FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Pre AP – Chemistry **Unit Name:** **Language of Chemistry: Part II** **Days: 10**

Quality Core Objectives:

Unit 4 Language of Chemistry: Part II	
I.A.1. Scientific Inquiry	c. Collect, organize, and analyze data accurately and use techniques and equipment appropriately
	d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations
	e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
	f. Safely use laboratory equipment and techniques when conducting scientific investigations
I.A.2. Mathematics and Measurement in Science	a. Distinguish between precision and accuracy with respect to experimental data
	b. Use appropriate SI units for length, mass, time, temperature, quantity of matter, area, volume, and density; describe the relationships among SI unit prefixes (e.g., centi-, milli-, kilo-); recognize commonly used non-SI units
	c. Use the correct number of significant figures in reporting measurements and the results of calculations
	e. Express numbers in scientific notation when appropriate
	f. Solve for unknown quantities by manipulating variables
I.A.3. Science in Practice	d. Explain why all scientific knowledge is subject to change as new evidence becomes available to the scientific community
II.B.2. The Nature of Gases	f. Describe Avogadro's hypothesis and use it to solve stoichiometric problems
III.A.1. Empirical Formulas, Molecular Formulas, and Percentage Composition	e. Calculate the percent composition of a substance, given its formula or masses of each component element in a sample
	f. Determine the empirical formulas and molecular formulas of compounds, given percent composition data or mass composition data
	g. Determine percent composition experimentally and derive empirical formulas from the data (e.g., for hydrates)

III.A.2.	Mole Concept, Molar Mass, Gram Formula Mass, and Molecular Mass	a. Explain the meaning of mole and Avogadro's number
		b. Interconvert between mass, moles, and number of particles
		c. Distinguish between formula mass, empirical mass, molecular mass, gram molecular mass, and gram formula mass

Purpose of the Unit: Students will be able to solve stoichiometric problems using Avogadro's hypothesis as well as convert between the quantities of mass, moles and particles. Students will continue to solve percent composition problems and will expand their understanding of deriving empirical formulas to include compounds (in addition to hydrates.) Students will also be able to differentiate and calculate formula, empirical, molecular, gram molecular, and gram formula masses.

Prerequisites: Students should be able to:

- calculate molar mass and percent composition
- determine the empirical formula of a hydrate
- perform dimensional analysis to convert between units
- identify elements and polyatomic ions from their symbols

Daily Lesson Guide

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1	*** Mole & Avogadro's hypothesis** *** Mole-Particle conversions** **II.B.2.f** **III.A.2.a, b**	*** How are moles related to Avogadro's number?** *** How can moles be used as a conversion factor?**	*** Summarizing and note taking** *** I Do – We Do – You Do** *** Application** *** Working with others**	*** Pre test** *** ACT bell ringer** *** Math notes** *** Solve practice problems together**	*** Evaluate pre test, formative assessment and math notes** **Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative**

2-3	*** Mole-Mass & Particle-Mass Conversions II.B.2.f III.A.2.a, b**	*** How can moles be used as a conversion factor?**	*** Summarizing and note taking * I Do – We Do – You Do * Application * Working with others**	*** ACT bell ringer * Math notes * Solve practice problems together**	*** Evaluate formative assessment and math notes Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative**
4	*** % composition and empirical formula review * empirical formula of a compound calculations III.A.1.e, f, g**	*** How can I apply what I know about % composition and empirical formulas of hydrates to compounds?**	*** Summarizing and note taking * I Do – We Do – You Do * Analysis/ Application * Working with others**	*** ACT bell ringer * Solve practice problems together * MSDS sheet on water (H_2O)**	*** Evaluate formative assessment and for understanding of MSDS sheet Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative**
5	*** Different types of masses: formula, empirical, molecular, gram-molecular, and gram-formula III.A.2.c**	*** How are the different types of masses related/ unique?**	*** Summarizing and note taking * I Do – We Do – You Do * Advanced organizers * Identifying similarities and differences * Working with others**	*** ACT bell ringer * Create graphic organizer to compare masses**	*** Evaluate formative assessment and evaluate graphic organizer Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative**
6-7	**Laboratory: Determining the empirical and molecular formula of a compound I.A.1.c, d, e, f I.A.2.a, b, c, e, f I.A.3.d II.B.2.f III.A.1.e, f, g III.A.2.a, b, c**	*** How can I use what I know to experimentally determine the formula of an unknown compound?**	*** Synthesis * Application/ Analysis * Identifying similarities and differences * Learning with others * Authenticity * Novelty and Variety * Generating and testing hypotheses**	*** ACT bell ringer * Conduct lab according to procedures provided (summative)**	*** Evaluate lab report Enrichment: Student development of lab procedures with less guidance**

9	*** Review** **I.A.1.c, d, e, f** **I.A.2.a, b, c, d, e, f** **I.A.3.d** **II.B.2.f** **III.A.1.e, f, g** **III.A.2.a, b, c**	*** What can I do to be better prepared for the exam?**	*** Use clickers to test students' knowledge and clarify and misconceptions before the exam with immediate feedback.**	*** ACT bell ringer** *** Use clickers to review with exam like questions (summative)**	*** Students participate in review** **Enrichment: Less time to solve problems and limited use of aides**
10	*** Exam** **I.A.1.c, d, e, f** **I.A.2.a, b, c, d, e, f** **I.A.3.d** **II.B.2.f** **III.A.1.e, f, g** **III.A.2.a, b, c**	*** Can I demonstrate my knowledge on the exam?**	*** Evaluation** *** Analysis** *** Application** *** Synthesis**	*** ACT bell ringer** *** Students take exam (summative)**	*** Evaluate exam** **Enrichment: No use of supports with exemption of periodic table, periodic table only has element symbols, not names**