



APS Science Curriculum Unit Planner

Grade Level/Subject	Chemistry
Stage 1: Desired Results	
Enduring Understanding	
Molar relationships are a conversion method for relating measurable quantities.	
Correlations	
Unifying Understanding	
VA SOL	CH.4 The student will investigate and understand that quantities in a chemical reaction are based on molar relationships. Key concepts include a) Avogadro's principle and molar volume; b) stoichiometric relationships; c) partial pressure; d) gas laws
NSES (grade level)	
AAAS Atlas	
Essential Questions	
<ul style="list-style-type: none"> • What do mathematical relationships have to do with chemistry? • How do balanced equations apply to both chemistry and every day situations? • How are units used to communicate concepts? 	
Knowledge and Skills	
Students should know:	
<ul style="list-style-type: none"> • Mole conversions • Molarity • SI units • Stoichiometry • Percent by mass • Empirical and molecular formulas • Formula units • Freezing point depression and boiling point elevation are related to the number concentration of solute in a solvent 	
Students should be able to:	
<ul style="list-style-type: none"> • Convert between different metric units • Calculate molarity • Use stoichiometry to relate moles, grams, atoms, and volume • Calculate percent by mass of the element • Use the empirical formula to find a compounds molecular formula • Interpret balanced chemical equations in terms of moles, representative particles, mass and gas volume at STP • Use mole ratios 	
Stage 2: Assessment Evidence	
Prior Knowledge and Skills	
<ul style="list-style-type: none"> • Metric units for length, mass, and volume 	

<ul style="list-style-type: none"> • Simple algebra and how to find a variable • The prefixes for the metric system 	
Formative Assessment	Summative Assessment
<ul style="list-style-type: none"> • Student participation • Homework (readings, questions, and problems) • Laboratory assessment understanding models 	<ul style="list-style-type: none"> • Laboratory Reports • Tests and Quizzes
Stage 3: Learning Plan	
References to Adopted Materials	
<p><i>Prentice Hall Chemistry:</i></p> <ul style="list-style-type: none"> • Chapter 12 Stoichiometry <p><i>Holt Chemistry:</i></p> <ul style="list-style-type: none"> • Read pg 101 - Introduction to the Mole • Read pg 62-63 - Scientific Notation • Read pg 67-68 - problems # 30, 31, 40, 41 • Read pg 84 – Mass Number is the Number of Particles in the Nucleus • Read pg 88 – Isotopes of an Element Have the Same Atomic Number • Read pg 230 – Amount in Moles Can Be Converted to Mass • Do pg 89 – Problems # 1, 2, & 5 • Read pg 230 – Molar Mass Relates Moles to Grams • Read pg 237 - 238 – Formulas are Used to Calculate Molar Masses • Do pg 236 (practice) #1 (a-f) • Read pg 316 – 318 – Actual Yield and Percentage Yield • Do pg 319 # 7 (a-c) • Read pg 419 – 420 – Gas Pressure • Read pg 431 - Volume-Molar Relationships • Read pg 432 – Avagadro’s Law • Do pg 432 # 4 	
Suggested Investigations	
<ul style="list-style-type: none"> • Popcorn Mole Counting Lab - Students use popcorn and beans as a method of counting a "mole" • Synthesis of Copper Oxide Lab - Students calculate theoretical yield of copper oxide and then after performing the experiment determine actual yield and calculate percent error. • Kool-aid Dilution Lab - Different concentrations of Kool-aid are created and their molarities calculated. 	
Outdoor Education Applications	
<ul style="list-style-type: none"> • None currently noted 	
Resources	
Web Sites	
<ul style="list-style-type: none"> • Explorelearning.com (Stoichiometry Gizmo) 	
Videos	
<ul style="list-style-type: none"> • None currently noted 	

Discovery Learning

- None currently noted

Field Trips

- None currently noted

Other

- Holt Chapter Resources on CD- ROM pg 52-53 Concept Review: Avogadro's Number and Molar Conversions
- Holt Chapter Resources on CD- ROM pg 56- 59 Concept Review: Formulas and Percentage Composition
- Holt Chapter Resources on CD- ROM pg 69-73 Concept Review: Calculating Quantities in Reactions
- Holt Chapter Resources on CD- ROM pg 77- 79 Concept Review: Stoichiometry and Cars
- Holt Chapter Resources on CD- ROM pg 108-109 Concept Review: Concentration and Molarity