

| Yr 12 | Aut 1  | Aut 2  | Spring 1   | Spring 2   | Summer 1   | Summer 2   |
|-------|--|--|--|--|--|--|
|       | <b>Atomic structure</b>  | <b>Periodicity</b>   | <b>EXAM</b>  |  |  |  |
|       | 3.1.1.1 Fundamental particles  | 3.2.1.1 Classification   | Test reflection  | <b>Alkenes</b>   | <b>Organic analysis</b>  | <b>Periodicity - Summer Task</b>                       |
|       | 3.1.1.2 Mass number and isotopes   | 3.2.1.2 Physical properties of Period 3 elements                             | <b>Introduction to organic chemistry</b>   | 3.3.4 Alkenes  | 3.3.6.1 Identification of functional groups by test-tube reactions                               | 3.2.4 Properties of Period 3 elements and their oxides |
|       | 3.1.1.3 Electron configuration   | <b>TEST 3.2.1</b>  | 3.3.1.1 Nomenclature   | 3.3.4.1 Structure, bonding and reactivity                | 3.3.6.2 Mass spectrometry  |  |
|       | <b>TEST 3.1.1</b>  |  | 3.3.1.3 Isomerism  | 3.3.4.2 Addition reactions of alkenes                    | 3.3.6.3 Infrared spectroscopy  |  |
|       |  | <b>Oxidation/reduction</b>   |  | 3.3.4.3 Addition polymers                                | <b>RP 6 Tests for alcohols, aldehydes, alkene and carboxylic acid</b>                            |  |
|       | <b>Bonding</b>   | 3.1.7 Oxidation, reduction and redox equations                               | <b>Alkanes</b>   | <b>TEST 3.3.3 and 3.3.4</b>                              | <b>TEST 3.3.5 and 3.3.6</b>  |  |
|       | 3.1.3.1 Ionic bonding  |  | 3.3.2 Alkanes  |  |  |  |
|       | 3.1.3.2 Nature of covalent and dative covalent bonds                                   | <b>Group 2</b>   | 3.3.2.1 Fractional distillation of crude oil                                     | <b>Alcohols</b>  | <b>Nomenclature and isomerism &amp; Compound containing the carbonyl group (YEAR 13 Content)</b> |  |
|       | 3.1.3.3 Metallic bonding   | 3.2.2 Group 2, the alkaline earth metals                                     | 3.3.2.2 Modification of alkanes by cracking                                      | 3.3.5.1 Alcohol production                               | 3.3.7 Optical isomerism  |  |
|       | 3.1.3.4 Bonding and physical properties  |  | 3.3.2.3 Combustion of alkanes  | 3.3.5.2 Oxidation of alcohols                            | 3.3.8 Aldehydes and ketones  |  |
|       | 3.1.3.5 Shapes of simple molecules and ions  | <b>Halogens</b>  | 3.3.2.4 Chlorination of alkanes  | 3.3.5.3 Elimination                                      | 3.3.9 Carboxylic acids and derivatives   |  |
|       | 3.1.3.6 Bond polarity  | 3.2.3.1 Trends in properties   |  | <b>RP 5 Distillation of a product from a reaction</b>    | <b>TEST 3.3.7, 3.3.8 and 3.3.9</b>   |  |
|       | 3.1.3.7 Forces between molecules   | 3.2.3.2 Uses of chlorine and chlorate(I)                                     | <b>TEST 3.3.1 and 3.3.2</b>  |  |  |  |
|       | <b>TEST 3.1.3</b>  | <b>RP 4 Carry out simple test-tube reactions to identify (Group 2 and 7)</b> |  |  |  | <b>End of year 12 exams w/c 24th of June</b>           |
|       | <b>Consolidating lesson</b>  | <b>TEST 3.1.7, 3.2.2 and 3.2.3</b>   | <b>Halogenoalkanes</b>   |  |  |  |
|       |  | <b>Consolidating lesson</b>  | 3.3.3 Halogenoalkanes  |  |  |  |
|       |  |  | 3.3.1.2 Reaction mechanisms  |  |  |  |
|       |  |  | 3.3.3.1 Nucleophilic substitution  |  |  |  |
|       |  |  | 3.3.3.2 Elimination  |  |  |  |
|       |  |  | 3.3.3.3 Ozone depletion  |  |  |  |
|       |  |  | <b>Consolidating lesson</b>  |  |  |  |
|       | <b>Amount of substance</b>   | <b>Energetics</b>  | <b>Kinetics</b>  | <b>Chemical equilibria</b>                               | <b>Kinetics (YEAR 13 Content)</b>  |  |
|       | 3.1.2 Amount of substance  | 3.1.4.1 Enthalpy change  | 3.1.5.1 Collision theory   | 3.1.6.1 Chemical equilibria and Le Chatelier's principle | 3.1.9.1 Rate equations <b>AND</b> Arrhenius  |  |
|       | 3.1.2.2 The mole and the Avogadro constant   | 3.1.4.2 Calorimetry  | 3.1.5.2 Maxwell-Boltzmann distribution   | 3.1.6.2 Equilibrium constant Kc for homogeneous systems  | 3.1.9.2 Determination of rate equation   |  |
|       | 3.1.2.3 The ideal gas equation   | 3.1.4.3 Applications of Hess's law   | 3.1.5.3 Effect of temperature on reaction rate                                   | <b>TEST 3.1.6</b>  | <b>RP7a and 7b Measuring the rate of reaction by initial rate AND continuous monitoring</b>      |  |
|       | 3.1.2.4 Empirical and molecular formula  | 3.1.4.4 Bond enthalpies  | 3.1.5.4 Effect of concentration and pressure                                     | <b>Consolidating lesson</b>                              | <b>TEST 3.1.9</b>  |  |
|       | 3.1.2.5 Balanced equations and associated calculations                                 | <b>RP 2 Measurement of an enthalpy change</b>                                | 3.1.5.5 Catalysts  |  |  |  |
|       | <b>RP 1 Making up a volumetric solution and carry out a simple acid-base titration</b> | <b>TEST 3.1.4</b>  | <b>RP 3 Investigation of how the rate of a reaction changes with temperature</b> |  |  |  |
|       | <b>TEST 3.1.2</b>  | <b>Consolidating lesson</b>  | <b>TEST 3.1.5</b>  |  |  |  |
|       |  |  | <b>Consolidating lesson</b>  |  |  |  |

