I apologize for the spraeling messiness of this packet. It is a combination of 1) things to know 2) unsolved problems 3) solved problems. It is a broad survey meant to be a starting point that jogs your memory.

Review for the June 2014 Chemistry Final Exam

(The exam covers only second semester, from Jan 27 to June 6th)

Disclaimer: Studying this packet is a great start but is not a substitute for actually studying all 80 days of material. Hopefully time spent with this packet will help you find what parts of the semester you need to go back and study in depth, either from your notes or from http://genest.weebly.com

Of the 80 days we have been together this semester, the things in this packet are the ones that came up over and over.

About a third of what you need to know are specific facts. Get these from your notes.

Two thirds of what you need to know are skills. Get these by doing, redoing, and redoing one more time, all of the old homework problems that you learned to solve this semester.

UNIT 8 GAS

VOCA

FORM

a. $\frac{PV}{nT} = \frac{PV}{nT}$

b. PV = nRT

The 'Before-and-After' formula A formula for changing the volume or concentration of things.	
The formula	$M_1V_1 = M_2V_2$
The units	[M][anything*] = [M][anything]

The 'Now' formula A formula for finding out what the concentration is of something.	
The formula	$concentration = \frac{moles\ of\ solute}{volume\ of\ solution}$
The units	$[M] = \frac{[moles]}{[L]}$

Useful conversion factors:
0 degrees C = 273 kelvins
760 torr = 760 mmHg = 1.00 atm = 101 kPa
R = 0.0821 $\frac{L\ atm}{mol\ K}$

Answer questions 1, 2, and 3 after reading the following story problem:

A gas filled weather balloon contains 33.0 moles of air at 10.0°C at a pressure of 0.901atm. What is the volume of the balloon?

1. Circle which equation below will be most helpful for solving this problem

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \qquad P\,V = n\,R\,T$$

2. *Rearrange* the equation you chose to get the unknown by itself on one side of the equals sign.

3. Calculate the answer to the story problem. Show work and remember to write units.

If a thermometer reads 20. degrees Celsius, what is the temperature in kelvins?

For the following questions determine what gas law will be used, write a list, and show all necessary work for the calculation.

The story problem:	Make two lists of the givens	Write an appropriate equation. Cross out anything that stays constant. Circle the unknown you are solving for.	Rearrange to get the unknown by itself on one side of the equals sign.	Finally, substitutre in the values from your two lists.
A gas with a volume of 5.0 L at a pressure of 0.85 atm is allowed to expand until the pressure drops to 0.20 atm. What is the new volume?				
The pressure in an automobile tire is 2.0 atm at 27°C. At the end of a trip, the pressure has risen to 2.3 atm. What is the temperature of the air in the tire? (Assume volume doesn't change.)				
A gas tank has a volume at atmospheric pressure of 2.00×10^6 m^3 at +20.°C. The temperature falls to -20. °C. What is the volume of the gas tank now? (Since the question doesn't mention pressure you can assume it is constant.)				

1. If a tuna fish can is initially at 364 kelvins and initial pressure is 1.1 atm, what will the new pressure be if it is cooled to 300. kelvins?

2. If you have a can that is at 2.0 atm and 293 kelvins, what temperature would make the pressure in the can be 1.0 atm?

More gas
Instructions: Draw 4 tiny particles. Using a ruler make each particle travel 30 cm

Less Gas
Instructions: Draw 2 tiny particles. Using a ruler make each particle travel 30 cm

1. Total wall hits for
More gas: _____ Less Gas: _____
Compare the pressure in the two boxes using words like double, half, etc.:
_____
_____
_____
_____

More temperature
Instructions: Draw 4 tiny particles. Using a ruler make each particle travel 30 cm

Less temperature
Instructions: Draw 4 tiny particles. Using a ruler make each particle travel 15 cm

2. Total wall hits for
High temperature: _____
Lower temperature: _____
Compare the pressure in the two boxes using words like double, half, etc.:
_____
_____
_____
_____

