



Year 12 Syllabus in a nutshell

A Level CHEMISTRY





Year 12 Syllabus in a nutshell – A Level Chemistry

Below is a summary of the work covered in Year 12 during the academic year 2019-20. The course is taught by two teachers, and so the content has been separated into a columns for each teacher. For further detail on the content, see the A Level Chemistry Firefly pages at: <https://intranet.tauntonschool.co.uk/chemistry/year-12-and-13-a-level>

<p><u>Module 2: Foundations in Chemistry</u></p> <p>2.1 Atoms and reactions</p> <ul style="list-style-type: none"> • Atomic structure and isotopes • Relative mass • The mole as amount of substance • Calculation of reacting masses, gas volumes and mole concentrations • Acid-base titrations • Oxidation number • Redox reactions <p><u>Module 3: Periodic Table and Energy</u></p> <p>3.1 The periodic table</p> <ul style="list-style-type: none"> • The structure of the periodic table • Periodic trend in electron configuration and ionisation energy • Group 2 metals: redox reactions and reactivity • Group 2 compounds: action of water, trend in pH, uses • Tests for ions • The halogens: characteristic physical properties • Redox reactions and reactivity of halogens and their compounds • Precipitation reactions of halide ions <p>3.2 Energy and equilibrium</p> <ul style="list-style-type: none"> • Energy profile diagrams and activation energy • Enthalpy changes: ΔH of reaction, formation, combustion and neutralisation • Determination of enthalpy changes from experimental results • Bond enthalpy, Hess' law and enthalpy cycles • Dynamic equilibrium and le Chatelier's principle • The equilibrium constant, K_c <p><u>Module 5: Physical chemistry and transition metals</u></p> <p>5.1 Rates, equilibrium and pH</p> <ul style="list-style-type: none"> • mole fraction and partial pressure • K_c and K_p: calculation from data and effect of changing conditions • Brønsted–Lowry acids and bases • acid dissociation constant, K_a and pK_a • pH and $[H^+(aq)]$ • calculation of $[H^+(aq)]$ for strong and weak acids, and strong bases 	<p><u>Module 2: Foundations in Chemistry</u></p> <p>2.1 Atoms and reactions</p> <ul style="list-style-type: none"> • Compounds, formulae and equations • Determination of formulae • Percentage yields and atom economy • Formulae and equations for reactions of acids <p>2.2 Electrons, bonding and structure</p> <ul style="list-style-type: none"> • Energy levels, shells, sub-shells, atomic orbitals, electron configuration • Ionic bonding • Covalent bonding • The shapes of simple molecules and ions • Electronegativity and bond polarity • Intermolecular forces <p><u>Module 3: Periodic Table and Energy</u></p> <p>3.1 The periodic table</p> <ul style="list-style-type: none"> • Periodic trend in structure and melting point <p><u>Module 4: Core Organic Chemistry</u></p> <p>4.1 Basic concepts and hydrocarbons</p> <ul style="list-style-type: none"> • Naming and representing the formulae of organic compounds • Isomerism • Reaction mechanisms • Properties and reactions of alkanes • Properties and addition reactions of alkenes • Stereoisomerism in alkenes • Polymers from alkenes, waste polymers and alternatives <p>4.2 Alcohols, haloalkanes and analysis</p> <ul style="list-style-type: none"> • Properties of alcohols and reactions of alcohols • Substitution reactions of haloalkanes • Environmental concerns from use of organohalogen compounds • Practical skills for organic synthesis • Synthetic routes • Analytical techniques: infrared spectroscopy • Analytical techniques: mass spectrometry
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