

Name: _____ Official Class: _____ Date: _____
Teacher: _____ Period: _____ Class: _____

Unit 6: Gases

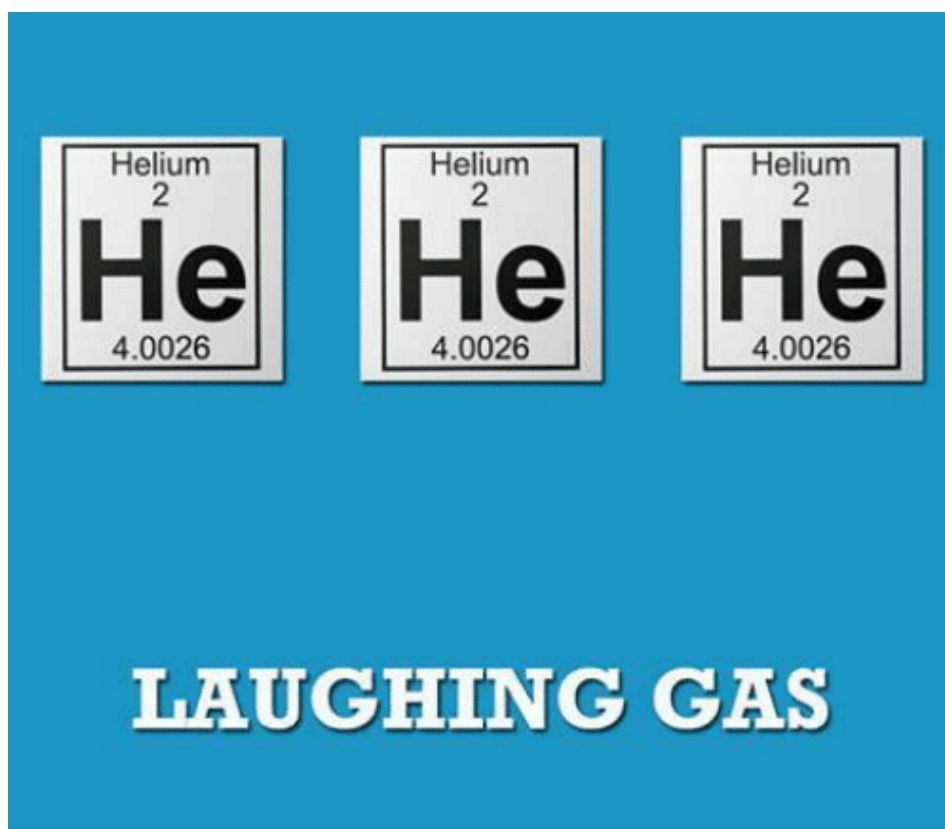
| | | | | | | |
|---|---|--|--------------------------------------|------------------------------------|-----------------------------------|--|
| 67 Ho Holmium 164.93032 | 25 Mn Manganese 54.938045 | 63 Eu Europium 151.964 | 74 W Tungsten 183.84 | 8 O Oxygen 15.9994 | 86 Rn Radon [222] | 19 K Potassium 39.0983 |
|---|---|--|--------------------------------------|------------------------------------|-----------------------------------|--|

The following pages are practice questions for this unit, and will be submitted for homework!

You must complete:

- Gas Law Graphic Organizer – **ALL QUESTIONS**
- Setting the Stage – Basic Info and Conversions – **ALL QUESTIONS**
- Boyle's Law Graph/Practice Questions – **ALL QUESTIONS**
- Charles' Law Graph/Practice Questions – **ALL QUESTIONS**
- Gay-Lussac's Law Graph/Practice Questions – **ALL QUESTIONS**
- Combined Gas Law Practice – **ALL QUESTIONS**
- Ideal Gas vs. Real Gas and the KMT - **ALL QUESTIONS**

DUE: Friday February 7, 2020



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Gas Law Graphic Organizer

Directions: Fill in the table below to review and summarize all three gas laws.

| Gas Law | Variables Studied | Equation | Relationship | Graph |
|-------------------------|-------------------|----------|--------------|-------|
| Boyle's Law | | | | |
| Charles' Law | | | | |
| Gay-Lussac's Law | | | | |

