# St Peter's Collegiate Academy

## Yr 10 Combined Chemistry Curriculum

*At St Peter's we believe that a broad and balanced curriculum with a strong academic core is a right for all pupils. We seek to encourage pupils to explore subjects of interest around their in-school learning and to enhance their curriculum experience through enrichment.*

| Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|
| Unit of Work/Big Question | Unit of Work/Big Question | Unit of Work/Big Question | Unit of Work/Big Question | Unit of Work/Big Question | Unit of Work/Big Question |
| **C2: Elements, Compounds and Mixtures** | **C2: Elements, Compounds and Mixtures** | **C2: Elements, Compounds and Mixtures**<br>**C3: Chemical Reactions** | **C3: Chemical Reactions** | **C3: Chemical Reactions** | **C3: Chemical Reactions**<br>**C4: Predicting and Identifying Reactions and Products** |
| Knowledge | Knowledge | Knowledge | Knowledge | Knowledge | Knowledge |
| • The structure of the atom<br>• Properties of sub-atomic particles<br>• The link between atomic structure and the periodic table<br>• The number of sub-atomic particles in isotopes<br>• Ionic bonding between metal and non-metal atoms<br>• Properties of ionic compounds<br>• Covalent bonding between non-metal atoms<br>• Properties of simple covalent substances<br>• The structure of giant covalent allotropes, substances and fullerenes | • The properties and uses of nanoparticles<br>• The structure, properties and uses of polymers<br>• The structure and properties of metals<br>• Comparison of states, structure and bonding of different chemical substances<br>• Linking bulk properties to the types of bonding, structures and intermolecular forces present<br>• Formulae and equations of elements, ionic and simple covalent substances<br>• Atomic radii, sizes of atoms and order of magnitude | • Definition of relative atomic mass and relative formula mass<br>• Calculation of relative formula mass and percentage composition<br>• Empirical formula as its link to molecular mass<br>• The law of conservation of mass<br>• Mass changes in non-enclosed systems<br>• Balanced equation, **ionic equations and half equations**<br>• **Definition of the mole and use of the Avogadro constant**<br>• **Calculation of the masses of atoms and molecules**<br>• **Stoichiometry**<br>• **Calculation of the masses of reactants or products (HT)** | • Exothermic and endothermic reactions<br>• Reaction profiles<br>• Definition of activation energy<br>• **Energy change calculations using bond energies (HT)**<br>• Definitions of oxidation and reduction<br>• **Oxidising and reducing agents**<br>• **Using half equations to identify oxidation, reduction and redox (HT)** | • Definition of acids and alkalis and salts<br>• Neutralisation as the reaction of an acid with an alkali or base to form a salt and water<br>• Reactions of metals with acids<br>• Reactions of metal oxides with acids<br>• Reactions of metal carbonates with acids<br>• Reaction of acids and alkalis<br>• Acidity and the pH scale<br>• **Strong and weak acids**<br>• **Concentrated and dilute solutions**<br>• **Link between pH and [$H^+$]**<br>• **pH curves**<br>• **Concentration of solutions (HT)**<br>• Tests for gases | • Inert and non-inert electrodes<br>• Electrolysis of molten ionic compounds **in terms of half equations (HT)**<br>• Electrolysis of aqueous solutions of ionic compounds **in terms of half equations (HT)**<br>• Competing reactions in the electrolysis of aqueous solutions<br>• Physical properties of group 1 Alkali metals<br>• Chemical properties of group 1 metals<br>• Physical properties of group 7 Halogens<br>• Chemical properties of group 7 Halogens<br>• Halogen displacement reactions |
| Skills & Procedural Knowledge | Skills & Procedural Knowledge | Skills & Procedural Knowledge | Skills & Procedural Knowledge | Skills & Procedural Knowledge | Skills & Procedural Knowledge |
| • Calculation of atomic number and mass number<br>• Comparing particle diagrams<br>• Drawing dot and cross for ionic compounds<br>• Drawing dot and cross diagrams for covalent substances | • Calculation of surface area<br>• Calculation of surface area to volume ratio<br>• **Expressing numbers using standard form (HT)**<br>• Formulae of molecules and compounds<br>• Expressing quantities using standard form | • Calculation of formula mass<br>• Calculation of percentage composition<br>• Mathematical link between empirical formula and molecular mass<br>• Using a balance to calculate masses<br>• Using formula masses to show | • Labelling of reaction profiles<br>• Using a thermometer to calculate the temperature<br>• **Calculation of sum of bond energies in reactants and products**<br>• **Calculation of energy change**<br>• **Writing half equations for oxidation and reduction** | • Using indicators to identify solutions as acidic, alkaline or neutral<br>• Identifying the formulae of salts formed by neutralisation<br>• Writing and balancing symbol equations<br>• Separation of salts from a mixture using filtration, | • Link between electrode use conductivity and reactivity<br>• Identification of ions present in molten and aqueous solutions<br>• How to set up a chemical cell<br>• **Representing reactions using half equations and overall equations (HT)**<br>• Identifying and explaining trends |

