Gas Law Review
Honors Chem.
Directions

• Each person writes their number on the board.

• Each slide will have a question as well as what should be written on each board.

• First group to “pop” their bottle and get the most points and you get one point off for each wrong answer. Remember! Have your pens capped! Minus one for each uncapped pen!

• Group with the most points wins!
Question 1: KMT

1: What does KMT stand for?
2: Gas particles have no ________ or ________.
3: Gas particles are not ________ to or ________ by each other.
4: ______________ measures the average kinetic energy of gas particles.
Question 1: KMT

1: What does KMT stand for? Kinetic Molecular Theory

2: Gas particles have no mass or volume.

3: Gas particles are not attracted to or repelled by each other.

4: Temperature measures the average kinetic energy of gas particles.
Question 2: Gas Concepts

1: What is happening to the marshmallows?

2: Judging by that, what is happening to the pressure inside the container?

3: What is being held constant?

4: Which law is being observed?
Question 2: Gas Concepts

1: What is happening to the marshmallows? Getting larger.

2: Judging by that, what is happening to the pressure inside the container? It is decreasing.

3: What is being held constant? Temperature

4: Which law is being observed? Boyle's Law
Question 3: IMF Concepts/ Solids

1. What type of solid has the highest MP/BP? Also, what is an example of one?

2. Rank the following molecules from the highest boiling point to the lowest boiling point? \( I_2, HBr, H_2O, Br_2, HCl \)

3. At what pressure and temperature does the triple point occur on the following phase diagram?

4. What is the normal melting and boiling point?
Question 3: IMF Concepts/Solids

1: What type of solid has the highest MP/BP? Also, what is an example of one? Covalent Network (diamond, graphite, silicon dioxide, silicon)

2: Rank the following molecules from the highest boiling point to the lowest boiling point? \( \text{H}_2\text{O}, \text{HBr}, \text{HCl}, \text{I}_2, \text{Br}_2 \)

3: At what pressure and temperature does the triple point occur on the following phase diagram? 0.5 atm, 10°C

4: What is the normal melting and boiling point? -15°C, 140°C
Question 4: Gas Laws

1. Which law do you need to use?
2. What is being held constant?
3. What is the set up for the question?
4. What is the answer?

What change in volume results if 60.0 mL of gas is cooled from 33.0 °C to 5.00 °C?
Question 4: Gas Laws

- What change in volume results if 60.0 mL of gas is cooled from 33.0 °C to 5.00 °C?

1: Which law do you need to use? Charles’s

2: What is being held constant? Pressure and moles

3: What is the set up for the question? Varies...

4: What is the answer? 54.5 mL
Question 5: Gas Laws

• A gas balloon has a volume of 106.0 liters when the temperature is 45.0 °C and the pressure is 740.0 mm of mercury. What will its volume be at 20.0 °C and 780.0 mm of mercury pressure?

• 1: Which law do you need to use?

• 2: What is being held constant?

• 3: What is the set up for the question?

• 4: What is the answer?
Question 5: Gas Laws

• A gas balloon has a volume of 106.0 liters when the temperature is 45.0 °C and the pressure is 740.0 mm of mercury. What will its volume be at 20.0 °C and 780.0 mm of mercury pressure?

• 1: Which law do you need to use? **Combined**

• 2: What is being held constant? **Moles**

• 3: What is the set up for the question? **Varies...**

• 4: What is the answer? **92.66 L**
Question 6: Gas Laws

• 500.0 liters of a gas are prepared at 700.0 mm Hg and 200.0 °C. The gas is placed into a tank under high pressure. When the tank cools to 20.0 °C, the pressure of the gas is 30.0 atm. What is the volume of the gas?

• 1: Which law do you need to use?

• 2: What is being held constant?

• 3: What is the set up for the question?

• 4: What is the answer?
Question 6: Gas Laws

- 500.0 liters of a gas are prepared at 700.0 mm Hg and 200.0 °C. The gas is placed into a tank under high pressure. When the tank cools to 20.0 °C, the pressure of the gas is 30.0 atm. What is the volume of the gas?

