)Thermodynamics (15 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * The organic topics build on previous organic material in order to consolidate understanding of organic chemistry
* Transition metals are covered to build on ideas covered in Periodicity, Group 2, Group 7, Structure and bonding, writing balanced equations, catalysts from kinetics, titrations covered in Amount of substance and Acids and bases.
 | * The organic topics build on previous organic material in order to consolidate understanding of organic chemistry
* Thermodynamics provides an opportunity to review earlier work covered through a range of different specification content such as ionisation energy, electron affinity, bond enthalpy, Hess’ law, Structure and Bonding, equation for a straight line already covered with the rate equations topic
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**Year Group 13:** Half Term 4

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| Number of Hours | Topic |
| 5 x 5 = 25 | Version one of 3:2 split | Version two of 3:2 split |
| Reactions of ions in aqueous solutions (5 hours)Thermodynamics (15 hours)Electrode potentials and electrochemical cells (10 hours) | Reactions of ions in aqueous solutions (5 hours)Thermodynamics continuedElectrode potentials and electrochemical cells (10 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * Thermodynamics provides an opportunity to review earlier work covered through a range of different specification content such as ionisation energy, electron affinity, bond enthalpy, Hess’ law, Structure and Bonding, equation for a straight line already covered with the rate equations topic
* Electrode potentials enhances understanding of oxidation numbers, oxidising agents, reducing agents, writing half ionic equations, redox reactions, bonding, formula of molecules, ions, atoms – all of which have been covered in previous topics during the whole course.
 | * Electrode potentials enhances understanding of oxidation numbers, oxidising agents, reducing agents, writing half ionic equations, redox reactions, bonding, formula of molecules, ions, atoms – all of which have been covered in previous topics during the whole course.
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**Year Group 13:** Half Term 5

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| Number of Hours | Topic |
| 5 x 5 = 25 | Version one of 3:2 split | Version two of 3:2 split |
| Electrode potentials and electrochemical cells continuedProperties of period 3 elements and their oxides (3 hours) | Electrode potentials and electrochemical cells continuedProperties of period 3 elements and their oxides (3 hours) |
| As available | Revision work |
| Reasons behind order of topic in this half term |
| * Properties of period 3 elements supports areas of inorganic chemistry covered through the whole course, as well as, Structure and bonding.
* Revision aids recall of all of the course through the use of past papers. This continues to develop familiarity with language and style of exam questions.
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* Revision aids recall of all of the course through the use of past papers. This continues to develop familiarity with language and style of exam questions.
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