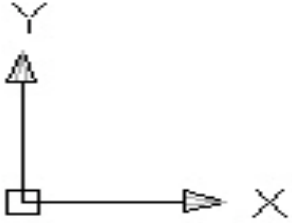
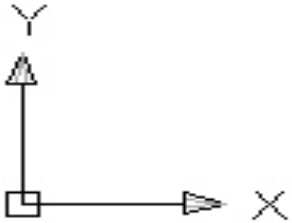
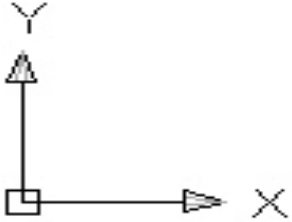


Name: _____

How do the Gas Laws Work?

Predictions: Use the space below to make predictions about the four relationships listed below. Draw a graph of the relationship and explain your reasoning for why you drew the graph that way. Explanations must be scientific and specific. **Note: Be sure to label your x and y axes.**

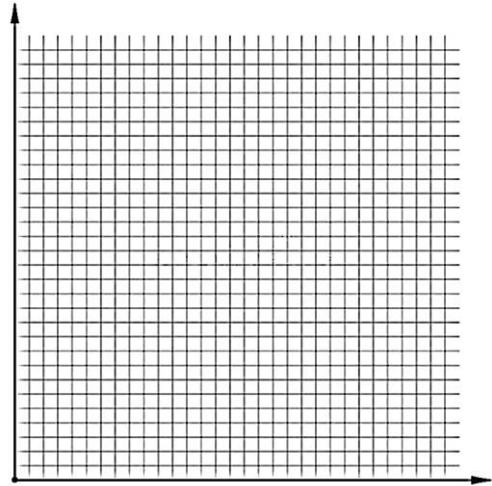
<p>1. Volume-Pressure graph</p> 	<p>Explain your reasoning for the graph's appearance</p>
<p>2. Volume-Temperature graph</p> 	<p>Explain your reasoning for the graph's appearance</p>
<p>3. Temperature-Pressure graph</p> 	<p>Explain your reasoning for the graph's appearance</p>

Experiments:

1. Go to: <https://phet.colorado.edu/en/simulation/gas-properties> and click play. Select "Ideal"
2. Your task is to design experiments using the simulation to demonstrate the four scenarios you have already made predictions about.
 - Whatever variable you are not testing (Ex: Volume-Pressure is not testing Temperature), click it to keep Constant after you have pumped some particles into the box.
 - Use the Heat Control at the bottom to change the Temperature. The thermometer at the top will allow you to read the temperature.
 - Move the left side whole out to increase the Volume or in to decrease the Volume. To measure Volume, you will need to click Width.
 - Pump the pump on the right side of the screen to increase Pressure. Open the gate at the top of the screen to decrease Pressure. The pressure gauge on the side will allow you to read pressure.

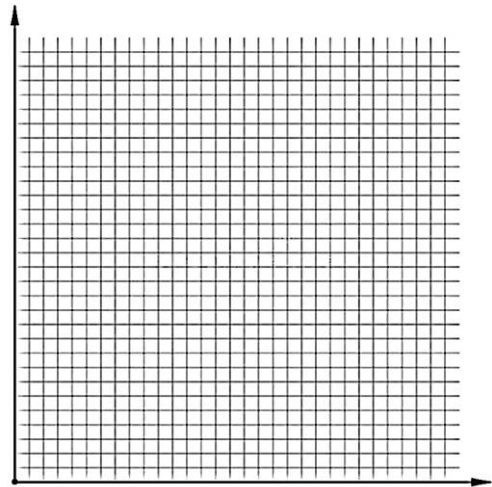
3. Design and carry out an experiment to compare volume and pressure. Keep temperature constant. Fill-in the data table below and make a graph based on your data (make sure to label your axes.)

Volume (nm)	Pressure (atm)



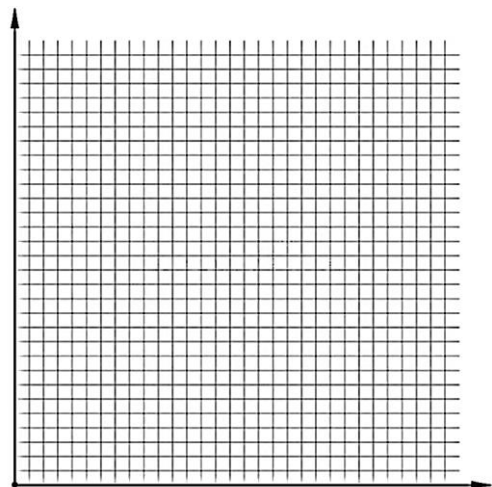
4. Design and carry out an experiment to compare volume and temperature. Keep pressure constant. Fill-in the data table below and make a graph based on your data (make sure to label your axes.)

Volume (nm)	Temp (K)



5. Design and carry out an experiment to compare temperature and pressure. Keep volume constant. Fill-in the data table below and make a graph based on your data (make sure to label your axes.)

Temp (K)	Pressure (atm)



Questions:

1. Complete this table. Note: You will have to use the internet to research Whose Law? It will be a person's name.

Relationship	Direct or indirect?	Constant parameters	Whose Law?	Briefly, why according to particle model.
V vs P				
V vs T				
T vs P				

2. Using your results, explain each of the following scenarios. Make sure to refer to which graph (Graph 3, 4, or 5) can be used as evidence for your answer.
- Explain why bicycle tires seem more flat in the winter than in summer.
 - Explain why a can of soda pop explodes if left in the hot sun.
 - A rigid container filled with a gas is placed in ice (ex. water bottle). What will happen to the pressure of the gas? What do you think will happen to the volume?
 - An infected tooth forms an abscess (area of infected tissue) that fills with gas. The abscess puts pressure on the nerve of the tooth, causing a toothache. While waiting to see a dentist, the person with the toothache tried to relieve the pain by treating the infected area with moist heat. Will this treatment help? Why or why not?