Unit 5: Study Guide

**SC6. Students will understand the effects motion of atoms and molecules in chemical and physical processes.**

**a. Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas**.

1. The measure of the average kinetic energy of the particles in a sample of matter is \_\_\_\_\_.

2. What determines how fast a gas diffuses at room temperature?

3. In a container filled with one mole of helium and one mole of nitrogen, the pressure in the container is primarily \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. 6 Gas laws:

* Formula:
* Picture with Piston:
* What happens to one thing of the other changes? (Example: If the Volume decrease what happens to the Temperature?)

5. What determines the boiling points?

6. What are the 5 Intermolecular forces and how can you tell the force?

7. Which of the following is the general definition of a solid, liquid, and gas?

8. What of the following is a covalent network solid?

9. What are phase changes and which ones will release energy, and which ones will need energy during the transition?

10. What is STP?

11. The unit cell of a crystalline solid is \_\_\_\_\_\_\_\_.

12. What would would the phase change digram look like for water. Label the following on your drawing. (solid, liquid, gas, the triple point, boiling point, critical point)

13. When will the molecules of all samples of ideal gases have the same average kinetic energies?

14. How can the molar volume of a gas be defined?

15. What will happen to a real gas when the temperature is lowered and the pressure is raised?

16. What is the molar mass of a gas if 0.104 g of the gas occupies 48.7 mL at STP?

17. What makes a gas behave most like an ideal gas?

18. In the Ideal Gas Law equation, the units of R will commonly change based on different units of \_\_\_\_\_\_\_\_.

19. Astronauts exhale carbon dioxide, a potentially deadly gas. Lithium hydroxide can absorb carbon dioxide from the air inside a spaceship via the reaction shown below. What volume of carbon dioxide at STP can be absorbed by 5.00 g LiOH?

CO2 + 2LiOH → Li2CO3 + H2O

20. What is a molecular crystalline solid

21. What is a Volatile compound?

22. An unknown diatomic gas has a density of 3.164 g/L at STP. What is the identity of the gas?

23. What is viscosity?

24. The atmospheric pressure in Brunswick, GA, is 760 torr and the composition of the atmosphere there is

Component Percentage (%)

Nitrogen, N2 78.03

Oxygen, O2 20.99

Argon, Ar 0.94

Carbon dioxide, CO2 0.03

Other gases Trace

What is the partial pressure of oxygen in the atmosphere?

25. Ammonium nitrate is a common ingredient in chemical fertilizers

NH4NO3(s) → N2O(g) + 2H2O(g)

Use the chemical equation above to calculate the mass of solid ammonium nitrate that must be used to obtain 1.28 L of dinitrogen oxide gas, N2O, at STP.

26. Calculate the pressure of 4.67 x 1022 molecules of CO gas mixed with 2.87 x 1024 molecules of N2 gas in a 6.00-L container at 34.8oC.