

Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Science	Course:	Chemistry I	Unit 6 Title:	Molar Quantities	Grade Level(s):	10th
Assessed Trimester:	Trimester B	Pacing:	5 - 10 Days	Date Created:	6/7/2012	Last Revision Date:	4/3/2014

Course Understandings: <i>Students will understand that:</i> - Problems can be solved and knowledge gained in a systematic way: solutions to one problem can create new questions and problems. - Chemistry is recognized as significant in its application to other disciplines and the world. - Ideas are expressed symbolically, numerically, and graphically. - Behavior and properties of materials are organized, classified, and predicted utilizing periodic trends. - Mathematical relationships are interpreted and manipulated to model the real world. - The basic building blocks combine and recombine in a variety of ways to make all matter from the simple to the complex. - The laws of chemistry predict outcomes that impact and apply to daily life.

DESIRED RESULTS (Stage 1) - WHAT WE WANT STUDENT TO KNOW AND BE ABLE TO DO?

Established Goals	
Standard: 9C.2.1.2.4: Determine the molar mass of a compound from its chemical formula and a table of atomic masses; convert the mass of a molecular substance to moles, number of particles, or volume of gas at standard temperature and pressure. 9.1.3.4.5: Demonstrate how unit consistency and dimensional analysis can guide a calculation of quantitative solutions and verification of results. 9C.2.1.2.5: Determine percent composition, empirical formulas and molecular formulas of simple compounds. 9C.2.1.2.6: Describe the dynamic process by which solutes dissolve in solvents and calculate concentrations, including percent concentration, molarity and parts per million. [note: the first half of this benchmark was done in Tri A] Literacy Standards: 9.13.7.7: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	
Transfer	
Students will be able to independently use their learning to: (product, high order reasoning) Use the concept of counting by mass in other areas of life.	
Meaning	
Unit Understanding(s): Students will understand that: The mole concept relates the amount of particles of a substance to its mass.	Essential Question(s): Students will keep considering: How does the mole concept relate the number of particles to mass of a substance?
Acquisition	
Knowledge - Students will: - Use scientific notation to describe a quantity and also in calculations. (H) 9C.2.1.2.4 - Know that one mole of a substance contains 6.02 X 10²³ particles. (H) 9C.2.1.2.4	Skills - Students will: Determine the molar mass of a compound from its chemical formula and a table of atomic masses (H) 9C.2.1.2.4

• Know how to calculate percent. (M) 9C.2.1.2.5 • Know that ionic compounds are always expressed as empirical formulas. (L) 9C.2.1.2.5 • Know the difference between an empirical formula and molecular formula. (L) 9C.2.1.2.5 Reasoning - Students will: • Explain the relationship between atomic mass, formula mass and molar mass. (M) 9C.2.1.2.4 • Explain the mole concept: 1 mole of a substance is 6.02 x 10 ²³ particles and it is also a mass amount. (H) 9C.2.1.2.4 • Interpret the subscripts in a chemical formula as indicating the number of moles of the element(s) in 1 mole of the compound. (M) 9C.2.1.2.4	• Use dimensional analysis to convert among the mass, number of moles and number of particles of a molecular substance. (H) 9C.2.1.2.4 • Perform unit conversions using dimensional analysis 9.1.3.4.5 (H) • Determine percent composition by mass of a chemical compound. (M) 9C.2.1.2.5 • Calculate empirical formula from % mass data. (L) 9C.2.1.2. • Calculate the molecular formula when given the molar mass and empirical formula (L) 9C.2.1.2.5 • Calculate the concentration of a solution, including percent concentration, molarity (M) and parts per million (L). (After the mole unit) 9C.2.1.2.6 • Calculate the number of molecules given the mass of a compound. (M) 9C.2.1.2.4 • Calculate the number of atoms given the mass of a compound. (L) 9C.2.1.2.4

Common Misunderstandings • Lack of understanding that mole is a unit used to count matter particles • Lack of understanding of the large magnitude of Avogadro’s number. • Use of scientific notation in communicating large and small quantities. • Use of correct representative particles in describing molar quantities.	Essential new vocabulary • Mole • Molar mass • Avogadro’s number • Formula mass • Empirical formula, Molecular formula • Molarity • Concentration
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