3. When number of gas atoms increases, pressure will:

4. When temperature of a gas increases, pressure will:

5. When volume of a gas increases, pressure will:

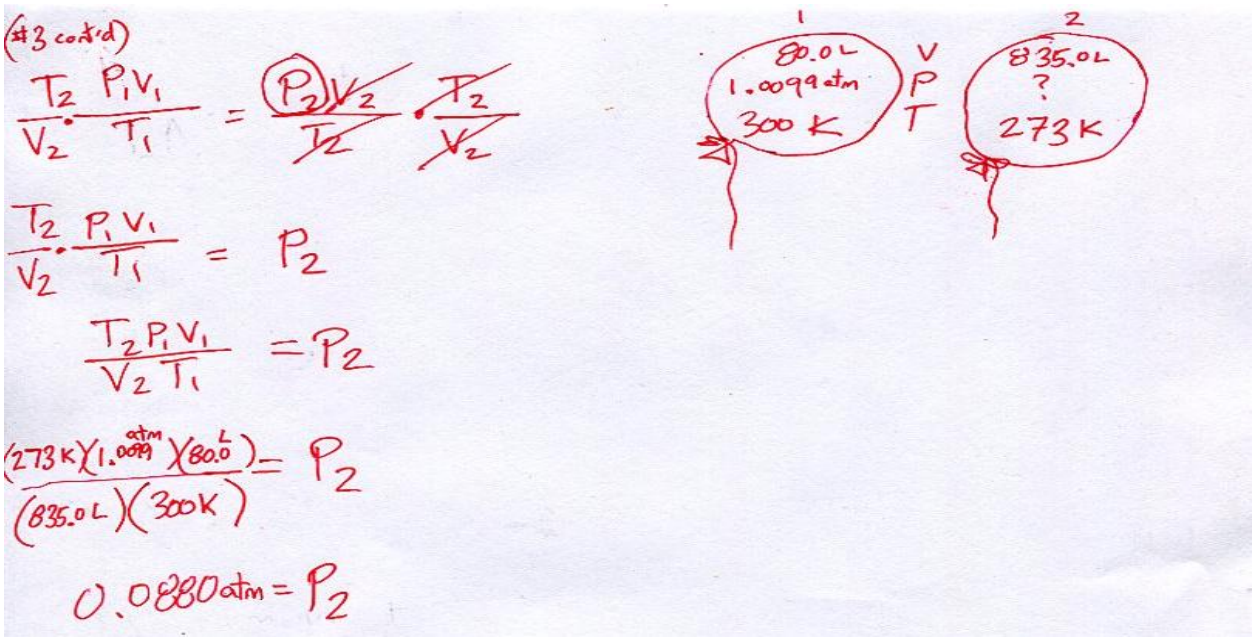
6. Label the X axis number of molecules and the Y axis pressure. Make a **crude** graph, without units.

7. Based on the graph, pressure and molecule number are (directly / inversely) proportional.

8. Label the X axis temperature and the Y axis pressure. Make a crude graph, without units.

9. Based on the graph, pressure and temperature are (directly / inversely) proportional.

10. Looking at the can in Problem #2 on the front of the sheet, calculate what the pressure would be if you reduced the temperature to "absolute zero".



HOMEWORK!

The Ideal Gas Law

CHeMis+ry: http://genest.weebly.com

Stop in for help every day at lunch and Tues, Weds., &Thurs after school!

After-hours question? Email me at home: eagenest@madison.k12.wi.us

GAS

answers

Name _____ Period _____

1. What pressure is exerted by 0.693 moles of oxygen in a 7.55 L vessel at 18°C?

This is a "now" problem.

$PV = nRT$

$\frac{PV}{V} = \frac{nRT}{V}$

$P = \frac{nRT}{V}$

$P = \frac{(0.693\ \text{mol})(0.0821\ \frac{\text{L·atm}}{\text{mol·K}})(291\text{K})}{(7.55\text{L})}$

$P = 2.19\ \text{atm}$

2. Carbon monoxide, a poisonous gas, has a formula of CO. How many moles of carbon monoxide occupies a volume of 0.445 L at 333 kelvins and 1.5 atm?

This is a now problem.

$PV = nRT$

$\frac{PV}{RT} = \frac{nRT}{RT}$

$\frac{PV}{RT} = n$

$\frac{(1.5\text{atm})(.445\text{L})}{(0.0821\ \frac{\text{L·atm}}{\text{mol·K}})(333\text{K})} = n$

$0.024\ \text{mol} = n$

3. A gas filled weather balloon with a volume of 80.0 L is released at sea level at 102.0 kPa pressure and 27.0°C. The balloon expands to final volume of 835.0L at maximum altitude, where the temperature is 0.00°C. What will be the pressure at this time?

(This is before + after)

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

Fix the units

$27.0°\text{C} + 273 = 300\text{K}$

$0°\text{C} + 273 = 273\text{K}$

Fix the units

$102\text{kPa} \times \left(\frac{1.\text{atm}}{101\text{kPa}}\right) = 1.009\text{atm}$

$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$