

Unit Title: Gas Laws

Grade Level: (example: 9, 10, 11, 12 or 7-8) 11

Subject Area: (example: Science, Physics; English, Short Stories) Science

Duration/Length/Number of class periods: (example: 5 class periods) 10 class periods (52 min for each class)

Description: Students will conduct a series of experiments to find the relationships involved with the variables of gases. These relationships will be used to find the ideal gas law. Students will use the Kinetic Molecular Theory to explain these relationships and then use the motion of molecules to explain everyday phenomena involving gases (can crush, boil water in a Florence flask with ice, marshmallows in a vacuum, egg in a bottle, air pressure and fog etc.)

Established Goals (National, State, Local): 9c.2.1.4.1 (2009) New # 9c.2.2.1.1(2022?)

Describe how volume, temperature and pressure relate to each other in terms of Kinetic Molecular Theory.

What Enduring Understandings are desired? 6 - How can we use a variety of sources to draw conclusions? and 7 How can we use technology to gather, classify, sequence, and interpret information and visual data?

Students will understand the relationships between volume, pressure, temperature, and moles for an ideal gas.

Students will use the Kinetic Molecular Theory and the motion of molecules to explain how those variables affect each other.

Students will use the ideal gas law and/or the combined gas law to solve problems involving the variables for a gas.

What Essential Questions will be considered? What is the relationship of the variables in a gas sample?

I can explain the direct or inverse relationship of volume, pressure, temperature, and moles for an ideal gas.

I can use the motions of molecules to explain how the molecules/atoms in a gas affect the variables of the ideal gas.

I can use the ideal gas law and/or combined gas law to solve problems involving an ideal gas.

Students will know / be able to: Describe how volume, temperature and pressure relate to each other in terms of kinetic molecular theory.

Description <i>Units must include at least one of each formative, summative, introductory activity and learning activity. Check the appropriate box; one per row.</i>	Formative	Summative	Introductory Activity	Learning Activity	Student Technology Used	Teacher Technology Used	ISTE Standards
Phet Colorado Gas Properties - play with online simulations to determine properties of gases. These properties are verified through simulations and an online schoology quiz-document (I hesitate to use the word quiz because there are no points given, it is just for students to check their understanding)			X		X	X	
Boyle's law lab/pressure vs. temperature lab; labquests and pressure probes and temperature probes are used. A capped erlenmeyer flask submerged in beakers of hot, warm, and cold water. Results are graphed and the y-intercept is absolute zero.				X	X		
Practice test , schoology assignments -	X				X		
Test		X					

Materials, tools and resources
<p>Unit Plan Author (name, school and optional email address or hyperlink to teacher's web page) Daily agenda for chem (Collaboratively created by Jon Schrupp, Jen Erdahl, and Nancy Bynum) Slides 86-97 Boyle's law lab Pressure vs. temperature lab Phet Colorado Gas Properties</p>
<p>Additional credit given to Jon Schrupp, Jennifer Erdahl, Greg Sullivan, and Paul Anderson</p>