http://martinezchem.weebly.com

Name: _____ Date: _____

Notes: The Combined Gas Law

$$\frac{(\text{Initial pressure})(\text{initial volume})}{(\text{Initial moles})(\text{initial temperature})} = \frac{(\text{final pressure})(\text{final volume})}{(\text{final moles})(\text{final temperature})} \qquad \frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$$

Today you conducted labs to understand how the variables used to describe gases are related. There is also an equation that is used to describe how changing any of the variables affects the others. Use the results of your experiments and the equation above to answer the following questions.

How are **volume** and the **number of moles** of a gas related?

_____

Are **V** and **n** on the same side or opposite sides of the equation? _____

How are **pressure** and the **number of moles** of a gas related?

_____

Are **P** and **n** on the same side or opposite sides of the equation? _____

How are **pressure** and the **volume** of a gas related?

_____

Are **P** and **V** on the same side or opposite sides of the equation? _____

How are **pressure** and the **temperature** of a gas related?

_____

Are **P** and **T** on the same side or opposite sides of the equation? _____

What can you conclude about how variables relative position in the Combined Gas Law equation predicts how they are related?

_____

_____

_____

What does the *left* side of the Combined Gas Law describe?

_____

What does the *right* side of the Combined Gas Law describe?

_____

Define ***directly*** proportional: _____

Define ***inversely*** proportional: _____

When are variables inversely proportional? _____

When are variables directly proportional? _____

If you are interested in how 2 variables are related, how can you derive the equation from the combined gas law? _____

Write the equation for each of the following sets of variables:

pressure and number of moles: _____

pressure and temperature: _____

temperature and number of moles: _____

Example: The pressure of a container is 100. kPa at a temperature of 300. K. At what temperature would the pressure be 150. kPa if the volume and number of moles of gas are held constant?

Equation: **Substitution:** **Solution:**

$$\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$$

What are the 2 units for measuring temperature? _____

Define ***kinetic energy***: _____

Define ***absolute zero***: _____

$0°C = 273\ K$

How do you convert between °Celsius and Kelvin? _____

How do you convert between Kelvin and °Celsius? _____

What units MUST be used for the gas laws? _____

Convert between the temperature scales below.

100°C = _____ K	400 K = _____ °C	20°C = _____ K
350 K = _____ °C	-15°C = _____ K	273 K = _____ °C

Why is the Combined Gas Law such an important equation?

_____

_____