Teacher 1: NEW

Teacher 2: MWL

| Aut 1   | Aut 2  | Spring 1  |
|---|--|---|
| 3.3.9 Carboxylic acids and derivatives  | Amines   | Organic synthesis and analysis & Structure determination  |
| RP10 Preparation of<br>1. a pure solid and test of its purity<br>2. a pure organic liquid | 3.3.11 Amines  | 3.3.14 Organic synthesis  |
| TEST 3.3.7, 3.3.8, 3.3.9 - To be given as homework  | 3.3.12 Polymers  | 3.3.15 Nuclear magnetic resonance spectroscopy  |
| Periodicity - Summer Task   | Amino acids, Proteins and DNA  | RP12 Separating of species by thin-layer chromatography   |
| 3.2.4 Properties of Period 3 elements and their oxides                                    | 3.3.13.2 Proteins  | TEST 3.3.14, 3.3.15, 3.3.16   |
| TEST 3.2.4  | 3.3.13.3 Enzymes   | Reactions of ions in aqueous solution   |
| Aromatic chemistry, amines, polymers  | 3.3.13.4 DNA   | RP11 Carry out simple test-tube reactions to identify transition metal ions in aqueous solution |
| 3.3.10 Aromatic Chemistry   | 3.3.13.5 Action of anti-cancer drugs                                       | TEST 3.2.6  |
| TEST 3.3.10   | <u>3.3.11, 3.3.12, 3.3.13</u>  |   |
| PPE exams (Early oct)   |  | PPE exams (Jan)   |
| A2 Thermodynamics   | Acids, bases and buffers   |   |
| 3.1.8.1 Born–Haber cycles   | 3.1.12 Acids and bases   | Transition Metals   |
| 3.1.8.2 Gibbs free-energy change, $\Delta G$ , and entropy change, $\Delta S$             | 3.1.12.1 Brønsted–Lowry acid–base equilibria in aqueous solution           | 3.2.5.4 Formation of coloured ions  |
| TEST 3.1.8  | 3.1.12.3 The ionic product of water, $K_w$                                 | 3.2.5.5 Variable oxidation states   |
| PPE exams (Early oct)   | 3.1.12.4 Weak acids and bases $K_a$ for weak acids                         | 3.2.5.6 TM catalysts  |
|   | 3.1.12.5 pH curves, titrations and indicators                              | TEST 3.2.5  |
| Equilibrium constant $K_p$  | 3.1.12.6 Buffer action   | Electrode potentials and electrochemical cells  |
| 3.1.10 Equilibrium constant $K_p$ for homogeneous systems                                 | 3.1.12.3 The ionic product of water, $K_w$                                 | 3.1.11.1 Electrode potentials and cells   |
| TEST 3.1.10   | 3.1.12.6 Buffer action   | 3.1.11.2 Commercial applications of electrochemical cells                                       |
| Consolidating lesson  | RP9 Investigate how pH changes when a weak acid reacts with a strong base. | RP8 Measuring the EMF of an electrochemical cell  |
|   | TEST 3.1.12  | TEST 3.1.11   |
|   | Consolidating lesson   | Consolidating lesson  |