**Chemistry Unit Plan**

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| **Teacher** | **Subject Course and Group** |
| James Privett | IB Chemistry 11th Grade |
| **Course Topic** | **Level and Duration** |
| Topic 1. Quantitative Chemistry | HL 3.25 weeks |
| **Unit Description and Texts** | **DP assessment for unit** |
| Stoichiometric Relationships | Topic 1 Test |

**Inquiry:**

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| **Transfer Goals** |
| * The student should understand and be able to articulate that the properties of matter are the result of particulates and particle interactions. * The student will be able to explain the mole concept. * The student should be able to relate reacting masses and volumes to the amount of matter. |

**Action:**

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| **Content/Skills/Concepts-Essential Understandings** | | **Learning Process** | |
| Students will know the following content:   * The particulate nature of matter and chemical change * The mole concept * Reacting masses and volumes   Students will develop the following skills:   * Deduction of chemical equations when reactants and products are specified. * Application of the state symbols (s), (l), (g) and (aq) in equations. * Explanation of observable changes in physical properties and temperature during changes of state. * Calculation of the molar masses of atoms, ions, molecules and formula units. * Solution of problems involving the relationships between the number of particles, the amount of substance in moles and the mass in grams. * Interconversion of the percentage composition by mass and the empirical formula. * Determination of the molecular formula of a compound from its empirical formula and molar mass. * Obtaining and using experimental data for deriving empirical formulas from reactions involving mass changes. * Solution of problems relating to reacting quantities, limiting and excess reactants, theoretical, experimental and percentage yields. * Calculation of reacting volumes of gases using Avogadro’s law. * Solution of problems and analysis of graphs involving the relationship between temperature, pressure and volume for a fixed mass of an ideal gas. * Solution of problems relating to the ideal gas equation. * Explanation of the deviation of real gases from ideal behaviour at low temperature and high pressure. * Obtaining and using experimental values to calculate the molar mass of a gas from the ideal gas equation. * Solution of problems involving molar concentration, amount of solute and volume of solution. * Use of the experimental method of titration to calculate the concentration of a solution by reference to a standard solution.   Students will grasp the following concepts:   * Atoms of different elements combine in fixed ratios to form compounds, which have different properties from their component elements. * Mixtures contain more than one element and/or compound that are not chemically bonded together and so retain their individual properties. * Mixtures are either homogeneous or heterogeneous. * The mole is a fixed number of particles and refers to the amount, n, of substance. * Masses of atoms are compared on a scale relative to 12C and are expressed as relative atomic mass (Ar)and relative formula/molecular mass (Mr). * Molar mass (M) has the units g mol-1. * The empirical formula and molecular formula of a compound give the simplest * ratio and the actual number of atoms present in a molecule respectively. * Reactants can be either limiting or excess. * The experimental yield can be different from the theoretical yield. * Avogadro’s law enables the mole ratio of reacting gases to be determined from volumes of the gases. * The molar volume of an ideal gas is a constant at specified temperature and pressure. * The molar concentration of a solution is determined by the amount of solute and the volume of solution. * A standard solution is one of known concentration. | | Learning experiences and strategies/planning for self-supporting learning:   * Lecture * Socratic Seminar * Small Group/ Pair Work * PowerPoint Lecture/ Note * Individual Presentations * Group Presentations * Student Lecture/ Leading * Interdisciplinary Learning   Details:   * Other/s: | |
| **Formative Assessment:**  Topic 1 Test | |
| **Summative Assessment:**  Molar Mass Quiz  Stoichiometry Quiz | |
| **Differentiation:**   * Affirm Identity--Build Self-Esteem * Value Prior Knowledge * Scaffold Learning * Interdisciplinary Learning   Details:   * Prior knowledge will be used to relate the concepts to the daily lives of the students. * The concepts will be introduced from fundamental to complex. Beginning with the foundation to enhance understanding. * The lessons will be related to language, history, and social development to demonstrate the importance of the content. | |
| **Approaches to Learning** | | | |
| * Thinking * Social * Communication * Self-Management * Research   Details:   * Students will analyze and evaluate information in class. * Students will explain the concepts in written form. * The students will work in groups during laboratories. * Data will be obtained and analyzed in the laboratory. | | | |
| **Language and Learning** | **TOK Connections** | | **CAS Connections** |
| * Activating Background Knowledge * Scaffolding for New Learning * Acquisition of New Learning Through Practice * Demonstrating Proficiency   Details:   * Student reflection is used to allow past knowledge to be related to the current lesson. * The lessons are structured to relate to future content. * Problem solving is used to allow practice that will help ensure the ability to retain the knowledge. * Quizzes are used to document the student’s skill. | * Personal and Shared Knowledge * Ways of Knowing * Areas of Knowledge * The Knowledge Framework   Details:   * The student should be aware of what he or she knows and try to share that with others so that all can benefit. * The students should consider how the knowledge that they know is thought to be true. | | * Creativity * Activity * Service   Details:   * Students will use their creativity to produce an artistic rendering of a chemical concept. |

**Stage 3: Reflection**

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| What Worked Well | What Didn’t Work Well | Notes/ Changes/ Suggestions |
| * The problem solving activities worked very well and the students seemed to enjoy working in small groups more than alone. * The laboratories worked well because of the hands-on nature of the activity. | * Some of the individual work was difficult and the students seemed to stall when facing a challenge. * The test had some challenges that confused the students. | * A practice test before the test might be helpful for the students. * The students prefer group work. |