**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.
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**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:

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| **Formative Assessment:**Topic 1 Test |
| **Summative Assessment:**Molar Mass QuizStoichiometry 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.
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| **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.
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| **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.
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**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.
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