



# St Richard Reynolds Catholic High School

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| <p><b>SUBJECT:</b> Chemistry      <b>YEAR GROUP:</b> 12</p> <p><b>TOPICS COVERED</b></p> <p><b>Chemistry - year 1 content:</b> Atomic Structure, Amounts of Substance, Bonding, Kinetics and Equilibria, Energetics, Group 2, Group 7, Redox reactions, Organic Chemistry (Introduction, Alkanes, Alkenes, Alcohols, Analytical Techniques)</p> <p><b>Chemistry – year 2 content:</b> Optical isomerism, Aldehydes and ketons, Carboxylic acids and esters, Acylation, Rate equations, Thermodynamics</p>  |   |
| <p style="text-align: center;"><b>PROGRAMME OF STUDY</b></p>   | <p style="text-align: center;"><b>METHOD OF ASSESSMENT</b></p>  |
| <p><b>Autumn term</b></p> <ul style="list-style-type: none"><li>➤ Atomic Structure – early ideas about the composition of matter, relative mass and relative charge of subatomic particles, atomic number, mass number and isotopes, relative atomic mass, relative molecular mass, describing electrons, ionisation energies, evidence for shells and sub-shells</li><li>➤ Atomic Structure – relative masses, the mole and Avogadro constant, the ideal gas equation, empirical and molecular formulae, chemical and ionic equations, reactions in solutions</li><li>➤ Bonding – ionic, covalent, metallic, physical properties, shapes of molecules and ions, bond polarity, forces between molecules</li><li>➤ The periodic table – classification of elements in s, p and d blocks, properties of elements in Period 3</li><li>➤ Energetics – exo and endothermic reactions, enthalpy change, standard enthalpy of combustion and formation, measuring enthalpy changes, Hess’s law, bond enthalpies</li><li>➤ Kinetics – collision theory, factors affecting the rate of a chemical reaction, activation</li></ul> | <p>Practical assessments – required practicals</p> <p>End of topic test after each unit</p> <p>Weekly exam questions</p> <p>Mini assessments at mid-point</p> |

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| <p>energy, the Maxwell-Boltzmann distribution of energies, the effect of temperature and concentration on the rate of a reaction, catalyst</p> <ul style="list-style-type: none"> <li>➤ Equilibria – the dynamic nature of equilibria, the equilibrium constant <math>K_c</math>, changes that affect a system in homogeneous equilibrium, industrial processes and equilibria</li> <li>➤ Redox reactions – oxidation and reduction, oxidation states, redox equations</li> <li>➤ Group 2, the alkaline earth metals – trends in physical properties, extracting titanium, trends in chemical properties, uses of group 2 hydroxides, the relative solubilities of group 2 hydroxides</li> <li>➤ Introduction to Organic chemistry – nomenclature, isomers, molecular shapes, types of formulae, functional groups and homologous series, reaction mechanisms</li> <li>➤ Alkanes – fractional distillation and crude oil, cracking, combustion reactions of alkanes, problems with alkane combustion, reactions of alkanes with chlorine.</li> </ul> |   |
| <p><b>Spring Term</b></p> <ul style="list-style-type: none"> <li>➤ Group 2 continued</li> <li>➤ Group 7 – trends in physical properties, trends in chemical properties, the halide ion, uses of chlorine</li> <li>➤ Halogenoalkanes – what are they, chemical reactions of halogenoalkanes, ozone in the stratosphere</li> <li>➤ Alkenes – structure and bonding, addition reactions of alkenes, addition polymers</li> <li>➤ Alcohols – structure and properties, ethanol production, chemical reactions of alcohols, elimination reactions of alcohols.</li> <li>➤ Analytical techniques – identifying functional groups, mass spectrometry, infrared spectroscopy, the global warming link</li> <li>➤ Optical isomerism (year 2 content) – chirality, properties of optical isomers, synthesis of optical isomers</li> </ul>  | <p>Practical assessments – required practicals</p> <p>End of topic test after each unit</p> <p>Weekly exam questions</p> <p>Mini assessments at mid-point</p> |

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| <p><b>Summer Term – Start year 2 content</b></p> <ul style="list-style-type: none"> <li>➤ Thermodynamics – enthalpy changes and ionic lattices, Born – Haber cycles, solubility and enthalpy change, order, disorder and entropy, feasibility of reactions</li> <li>➤ Rate equations – the basics about rates, order of reactions, the rate constant, graphical</li> </ul> | <p>Practical assessments – required practicals</p> <p>Weekly exam questions</p> |
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| <p>determination of order of reaction, numerical determination, rate determining step, effect of temperature on rate of reaction</p> <ul style="list-style-type: none"><li>➤ Aldehydes and Ketons – properties and reactions</li><li>➤ Carboxylic acids and derivatives – esters, acylation</li><li>➤ Mock exams and WEX</li></ul>   | End of year exams |
| <p><b>Key Skills:</b></p> <ul style="list-style-type: none"><li>➤ Following written procedures</li><li>➤ Applying investigative approaches and methods when using instruments and equipment</li><li>➤ Safely using a range of practical equipment and materials</li><li>➤ Making and recording observations</li><li>➤ Researching and using references and reports</li><li>➤ Demonstrating knowledge and understanding of scientific ideas, processes, techniques and procedures</li><li>➤ Applying knowledge and understanding of scientific ideas, processes, techniques and procedures in a theoretical and practical context and when handling data</li><li>➤ Analysing, interpreting and evaluating scientific information, ideas and evidence to make judgements and reach conclusions and develop and refine practical design and procedures.</li></ul> |                   |