South Pasadena • Chemistry

Name _____
Period ___ Date ___/___/___

8 • How Do Hot Air Balloons Float?

Review Topic 1: Pressure Units

1 atm = 760 mmHg = 760 torr = 14.7 psi = 101.3 kPa

Make the following conversions: (Show your work)

550 mmHg x _____ = kPa

55 psi x _____ = mmHg

325 kPa x _____ = atm

2284 torr x _____ = kPa

48.0 mmHg x _____ = torr

1.85 atm x _____ = mmHg

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Review Topic 2: Kelvin Temp

K = °C + 273

Convert:

26.0 °C = _____ K

400 K = _____ °C

100 K = _____ °C

135 °C = _____ K

-127 °C = _____ K

4 K = _____°C

What is the temperature of a sample of gas that has **double** the kinetic energy (motion energy) of a sample of gas at 80°C?

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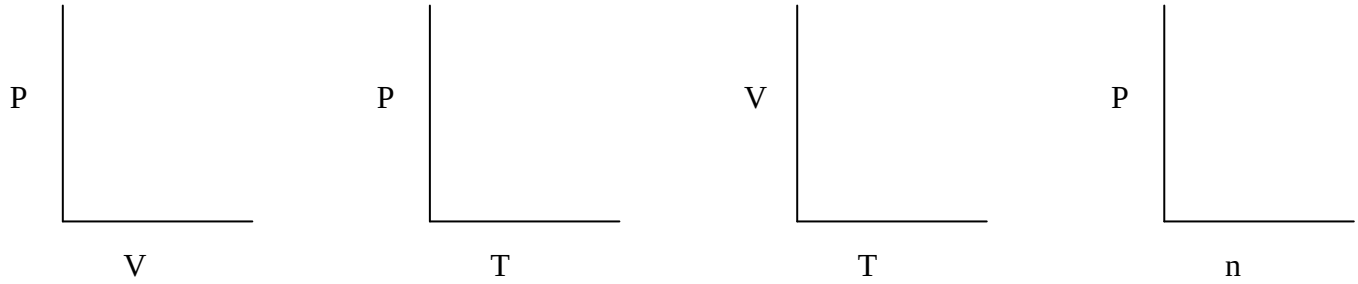
Review Topic 3: Graphs of Variables

Sketch the graph of the following pairs of variables:



CIrcle the "Law" that would relate each pair of variables:

$P \cdot V$ = constant $\frac{P}{V}$ = constant	$P \cdot T$ = constant $\frac{P}{T}$ = constant	$V \cdot T$ = constant $\frac{V}{T}$ = constant	$P \cdot n$ = constant $\frac{P}{n}$ = constant

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Review Topic 4: Identify problems

Identify the variables in each problem and decide **which law** applies.
You do not have to solve the problems (until Station 5)

_____ 1. A balloon at 35°C has a volume of 2.5 L. What is its volume at 45°C?

_____ 2. A balloon has a volume of 3.50 L at 21.0°C when the air pressure is 1.05 atm. How many moles of gas are contained in the balloon?

_____ 3. A balloon has a volume of 1.0 L at 21.0°C and 750 mmHg. What is the balloon's volume at STP?

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Review Topic 5: gas laws

Solve the following problems:

_____ 1. A balloon at 35°C has a volume of 2.5 L. What is its volume at 45°C?

_____ 2. A balloon has a volume of 1.0 L at 21.0°C and 750 mmHg. What is the balloon's volume at STP?

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Review Topic 6: KMT

Explain the following observations in terms of the "kinetic molecular theory" (that is, what do the gas particles look like?)

A balloon of gas is placed in a car on a hot day. The balloon gets larger.

A syringe is squeezed so the gas sample changes from 10 cc to 5 cc. The pressure doubles.

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Review Topic 7: Ideal

Solve the following problems using the Ideal Gas Law: (Identify the variables and show work)

A 10.0 gram chunk of dry ice (solid CO_2) changes to gas.
What is the volume of that gas measured at 27°C and 740 mmHg?

P =

V =

n =

R =

T =

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Review Topic 8: molar mass

PV = nRT can be converted into a useful form: $PV = \frac{g}{M}RT$

g = mass of the gas and M = molar mass of the gas

Calculate the molar mass of a gas sample if 3.0 grams of the gas in a 2.0 L container at 25°C has a pressure of 2.294 atm.

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Review Topic 9: Hydrogen Lab

Information:
volume of gas at room conditions: 45.0 mL
length of Mg used: 4.65 cm mass of 1.00 m of Mg: 0.958 g

How many moles of magnesium were used? Show work.

What is the molar volume of this hydrogen gas sample under room conditions? Show work.

Information:
molar volume of gas at room conditions: 25.6 Liters
room temperature: 21.0 °C pressure of hydrogen gas: 735 mmHg.

What is the molar volume of this hydrogen gas sample at STP? Identify the variables and show work.

P_1=		P_2=	
V_1=		V_2=	
T_1=		T_2=	