Name: _____ **Date:** _____

Conquer the Change: 8th Grade Molecular Dynamics Challenge

Analyze kinetic energy shifts and molecular behavior in this high-stakes assessment of phase transitions and particle theory.

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1. Which of the following describes the molecular behavior of Gallium as it melts in a person's hand at 29.7°C?

A. Particles speed up and move from a fixed lattice to a fluid arrangement.
B. Particles slow down and begin vibrating in a rigid hexagonal structure.
C. The kinetic energy decreases, causing the atoms to occupy a larger volume.
D. Intermolecular forces strengthen, pulling the metal atoms closer together.

2. When solid iodine is heated and turns directly into a purple vapor without becoming a liquid, the process is known as _____.

A. Vaporization
B. Sublimation
C. Deposition
D. Condensation

3. During a phase change, such as water boiling at 100°C, the temperature of the substance continues to rise as long as heat is applied.

A. True
B. False

4. A balloon filled with Nitrogen gas is placed in a freezer. What happens to the gas particles inside the balloon?

A. They lose kinetic energy and move closer together, decreasing volume.
B. They gain mass and become more dense, increasing the balloon's weight.
C. They expand to hit the walls of the balloon with more force.
D. The particles stop moving entirely as they reach the freezing point.

5. In a highly pressurized hydraulic system, the fluid used (such as mineral oil) is chosen because _____ are generally incompressible.

A. Gases
B. Plasmas
C. Liquids
D. Solids

6. Which of the following describes the phase change of 'Deposition' in a natural environment?

A. Dew forming on a blade of grass on a cool morning.
B. Dry ice releasing a thick 'smoke' at a concert.

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C. Frost forming on a car windshield during a freezing night.
D. Molten lava hardening into basalt rock in the ocean.

7. Amorphous solids, like glass or wax, lack a distinct melting point and instead soften over a wide range of temperatures.

A. True
B. False

8. The state of matter found in lightning bolts and stars, consisting of ionized gas with free-moving electrons, is called _____.

A. Plasma
B. Vapor
C. Superfluid
D. Bose-Einstein Condensate

9. If you increase the altitude (lower atmospheric pressure), why does water boil at a lower temperature, such as 95°C instead of 100°C?

A. The air is thinner, making the water more dense.
B. Less external pressure allows vapor bubbles to form more easily.
C. The lack of oxygen prevents the water from absorbing heat.
D. Gravity is weaker, so the water molecules escape more slowly.

10. The viscosity of a liquid generally increases as the temperature of the liquid increases.

A. True
B. False