Name: _____ Date: _____

Chem R Pd. ____ Gas Webquest

Purpose- To use an online simulation to determine the relationships between pressure, volume and temperature and to observe real world applications.

Background- When matter is in the gas phase, particles are in the highest energy state and move quickly. When these particles are confined in a closed container, they are constantly colliding with one another and with the walls o the container. Pressure is defined as the force exerted on the walls of a container due to gas particles colliding into them. There are two factors that can affect pressure; temperature and volume. If we recall the definitions of temperature and volume, we are able to predict the relationships between pressure, temperature and volume.

In your own words, define:

Pressure: _____

_____

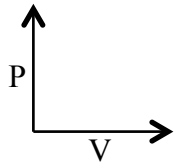
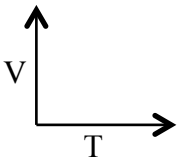
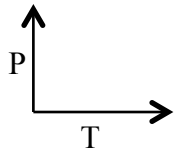
Temperature: _____

_____

Volume: _____

_____

Hypothesis- Predict the relationship between two variables. Sketch a line on each axis to represent that relationship and explain your prediction.

I. Volume-Pressure If the volume of a container decreases, pressure will _____.		Explain your prediction.
II. Temperature-Volume If the temperature of a gas increases, volume will _____.		Explain your prediction.
III. Temperature-Pressure If the temperature of a gas increases, pressure will _____.		Explain your prediction.

Procedure- 1) Google "Phet Chemistry" and click on "Gas Properties".

2) Click "Download" and open the simulation

3) Write the steps you will take to test all 3 relationships.

****The scientific method states that to determine a relationship between 2 variables, the third has to remain CONSTANT. However, you MUST have particles in the container BEFORE you make something constant.**

4) Determine the relationship based on your observations and explain why this occurs.

Variables	**Experiment!**	**Relationship**	**Why does this happen? Support using EVIDENCE from the simulation**
V – P (Temperature constant)		As V ⬇ , P _____ Relationship?	*(Make sure to answer in terms of collisions)*
T – V (Pressure constant)		As T ⬆, V _____ Relationship?	
T – P (Volume constant)		As T ⬆ P _____ Relationship?	*(Make sure to answer in terms of collisions)*

REASONING: Evaluate your hypothesis. Were your predictions correct or incorrect? EXPLAIN your reasoning based on what you observed in the simulation.

EXTEND: Is there a way that we can measure the changes in pressure, volume, and temperature using one formula/relationship? Brainstorm this idea with your group and try to think of a formula in which all three variables can be included.

Real-World Applications- Use one of the gas law relationships you discovered to explain each real-world scenario.

a. Your bicycle tires are more flat in the winter than in the summer.

b. It is easier to open up a jar if you run it under hot water first.

c. Balloons pop when you squeeze them.

d. If you put an empty water bottle in the refrigerator, it will be all shriveled up the next day.

e. When scuba divers breathe out, their air bubbles get larger as they reach the surface of the water.

f. The plunger on a turkey syringe thermometer pops out when a turkey is done cooking.

g. Throwing an aerosol can (like hairspray) into a fire can cause it to explode.

h. An infected tooth forms an abscess that fills with gas. The abscess puts pressure on the nerve of the tooth, causing a toothache. Will a heating pad help the pain? Why?

i. Choose one relationship that you understand very well and describe an example of this in real life that we haven't discussed during this activity.