

Name: _____ Date: _____

Molecular Mayhem: Mastery of Matter for 7th Grade

Can you predict how pressure reshapes a gas or why gallium melts in your hand? Analyze kinetic energy and phase transitions through challenging chemical scenarios.

1. A scientist is observing a sample of Gallium (Ga) that is transitioning from a solid to a liquid in her palm. During this endothermic phase change, what is happening to the kinetic energy and potential energy of the molecules?

- A. Kinetic energy increases while potential energy remains constant.
- B. Potential energy increases while kinetic energy remains constant.
- C. Both kinetic and potential energy decrease simultaneously.
- D. Kinetic energy stays the same and potential energy decreases.

2. In a high-pressure environment like the deep ocean, the boiling point of a liquid will ____ compared to its boiling point at sea level.

- A. Stay exactly the same
- B. Decrease significantly
- C. Increase significantly
- D. Become impossible to measure

3. Amorphous solids, such as glass or obsidian, lack a specific, repeating geometric internal structure compared to crystalline solids.

- A. True
- B. False

4. Which of the following scenarios best demonstrates the concept of deposition in a natural environment?

- A. Puddles disappearing on a hot sidewalk after a summer rain.
- B. The formation of sub-zero ice crystals directly from water vapor on a windowpane.
- C. Molten rock (magma) cooling into solid basalt on the ocean floor.
- D. A block of dry ice shrinking while sitting in a warm room.

5. When a gas is compressed into a smaller volume at a constant temperature, the molecules strike the walls of the container more frequently, resulting in an ____ in pressure.

- A. Equilibrium
- B. Increase
- C. Decrease
- D. Neutralization

6. Plasma, the most common state of matter in the universe, is distinct from gas because its particles are ionized and can conduct electricity.

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- A. True
- B. False

7. Consider a substance in a sealed container. If the attractive forces between the particles are moderately strong but the particles can still slide past one another, the substance is in which state?

- A. Solid
- B. Liquid
- C. Gas
- D. Plasma

8. In the process of _____, molecules at the surface of a liquid gain enough kinetic energy to enter the gas phase at temperatures well below the boiling point.

- A. Sublimation
- B. Condensation
- C. Evaporation
- D. Fusion

9. Adding thermal energy to a substance always results in an immediate increase in the measurable temperature of that substance.

- A. True
- B. False

10. Explain why a balloon filled with air shrinks when placed in a freezer, based on the Kinetic Molecular Theory.

- A. The gas particles lose kinetic energy and collide with the walls less forcefully.
- B. The gas particles go through deposition and turn into a thin layer of solid.
- C. The external air pressure outside the balloon decreases in the cold.
- D. The gas particles expand and seep through the pores of the balloon material.