Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Science	Course:	Chemistry I (H)	Unit 7 Title:	Behavior of Gases	Grade Level(s):	10th
Assessed Trimester:	Trimester B	Pacing:	1 Trimester (Tri B)	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

- **Standard:** Matter
  State of matter can be described in terms of motion of molecules. The properties and behavior of gases can be explained using the kinetic molecular theory.
  9C.2.1.4.1: Use kinetic molecular theory to explain how changes in energy content affect the state of matter (solid, liquid and gaseous phases).
  9C.2.1.4.2: Use the kinetic molecular theory to explain the behavior of gases and the relationship among temperature, pressure, volume and the number of particles.

- **ACT Standards:**
  ACT S-3: Interpolate between data points in a graph/table.
  ACT S-4: Determine how variables are related.
  ACT S-5: Identify/use mathematical relationships between data.

- **Literacy Standards:**
  9.13.10.10: By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
  9.14.7.7: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize ideas from multiple sources on the subject, demonstrating understanding of the subject under investigation.
  9.14.8.8: Gather relevant information from multiple authoritative data, print, physical (e.g., artifacts, objects, images), and digital sources using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
  9.14.9.9: Draw evidence from literary or informational texts to support analysis, reflection, and research.

Transfer

Students will be able to independently use their learning to: (product, high order reasoning)

- Use the Gas Laws and Stoichiometry to determine quantities of reactants or products in a chemical reaction involving gases. [9C.2.1.4.2]

Meaning

Unit Understanding(s):	Essential Question(s):
Students will understand that:	**Students will keep considering:**
• The behavior of gases can be described using the kinetic molecular theory. [9C.2.1.4.1]	• How can Kinetic Molecular Theory explain the behavior of gases? [9C.2.1.4.1]

	● How is the relationship among pressure, volume, temperature and amount of matter quantified? [9C.2.1.4.2] ● Can you explain how the measureable variables of gases affect each other? [9C.2.1.4.2]

Acquisition

Knowledge - Students will: ● Define a solid, liquid, and gas in terms of kinetic energy and particle distance. [9C.2.1.4.1] ● Explain how pressure, temperature, volume, and number of particles affect the behavior of a gas. [9C.2.1.4.2] **Reasoning - Students will:** ● Predict the behavior of a gas when altering pressure, temperature, volume, and/or number of particles. [9C.2.1.4.2]	**Skills - Students will:** ● Use the Ideal Gas Law to solve for a missing variable. [9C.2.1.4.2] ● Use the Combined Gas Law to solve for a missing variable. [9C.2.1.4.2]

Common Misunderstandings ● Lack of understanding of the relative particle spacing among solids, liquids and gases ● Students think that Pressure and force are synonymous. ● Melting/freezing and boiling/condensation are often understood only in terms of water. ● Students lack an appreciation of the very small size of particles and that there must be something between all particles. ● Students may think some matter is weightless. ● Students may think atoms fill matter up rather than atoms ARE matter. ● Students may have trouble with the idea that atoms are in constant motion. ● Students are very committed to a theory of continuous matter, not yet understanding that a solid is a combination of separate particles making up that solid. ● Students lack an appreciation of the very small size of particles and that there must be something between all particles.	**Essential new vocabulary** ● Kinetic Molecular Theory ● Combined Gas Law ● Ideal Gas Law ● Pressure ● Avogadro's Gas Law ● Charles' Gas Law ● Boyle's Gas Law ● Gay-Lussac's Gas Law ● Dalton's Law of Partial Pressures ● Average Kinetic Energy