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| • Linking the state of a substance at a given temperature to its melting and boiling point | • Comparing quantities using standard form | conservation of mass<br>• Calculation of mass changes for reactions involving gases | • **Writing equations to represent redox reactions (HT)** | crystallisation or evaporation<br>• Using pH values to follow the progress of a reaction | in melting point, boiling point and density<br>• Identifying and explaining trends in reactivity |
| Key Assessment Task (KAT) | Key Assessment Task (KAT) | Key Assessment Task (KAT) | Key Assessment Task (KAT) | Key Assessment Task (KAT) | Key Assessment Task (KAT) |
| **Y10 Combined Chem KAT 1** | **Y 10 Combined Chem Assessment 1** | **Y10 Combined Chem KAT 2** | **Y 10 Combined Chem Assessment 2** | **Y10 Combined Chem KAT 3** | **Y 10 Combined Chem Assessment 3** |

# St Peter's Collegiate Academy

## Yr 11 Combined Chemistry Curriculum

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| Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|
| Unit of Work/Big Question | Unit of Work/Big Question | Unit of Work/Big Question | Unit of Work/Big Question | Unit of Work/Big Question | Unit of Work/Big Question |
| **C4: Predicting and Identifying Reactions and Products** | **C4: Predicting and Identifying Reactions and Products**<br>**C5: Monitoring and Controlling Chemical Reactions** | **C5: Monitoring and Controlling Chemical Reactions**<br>**C6: Global Challenges** | **C6: Global Challenges** | **Exam Revision** | |
| Knowledge | Knowledge | Knowledge | Knowledge | Knowledge | Knowledge |
| • Physical properties of group 0 elements<br>• Chemical properties of group 0 elements<br>• The reactivity series and metal displacement reactions | • Explaining reactions in terms of collision theory<br>• Calculation of reaction rate<br>• Collision theory and catalysts<br>• Calculation of concentration<br>• Equilibria and **Le Chatelier's Principle (HT)** | • The Haber and Contact processes as application of equilibria<br>• Extracting metals from ores and compounds (**to include bioloeaching and phytomining HT**)<br>• Life-Cycle Assessments and the recycling of materials | • Alkanes and alkenes<br>• Crude oil, hydrocarbons and cracking<br>• Atmosphere, Greenhouse Effect and Global Warming<br>• Pollutants and water treatment | **Exam Revision** | |
| Skills & Procedural Knowledge | Skills & Procedural Knowledge | Skills & Procedural Knowledge | Skills & Procedural Knowledge | Skills & Procedural Knowledge | Skills & Procedural Knowledge |
| • Identifying trends in melting point and boiling point data<br>• Writing word equations<br>• Balancing symbol equations | • Drawing tangents and calculation of gradients<br>• Use of pipettes, pipette fillers, stopwatches and burettes<br>• Converting volumes from $cm^3$ to $dm^3$<br>• Calculating concentrations in $g/dm^3$ and **$mol/dm^3$**<br>• Explanation of compromise conditions | • The effect of changing conditions upon the position of equilibrium<br>• Writing and balancing equations<br>• Choice of material used based upon its properties and the amount of energy and water used in its production<br>• Ease of recycling and potential re-use of materials | • Identifying the formulae and names of organic molecules<br>• Limitations of scientific evidence of how our atmosphere evolved and has changed over time. | | |
| Key Assessment Task (KAT) | Key Assessment Task (KAT) | Key Assessment Task (KAT) | Key Assessment Task (KAT) | Key Assessment Task (KAT) | Key Assessment Task (KAT) |

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| Y11 Combined Chemistry KAT 1 | Y11 Combined Chemistry Assessment 1 | Y11 Combined Chemistry Chemistry Mock 1 | Y11 Combined Chemistry Chemistry Mock 2 | | |