FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Pre – AP Chemistry **Unit Name:** **Stoichiometry** **Days: 11**

Quality Core Objectives:

Unit 6 Stoichiometry	
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
	d. Use appropriate statistical methods to represent the results of investigations
	e. Express numbers in scientific notation when appropriate
	f. Solve for unknown quantities by manipulating variables
	g. Use graphical, mathematical, and/or statistical models to express patterns and relationships inferred from sets of scientific data
I.A.3. Science in Practice	e. Use a variety of appropriate sources (e.g., Internet, scientific journals) to retrieve relevant information; cite references properly
II.B.2. The Nature of Gases	f. Describe Avogadro's hypothesis and use it to solve stoichiometric problems
III.A.3. Chemical Equations and Stoichiometry	i. Use chemical equations to perform basic mole-mole, mass-mass, and mass-mole computations for chemical reactions
	j. Identify limiting reagents and use this information when solving reaction stoichiometry problems
	k. Compute theoretical yield, actual (experimental) yield, and percent yield
	l. Calculate percent error and analyze experimental errors that affect percent error

Purpose of the Unit: Students will be able to use balanced equations to calculate the amounts of reactants that will be created from a given amount of products. They will do this by performing basic computations involving mole-mole, mass-mole, and mass-mass conversions, taking limiting reactants in to consideration. They will also be able to calculate the percent yield based on those calculations and the experimental yield. In addition, students will be able to identify factors affecting experimental error and percent yields.

Prerequisites: Students should be able to:

- Calculate molar mass.
- Perform basic dimensional analysis and use SI units.
- Balance equations.
- Apply the law of conservation of mass/ energy/ matter.
- Identify experimental sources of error.

Daily Lesson Guide

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1	*** Avogadro's number** *** Molar conversions** **I.A.2.b, c, e, f, g** **II.B.2.f** **III.A.3.i**	*** How is Avogadro's number used to relate moles of one reactant to another?**	*** Summarizing and note taking** *** Application** *** I Do-We Do-You Do**	*** Pre-test** *** ACT Bell Ringer** *** Modeled notes and examples** *** Practice stoichiometric conversions together (formative)**	*** Evaluate pre-test** *** Evaluate practice problems** **Enrichment: Less guidance in note taking, more independence in practice, discuss prior knowledge**

2-4	*** Stoichiometry: mole-mole, mass-mole, mole-mole conversions I.A.2.b, c, d, e, f, g II.B.2.f III.A.3.i**	*** How do you convert between given amounts of reactants and products?**	*** Summarizing and note taking * Application * Identifying similarities and differences * I Do-We Do-You Do**	*** ACT Bell ringer * Modeled notes and examples * Practice molar conversions together (formative)**	*** Evaluate practice problems Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative**
5-6	*** Limiting reactants in stoichiometry I.A.2.b, c, d, e, f, g II.B.2.f III.A.3.i, j**	*** What are the factors that limit the amount of product yielded? * How does this impact the reaction?**	*** Summarizing and note taking * Application/ Analysis * Identifying similarities and differences * I Do-We Do-You Do**	*** ACT Bell Ringer * Modeled notes and examples * Reading a recipe/ application to chem * Practice limiting reactant problems together (formative)**	*** Evaluate practice problems and understanding of recipe analogy Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative**
7	*** Theoretical vs. experimental yield, percent yield I.A.2.b, c, d, e, f, g II.B.2.f III.A.3.k**	*** How can you determine the efficiency of a reaction? * Is there anything you can do to improve the efficiency?**	*** Summarizing and note taking * Application/ Analysis * Identifying similarities and differences * I Do-We Do-You Do**	*** ACT Bell Ringer * Modeled notes and examples * Practice limiting reactant problems together (formative)**	*** Evaluate practice problems Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative**
8	*** Experimental and percent error * Factors affecting percent error I.A.2.b, c, d, e, f, g II.B.2.f III.A.3.l**	*** What causes a scientist to get fewer products than predicted stoichiometry?**	*** Summarizing and note taking * Application/ Analysis * Evaluation * I Do-We Do-You Do**	*** ACT Bell Ringer * Modeled notes and examples * Practice limiting reactant problems together (formative)**	*** Evaluate practice problems Enrichment: Less guidance in note taking, more independence in practice, more challenging examples in formative**

9	**Laboratory: Predicting the yield of a chemical reaction I.A.1.c, d, e, f I.A.2.a, b, c, d, e, f, g I.A.3.e II.B.2.f III.A.3.i, j, k, l**	*** How can I apply what I know about predicting amounts of product, chemical reactions, and percent yield**	*** Synthesis * Application/ Analysis * Identifying similarities and differences * Learning with others * Authenticity * Novelty and Variety * Generating and testing hypotheses**	*** ACTBell ringer * Conduct lab according to procedures provided (summative)**	*** Evaluate lab report Enrichment: Student development of lab procedures with less guidance**
10	*** Review I.A.1.c, d, e, f I.A.2.a, b, c, d, e, f, g I.A.3.e II.B.2.f III.A.3.i, j, k, l**	*** 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**
11	*** Exam I.A.1.c, d, e, f I.A.2.a, b, c, d, e, f, g I.A.3.e II.B.2.f III.A.3.i, j, k, l**	*** Can I demonstrate my knowledge on the exam?**	*** Evaluation * Analysis * Application * Synthesis**	*** ACT bellringer * Students take exam (summative)**	*** Evaluate exam Enrichment: No se of supports with exemption of periodic table, periodic table only has element symbols, not names**