1: Which law do you need to use? **Combined**

2: What is being held constant? **Moles**

3: What is the set up for the question? **Varies...**

4: What is the answer? **9.51 L**
Question 7: Gas Laws

1. What volume would 3.5 mol of NO₂ gas occupy at 3.12 atm and 18.0 °C?

2. Which law do you need to use?

3. What is the set up for the question?

4. What are the values for STP?

5. What is the answer?
Question 7: Gas Laws

- What volume would 3.5 mol of NO\textsubscript{2} gas occupy at 3.12 atm and 18.0 °C?

1. Which law do you need to use? Ideal

2. What is the set up for the question? Varies...

3. What are the values for STP? 0 °C and 1 atm

4. What is the answer? 27 L
Question 8: Gas Laws

- Blast furnaces give off many unpleasant and unhealthy gases. If the total air pressure is 0.99 atm, the partial pressure of carbon dioxide is 0.05 atm, and the partial pressure of hydrogen sulfide is 0.02 atm, what is the partial pressure of the remaining air?

1: Which law do you need to use?

2: What is the set up for the question?

3: What causes gas pressure?

4: What is the answer?
Question 8: Gas Laws

- Blast furnaces give off many unpleasant and unhealthy gases. If the total air pressure is 0.99 atm, the partial pressure of carbon dioxide is 0.05 atm, and the partial pressure of hydrogen sulfide is 0.02 atm, what is the partial pressure of the remaining air?

1. Which law do you need to use? **Dalton’s**

2. What is the set up for the question? **Varies...**

3. What causes gas pressure? **gas particles hitting a surface**

4. What is the answer? **0.92 atm**
Question 9: Gas Stoich

• How many liters of water can be made from 55 g of oxygen gas and an excess of hydrogen?

• 1: What is the balanced chemical equation?

• 2: What is the set up for the question?

• 3: At STP, one mole of gas occupies what volume?

• 4: What is the answer?
Question 9: Gas Stoich

- How many liters of water can be made from 55 g of oxygen gas and an excess of hydrogen?

1: What is the balanced chemical equation?

\[ 2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O} \]

2: What is the set up for the question? *Varies...*

3: At STP, one mole of gas occupies what volume?

22.4 L

4: What is the answer? 77 L
Question 10: Gas Laws

- At a certain temperature, molecules of methane gas, CH₄, have an average velocity of 0.098 m/s. What is the average velocity of carbon dioxide molecules at this same temperature?

1: Define diffusion?

2: What is the set up for the question?

3: When a bottle of perfume is opened, why does it take a while for you to smell it?

4: What is the answer?
Question 10: Gas Laws

• At a certain temperature, molecules of methane gas, CH\textsubscript{4} have an average velocity of 0.098 m/s. What is the average velocity of carbon dioxide molecules at this same temperature?

• 1: Define diffusion. Movement of gas from high conc. to low conc.

• 2: What is the set up for the question? Varies...

• 3: When a bottle of perfume is opened, why does it take a while for you to smell it? Perfume particles collide with the air particles

• 4: What is the answer? 0.059m/s
Question 11: STP

• 1: At STP, how many liters does 132 g of carbon dioxide occupy?

• 2: At STP, how many molecules does 11.2 L of oxygen gas contain?

• 3: What is the temperature at which all molecular motion has ceased and what is it known as?

• 4: At STP, how many liters does $1.20 \times 10^{24}$ Cl$_2$ molecules occupy?
Question 11: STP

• 1: At STP, how many liters does 132 of carbon dioxide occupy? 67.2 L

• 2: At STP, how many molecules does 11.2 L of oxygen gas contain? 3.01 \times 10^{23} \text{ molecules}

• 3: What is the temperature at which all molecular motion has ceased and what is it known as? 0 K - absolute zero

• 4: At STP, how many liters does 1.20 \times 10^{24} \text{ Cl}_2 molecules occupy? 44.8 L