Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Science	Course:	Chemistry I (H)	Unit 4 Title:	Molar Quantities	Grade Level(s):	10th
Assessed Trimester:	Trimester A	Pacing:	1 Trimester (Tri A)	Date Created:		Last Revision Date:	6/17/2013

Course Understandings: *Students will understand that:*

- 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

- **MN State Standard:**
  Chemical and physical properties of matter result from the ability of atoms to form bonds.
  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.
  9C.2.1.2.5: Determine percent composition, empirical formulas and molecular formulas of simple compounds.

- **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)

- Determine the empirical formula and/or percent composition of a compound in a lab setting. [9C.2.1.2.5]

Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that: • The mole concept relates the amount of particles of a substance to its mass. [9C.2.1.2.4]	**Students will keep considering:** • How can we represent a large number of particles in a way that we understand? [9C.2.1.2.4] • How are the masses of particles and the numbers of particles related? [9C.2.1.2.4] • What is a mole, and why is it important in chemistry? [9C.2.1.2.4]

Acquisition

Knowledge - Students will:	Skills - Students will:
• Understand the mole concept and define how it relates to molar mass and number of particles. [9C.2.1.2.4]	• Calculate the molar mass of a compound. [9C.2.1.2.4] • Carry out mole conversions. [9C.2.1.2.4]

Reasoning - Students will: ● Distinguish between molar mass, formula mass/molecular mass.[9C.2.1.2.4]	● Calculate empirical and molecular formulas. [*9C.2.1.2.5]* ● Calculate percent composition. [*9C.2.1.2.5]*

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. ● Students sometimes confuse atomic mass and molar mass. ● Students are challenged when asked the number of atoms in a mole of an element such as chlorine. Because chlorine consist of diatomic molecules one mole of chlorine will have two moles of chlorine atoms. ● Students sometimes misunderstand that one mole of a element has a mass in grams equal to the atomic mass of the element by thinking one mole of an elements is the mass in grams, for example one mole of carbon has a mass of 12.0 grams.	**Essential new vocabulary** ● Mole ● Molar Mass ● Formula Mass ● Molecular Mass ● Particles (ion, atom, formula unit, molecule)