

Anoka-Hennepin Secondary Curriculum Unit Plan

Department:	Science	Course:	Chemistry I	Unit 10 Title:	Behavior of Gases	Grade Level(s):	10th
Assessed Trimester:	Trimester B	Pacing:	5 - 10 Days	Date Created:	6/7/2012	Last Revision Date:	6/24/2014

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: 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. • 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. Benchmark: • Literacy Standards: 9.13.4.4: Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy) 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 concepts relating to gas laws to better understand natural and designed phenomena.	
Meaning	
Unit Understanding(s): Students will understand that: • The behavior of gases can be described using the kinetic molecular theory.	Essential Question(s): Students will keep considering: • How can Kinetic Molecular Theory explain the behavior of gases? • How is the relationship among pressure, volume, temperature and amount of matter quantified?

Acquisition	
Knowledge - Students will: - Know the components of the Kinetic Molecular Theory: (M) 9C.2.1.4.1 - Matter is made of particles; - Empty space exists between the particles of matter; - The particles of matter are in constant motion - The particles collide with each other. - Define standard temperature and pressure (STP) (M) 9C.2.1.4.2 - Know the combined and ideal gas laws. (M) 9C.2.1.4.2 Reasoning - Students will: - Explain the structure of solids, liquids and gases in terms of the Kinetic Molecular Theory. (M) 9C.2.1.4.1 - Explain the role of energy and the forces between particles in transitions among solids, liquids and gases. (M) 9C.2.1.4.1 - Explain the relationships among temperature, pressure, and volume for an ideal gas. (M) 9C.2.1.4.2 - Use mathematical equations to describe the relationships among temperature, pressure and volume for an ideal gas. (Emphasize Combined and Ideal Gas Laws). (M) 9C.2.1.4.2	Skills - Students will: - Calculate the number of moles or volume of gas at standard temperature and pressure (STP). (M) 9C.2.1.4.2 - Calculate changes in properties of a gas using the combined gas law.(M) 9C.2.1.4.2 - Calculate the number of moles, pressure, volume or temperature of a gas using the ideal gas law. (M)

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	Essential new vocabulary - Intermolecular forces - Molar volume - Ideal gas - Kelvin - Absolute temperature - Phase changes - Boiling - Condensation - Vaporization - Evaporation - Sublimation - Deposition - Atmosphere (atm)
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