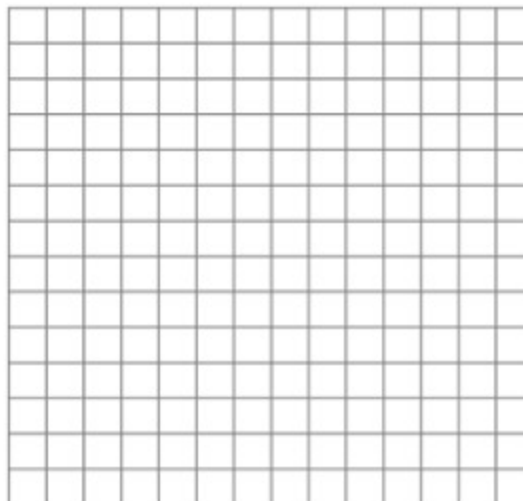
Setting the Stage...Basic Info and Conversions

- STP stands for: _____
- If a question asks for pressure at STP, it is _____ or _____
 - Other units of pressure
 - Torr: _____ torr = 1 atm
 - mmHg: _____ mmHg = atm
- If a question asks for temperature at STP, it is _____ or _____
- When using gas laws, we need to use _____ when dealing with temperature.
 - How to Convert to Kelvin: _____
 - $-56\text{ }^{\circ}\text{C} =$ _____
 - $198\text{ }^{\circ}\text{C} =$ _____
 - $273\text{ }^{\circ}\text{C} =$ _____
 - $0\text{ }^{\circ}\text{C} =$ _____
 - How to Convert to Celsius: _____
 - $273\text{ K} =$ _____
 - $0\text{ K} =$ _____
 - $82\text{ K} =$ _____
 - $621\text{ K} =$ _____

Boyle's Law Graph/Practice Questions

Directions: Use the following data to graph the relationship between pressure and volume. Answer the questions based on the graph. Pressure should be the X-axis and volume should be the Y-axis.

| X-Axis | Y-Axis |
|-----------------|-------------|
| Pressure (mmHg) | Volume (mL) |
| 1250 | 380 |
| 650 | 760 |
| 350 | 1520 |
| 250 | 2280 |
| 200 | 3040 |
| 170 | 3800 |
| 150 | 4560 |



1. What is the type of relationship shown in this graph above? _____

Directions: Use Boyle's Law to answer the following questions.

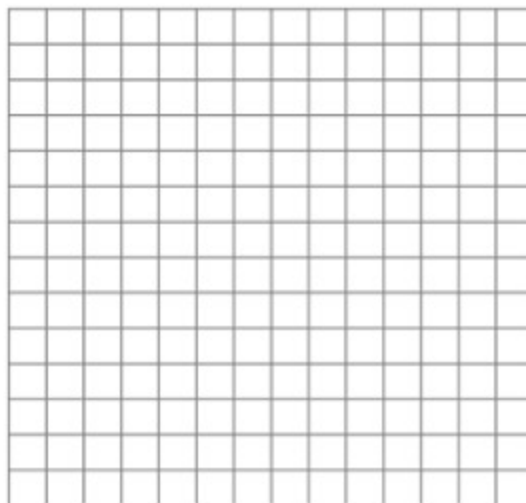
- A container holds 500. mL of CO₂ gas at 742 torr. What will be the volume of the CO₂ gas if the pressure is increases to 795 torr?
- A gas tank holds 2785 L of propane, C₃H₈, at 830 mmHg. What is the volume of the propane at standard pressure?
- A balloon contains 7.2 L of He. The pressure is reduced to 2.00 atm and the balloon expands to occupy a volume of 25.1 L. What is the initial pressure exerted on the balloon?
- A sample of neon occupies a volume of 461 mL at STP. What will be the volume of the neon when the pressure is reduced to 93.3 kPa?
- 352 mL of chlorine under a pressure of 680 mmHg are placed in a container under a pressure of 1210 mmHg. What is the volume of the container in liters?

