Name_________________________________ Period____

ASSIGNMENT CHECKLISTS UNIT – GASES

Assign. ID	SCORE	Recommended Readings	Due Date
A	5 4 3 2 1	Notes 11-1 *Gas and Pressure*	
B	5 4 3 2 1	Notes 11-2 *The Gas Laws*	
C	5 4 3 2 1	Notes 11-3 *Gas Volumes and the Ideal Gas Law*	
D	5 4 3 2 1	Notes 11-4 *Diffusion and Effusion*	

Assign. ID	SCORE	Packet Assignment	Due Date
1	5 4 3 2 1	Crucial Vocabulary	
2	5 4 3 2 1	Short Answer Prep	
3	5 4 3 2 1	Intro to Gases Activity	
4	5 4 3 2 1	Gas Calculations Roundtable	
5	5 4 3 2 1	Calculation Examples	
6	5 4 3 2 1	YouTube Videos	
7	10 8 6 4 2	Gases Lecture	
8	5 4 3 2 1	Learning Objectives	

_____ / 45 points for Packet Assignments

ADDITIONAL ASSIGNMENT NOTES	Due Date

NOTES:

Gases – Crucial Vocabulary

Term	Definition
gas	
temperature	
pressure	
volume	
Kinetic energy (include formula w/ definition)	
Kinetic theory	
Collision theory	
barometer	
STP (give values)	
Real vs. ideal gas	
Molar volume	
Dalton’s law	
Boyle’s law	
Charles’ law	
Gay-Lussac’s law	
Combined gas law	
Ideal gas law	
Mole	
Total pressure (of a gas)	
Partial pressure (of a gas)	
Diffusion	
Effusion	
Buoyancy	

Short Answer Prep

1. How does the java applet help to describe the behavior of particles in a gaseous material?

2. Draw a picture of the events that take place during diffusion.

3. Draw a picture of the events that take place during effusion.

Introduction to Gases
Purpose: This activity explores how changing pressure, volume and temperature affects gases.

Part I: Volume Changes with Pressure

1. Watch the videos/demo of the behavior of balloons and marshmallows inside the vacuum chamber.
2. Record observations.
    a. What happens to the balloon/marshmallows when the vacuum pump is running?

    b. How would you explain why this occurs?

    c. What happens when the pump is turned off and the seal is opened?

    d. What causes this to occur?

Part II: Volume changes with Temperature

1. Place the Erlenmeyer flask upside down on the ring stand so that the tubing goes through the ring. Then put the end of the tubing into a beaker of water.
2. Warm the flask gently by holding the Bunsen burner next to the flask (not near the tubing).
3. Record observations.
    a. What is happening inside the flask?

    b. What is happening in the beaker of water?

    c. Why does this occur?

4. Now allow the flask to cool slightly, then place an ice cube on the flask bottom.
5. Record observations.
    a. What is happening inside the flask?

    b. Why does this occur?

Part III: Boiling water at Reduced Pressure

1. Fill a round bottom flask half full with water.
2. Set it on a ring and heat to boiling.
3. Using heat resistant gloves, hold the flask, stopper it tightly, and invert it into the ring.
4. Place an ice cube on the flask. Observe.

Analysis:

1. Why does the water begin to boil again when the ice cube is placed on the flask?

Part IV: Proving the Existence of Air Pressure

1. Pour a small amount of water into a soda can.
2. Using tongs, hold the can over the flame of a Bunsen burner until the water boils.
3. Quickly invert the can into a pan of ice water so that the opening will be submerged.

Analysis:

1. Why does the can crush?

Part V: Cartesian Diver

1. Use your hand to squeeze the soda bottle and observe the behavior of the diver.
2. Stop squeezing the bottle and observe the behavior of the diver.
3. Attempt to find the correct pressure to create “neutral buoyancy” for the diver.

Analysis:

1. What happens to the diver when the bottle is squeezed?

2. What happens when the squeezing pressure on the bottle is released?

3. Describe the changes that occur within the diver that allow the diver to go up or down in the water column.

Gas Calculations

1. What volume would 4.25 L of gas at standard pressure occupy if the pressure changed to 92.4 kPa?

2. Under what pressure would 5.07 L of gas at standard pressure occupy a volume of 1.35 L?

3. What volume would 3.01 L of gas at standard temperature occupy if the temperature was raised to 301.0° C?

4. At what temperature would 3.50 L of gas at 26.0° C occupy only 1.34 L?

5. A gas has a volume of 0.643 L at 125° C and 35.8 kPa of pressure. What would its volume be at STP?

6. A gas measures 0.854 L at STP. What temperature would it be at if the volume was changed to 0.218 L and the pressure increased to 748.2 kPa?

7. The pressures of three gases in a container are 34.1 kPa, 56.9 kPa and 78.5 kPa. What is the total pressure inside the container?

8. How many moles of gas are in a 6.07 L container measured at 165.0 kPa and at a temperature of 155 ° C?

9. How much volume would be occupied by 36.2 g of molecular oxygen at a pressure of 72.8 kPa and a temperature of 101° C?

10. Which gas will diffuse faster at the same temperature, hydrogen sulfide or carbon monoxide? How many times faster will that gas diffuse?

11. A lake has a temperature of 3.24° C at the bottom and 5.28° C at the surface. The pressure at the bottom of the lake is 2.99 atm and 1.02 right at the surface of the lake. A bubble containing 0.026 g of methane (CH_4) gas travels from the bottom of the lake to the surface. How many times bigger is the bubble at the surface than it is at the bottom of the lake?

YouTube Videos - Calculation Examples

Boyle's Law	Charles' Law
Gay Lussac's Law	Combined Gas Law
Ideal Gas Law	Dalton's Law of Partial Pressure

UNIT X: GASES

Goal 1. The student will describe the behavior of gases and relate the behavior to gas properties.
Objectives - The student will be able to:

a. Identify the properties of gases.

b. Differentiate among the behavior of particles in solids, liquids, and gases.

c. Explain the effects of temperature, pressure, and volume changes on the behavior of particles.

d. Define kinetic energy in terms of velocity (or speed) and mass of particles. [GT]

e. Relate molecular motion to temperature and molecular collisions to pressure. [GT]

Goal 2. The student will identify the volume, temperature, pressure, and amount of a gas.
Objectives - The student will be able to:

a. Explain which equipment and units are used to measure gas quantities.

b. Define standard temperature and pressure.

c. Define kinetic molecular theory and use it to explain differences in real versus ideal gases. [GT]

d. Define molar volume. [GT]

Goal 3. Describe relationships of the four quantities of a gas & perform calculations using those relationships.
Objectives - The student will be able to:

a. State the written and mathematical expression of five gas laws (Boyle's Law, Charles' Law, Gay-Lussac's Law, Combined Gas Law, Ideal Gas Law).

b. Apply the gas laws to problems involving the temperature, volume, pressure, and amount of a gaseous substance.

c. Explain how the total pressure in a mixture of gases is equal to the sum of the partial pressures of each gas present.

d. Compare the diffusion rates of two gases.

e. Compare velocities and masses of different gas molecules, measured at the same temperature. [GT]

f. Calculate the pressure of a dry gas when collected over water. [GT]