

Name: _____ Date: _____

State of the Plate: 6th Grade Molecular Motion Challenge

Evaluate how kinetic energy drives phase shifts in industrial manufacturing and deep-sea environments as you master complex matter transitions.

1. Engineers designing high-altitude weather balloons must account for the Kinetic Molecular Theory. As a balloon rises into the thinning atmosphere, why does the volume of the gas inside increase?

- A. The gas particles increase in physical size due to lower gravity.
- B. Reduced external pressure allows internal particle collisions to expand the container.
- C. The gas undergoes a chemical reaction to become a plasma.
- D. The particles stop moving and settle at the bottom of the balloon.

2. When a specialized fire suppression system releases liquid nitrogen, the substance immediately turns into a gas, absorbing massive amounts of heat. This specific transition is called _____.

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

3. Amorphous solids, such as glass or certain plastics, lack a highly ordered repeating geometric internal structure compared to crystalline solids.

- A. True
- B. False

4. In the process of 'Freeze-Drying' food, water is removed by turning ice directly into water vapor without it ever becoming a liquid. Which phase change is being utilized?

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

5. If you reduce the _____ of a gas while keeping the temperature constant, the particles will collide with the walls of the container more frequently, increasing the pressure.

- A. Mass
- B. Volume
- C. Weight
- D. Viscosity

6. Which of the following scenarios best demonstrates an 'exothermic' phase change, where energy is released into the environment?

- A. A puddle of rubbing alcohol evaporating on a countertop.

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- B. Molten lava hardening into basalt rock on a Hawaiian beach.
- C. An ice cube tray turning into ice inside a freezer.
- D. Both B and C

7. During a phase change, such as water boiling, the temperature of the substance continues to rise even while the state is changing.

- A. True
- B. False

8. A substance that has a definite volume but takes the shape of its container is characterized by particles that are close together but can _____ past one another.

- A. Vibrate
- B. Slide
- C. Expand
- D. Compress

9. In the cold upper atmosphere, water vapor can turn directly into ice crystals to move from a gas to a solid. This is known as:

- A. Condensation
- B. Crystallization
- C. Deposition
- D. Sublimation

10. Viscosity is a physical property of liquids that describes their resistance to flowing; for example, honey has a higher viscosity than water.

- A. True
- B. False