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Charles' Law Graph/Practice Questions

Directions: Use the following data to graph the relationship between temperature and volume. Answer the questions based on the graph. Temperature should be the X-axis and volume should be the Y-axis.

| X-Axis | Y-Axis |
|-----------------|-------------|
| Temperature (K) | Volume (mL) |
| 700 | 1425 |
| 601 | 1227 |
| 499 | 1023 |
| 401 | 827 |
| 300 | 625 |
| 199 | 423 |
| 100 | 225 |



2. What is the type of relationship shown in this graph above? _____

Directions: Use Charles' Law to answer the following questions.

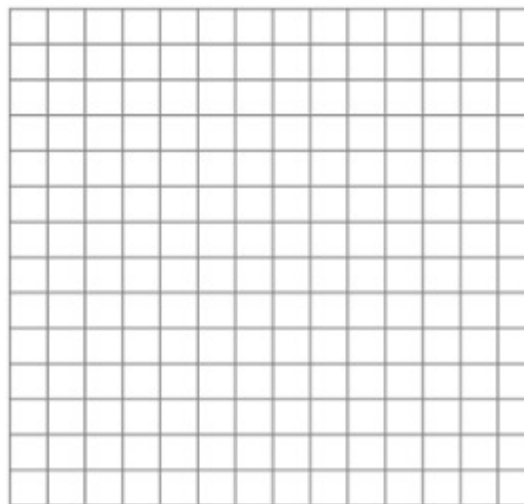
1. A gas occupies 1.00 L at standard temperature. What is the volume at 330.0 °C?
2. At 300 K a gas has a volume of 6.00 L. What will the volume be at 423 K?
3. At 498K a gas has a volume of 400.0 mL. What is the volume of this gas at 400 K?
4. Calculate the decrease in temperature when 2.00 L at 293 K is compressed to 1.00 L.
5. What is the initial temperature of 900 mL of gas before it was compressed to 423 mL with a temperature of 293 K?

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Gay-Lussac's Law Graph/Practice Questions

Directions: Use the following data to graph the relationship between temperature and pressure. Answer the questions based on the graph. Temperature should be the X-axis and pressure should be the Y-axis.

| X-Axis | Y-Axis |
|-----------------|----------------|
| Temperature (K) | Pressure (atm) |
| 125 | 0.2632 |
| 175 | 0.3947 |
| 225 | 0.5263 |
| 325 | 0.7895 |
| 425 | 1.0526 |
| 475 | 1.1842 |



3. What is the type of relationship shown in this graph above? _____

Directions: Use Gay-Lussac's Law to answer the following questions.

1. A gas has a pressure of 0.370 atmospheres at 50.0 °C, what is the pressure at standard temperature?
2. Determine the pressure when a constant volume of gas at 1 atm is heated from 270 K to 280K.
3. If a gas in a closed container is pressurized from 15 atm to 16 atm and its original temperature was 200 K, what is the final temperature of the gas?
4. A sample of gas at 1.65×10^2 mmHg inside a steel tank is cooled from 240 °C to 0 °C, what is the final pressure inside the steel tank?
5. Calculate the final pressure inside a scuba tank after it cools from 1.00×10^3 °C to 25.0 °C. The initial pressure in the tank is 130.0 atm.

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Combined Gas Law Practice

Directions: Use the Combined Gas Law to answer the following questions.

1. If _____ is constant, you use Boyle's Law and use the formula _____.
2. If _____ is constant, you use Charles' Law and use the formula _____.
3. If _____ is constant, you use Gay-Lussac's Law and use the formula _____.
4. A 28.4L sample of nitrogen inside a rigid, metal container at 51°C is placed inside an oven whose temperature is 254 °C. The pressure inside the container at 51 °C was 2.7 atm. What is the pressure of the nitrogen after the temperature is increased?
5. A has a temperature of 14 °C, and a volume of 4.5 liters. If the temperature is raised to 29 °C and the pressure is held constant. What is the new volume of the gas?
6. If 1.00 L of argon gas is originally at STP, and the pressure was then increased to 304.2 kPa, what is the final temperature of the gas?

Ideal Gas vs. Real Gas & the KMT

The Kinetic Molecular Theory States that all ideal gas particles...

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|--|--|--|--|