

pHET Simulation: Gas Properties

Objectives:

- Define four important properties of gases- pressure, temperature, volume, and amount of a substance.
- Analyze graphically the relationships between the properties and define their proportional relationship.
- Apply gas properties and laws to real life.

Assignment:

Tire pressures, sinus headaches, cabin pressure in airplanes, even hairspray bottles- all find their explanation in the properties and laws of gas molecules. Four important properties of gases - pressure, temperature, volume, and amount (in moles) - are used to define the behaviors of gas molecules. Using the **Gas Properties** simulation from the pHET program, you and your partner will first define each property and then compare the properties to one another.

1. Open the **Gas Properties** simulation on the University of Colorado's pHET website:
phet.colorado.edu/en/simulation/gas-properties
2. "Pump the Handle" to place gas molecules into the box.
3. Play around with the simulation, and list the **4** things in the simulation you can change below.

4. Using the "Constant Parameter" section to the right of the simulation, click "volume" to keep it constant.
5. Adjust the amount of gas molecules (the pump) and the temperature in order to observe what is happening to the pressure of the system.
6. Based on your observations, explain what happens to **pressure**. What law are you observing?

7. What type of relationship (direct or indirect) is this law?

8. Using the "Constant Parameter" section to the right of the simulation, click "temperature" to keep it constant.
9. Adjust the amount of gas molecules (the pump) and the volume in order to observe what is happening to the pressure of the system.
10. Based on your observations, explain what happens to **pressure**. What law are you observing?

11. What type of relationship (direct or indirect) is this law?

12. Using the “Constant Parameter” section to the right of the simulation, click “pressure” to keep it constant.
13. Adjust the amount of gas molecules (the pump) and the temperature in order to observe what is happening to the pressure of the system.
14. Based on your observations, explain what happens to *volume*. What law are you observing?

15. What type of relationship (direct or indirect) is this law?

16. How does the amount of gas molecules present affect the three properties above (pressure, volume, temperature)?

17. Using your knowledge of everyday life, the book, and the internet, provide the real-world situations that describe the relationships you discovered for:
 - a.) pressure and temperature

 - b.) volume and pressure

 - c.) temperature and volume

18. After you have completed the simulation and filled out this worksheet, get a STAMP.

19. Hold onto this worksheet until asked to turn it in for credit.