**11 CHEMISTRY- TERM 3**

| **TOPIC / TIMING (Weeks)** | **QCAA OBJECTIVES** | **LEARNING GOALS and SUCCESS CRITERIA** | **Notebook Page** |
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| **Rates of Reaction:**  **Week 1,2** (**6 lessons**) | **Unit 2:Topic 3**  **Objectives** 1,2,3,4,5,7 | **SC75**: I can explain how varying the conditions present during chemical reactions, including temperature, surface area, pressure (gaseous systems), concentration and the presence of a catalyst can affect the rate of the reaction  **SC76**: I can use the collision theory to explain and predict the effect of concentration, temperature, pressure and surface area on the rate of chemical reactions by considering the structure of the reactants and the energy of particles  **SC77**: I can construct and explain Maxwell-Boltzmann distribution curves for reactions with and without catalysts  **SC78**: I can recognise that activation energy (Ea) is the minimum energy required for a chemical reaction to occur and is related to the strength and number of the existing chemical bonds; the magnitude of the activation energy influences the rate of a chemical reaction  **SC79**: I can sketch and use energy profile diagrams, including the transitional state and catalysed and uncatalysed pathways, to represent the enthalpy changes and activation energy associated with a chemical reaction  **SC80**: I can explain how catalysts, including enzymes and metal nanoparticles, affect the rate of certain reactions by providing an alternative reaction pathway with a reduced activation energy, hence increasing the proportion of collisions that lead to a chemical change  **SC81**: I can use appropriate mathematical representations to calculate the rate of chemical reactions by measuring the rate of formation of products or the depletion of reactants  **SC82**: I can analyse experimental data, including constructing and using appropriate graphical representations of relative changes in the concentration, volume and mass against time  **Mandatory Practical : Investigate the rate of chemical reactions.**  **LG19: Students can understand and explain the factors that affect reaction rates, calculate rates of reaction and analyse experimental data.** |  |
|  |  | **STUDENT EXPERIMENT**  **Week 3,4,5,6 (9 lessons in these weeks)** |  |
| **Solubility and Identifying Ions in Solution**  **Week 7, 8 (6 lessons)** | **Unit 2:Topic 2**  **Objectives 1,2,3,4,5,6,7** | **SC83**: I can explain the relationship between the solubility of substances in water, including ionic and molecular substances, and the intermolecular forces between species in the substances and water molecules  **SC84**: I can recognise that changes in temperature can affect solubility and recall that most gases become less soluble as solvent temperature increases while most solutes become more soluble as the solvent temperature increases  **SC85**: I can interpret, analyse and evaluate data and solubility curves to communicate conceptual understanding, solve problems and make predictions  **SC86**: I can apply solubility rules to determine the products of reactions and to predict if a precipitate will form  **SC87**: I can determine the presence of specific ions in solutions based on evidence derived from chemical reactions, including precipitation and acid-carbonate reactions  **SC88**: I can construct and use appropriate representations, including ionic formulas, chemical formulas, chemical equations and phase descriptions for chemical species to communicate conceptual understanding, solve problems and make predictions  **Mandatory practical**: **Precipitation reactions to identify cations and anions**  **LG20: Students can understand and explain the solubility of ionic and molecular substances in water and predict whether precipitation will occur in chemical reactions.** |  |
| **Gases**  **Week 9 (3 lessons**) | **Unit 2 Topic 1**  **Objectives1, 2, 3, 4, 5, 6, 7** | **SC89:** I can convert between unit of pressure, volume and temperature, including Pa, kPa, mmHg, Atmospheres, 0C, K, mL, L, m3.  **SC90:** I canuse the kinetic theory of gases to describe and explain the behaviour of ideal gases, including the qualitative relationships between pressure, temperature and volume  **Mandatory practical : Investigate the properties of gases to determine the molar volume of a gas**  **SC91:** I know the volume of an ideal gas at STP and SLC  **SC92:** I can solve problems related to the ideal gas equation  **SC93:** I can solve (and make predictions for) problems, including the mole concept, to calculate the mass of chemicals and/or volume of a gas (at standard temperature and pressure) involved in a chemical reaction  **LG94: Students can solve questions using the kinetic theory and ideal gas equation and apply this to balanced chemical equations** |  |
| **Chromatography techniques**  **Week 10 (3 lessons)** | **Unit 2 Topic 1**  **Objectives 1, 2, 3, 4, 5** | **SC95:** I can recognise that chromatography techniques, including paper, thin layer, gas and high-performance liquid chromatography, can be used to determine the composition and purity of substances  **SC96:** I can describe and explain how variations in the strength of the interactions between atoms, molecules or ions in the mobile and stationary phases can be used to separate components  **SC97:** I can analyse, interpret and evaluate data from chromatographs to determine the composition and purity of substances, including calculating Rf values  **LG21: Students can understand chromatography techniques to determine composition of substances** |  |