

CC38 Chemistry – Semester 1

Unit 3.9 – Virtual Lab

Gas Laws

Virtual Lab Objectives:

- Determine how changing a variable among P, V, N, and T influences other gas properties.
- Describe the relationship between particle-wall collisions and pressure.
- Predict how changing temperature will affect the speed of molecules.
- Predict the speed of molecules in thermal equilibrium based on the relative masses of molecules.
- Relate gas particle observations to various gas laws learned within the unit

Procedure:

- In order to complete the Virtual Lab, interact with the online simulation within LMS.
- Answer the virtual lab questions in complete sentences (found above in blue box - **Virtual Lab: Gas Laws Lab Guide**), and include all diagrams, analysis (answers to the lab questions), and conclusion within a properly formatted lab report document (the worksheet is **NOT** your lab report, yet only a tool to help you compose a proper lab report)
- Construct an original, formal **Lab Report** inclusive of all of the components of a lab report (introduction, objective/scientific question, hypothesis, materials, procedure, data/results [images from the simulation], analysis, answers to reflection questions from Gas Laws Worksheet, and conclusion summary)

**ALL VIRTUAL LABS REQUIRE A COMPLETE AND PROPERLY
FORMATTED LAB REPORT!
ANY ASSIGNMENT THAT DOES NOT HAVE A LAB REPORT WILL
HAVE EARNED A FAILING GRADE.**

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Simulation Procedure:

Open Gas Properties (Ideal) and then use the pump to put gas into the box:

- 1) Observe gas particles' behavior.
- 2) Pump in some lighter particles (red) and discuss the similarities and differences that you note between heavy (blue) and light (red) particles.
- 3) Use the simulation to see how changing the temperature affects the behavior of the different gas particles.
- 4) Write a description for a gas based on your observations; include diagrams (or screenshots of the simulation) to help with your description.
- 5) Determine the size of the heavy particle using the simulation tools, and then relate their molecular size to something in your "real-world" that you are familiar. Show your calculations with the units clearly labeled.

Discussion Points to Include within the Analysis and/or Conclusion Components of the Lab Report:

- 1) How fast do you think the air particles in this room are moving compared to a car going 50 mph, which is about 22 meters/second (put your answer in sentence form, 'a molecule travels ____ as fast as a car'). How does the size and speed of gas molecules relate to everyday objects?
- 2) Describe the particle behavior of gases using words and diagrams.
- 3) How are gases distinguishable from solid or liquid matter? Explain the differences and similarities between solid, liquid and gas particle motion.
- 4) How does temperature, container volume, and particle size affect gas particle behavior?

You are expected to use appropriate and relevant scientific vocabulary and reasoning regarding gas particle behavior and various gas laws within your written responses. The inclusion of this will indicate your understanding of the course content up until this point. Failure to do so will result in a rejection or failure of your assignment

