Name: _____ **Date:** _____

Answer Key: Wrangle Molecular Transitions: 5th Grade Matter Lab Quiz

Synthesize knowledge of kinetic energy and molecular arrangement to predict how substance behavior shifts during complex phase change scenarios.

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1. A scientist observes that the molecules in a sealed container are moving at high speeds and can be compressed into a smaller volume. Which state of matter is being observed, and what happens to the pressure if the volume is halved?

Answer: C) Gas; pressure increases

Gases have large spaces between particles, making them compressible. When you decrease the volume, particles collide more frequently with the walls, increasing pressure.

2. During the process of melting, the temperature of a substance continues to rise steadily even while the solid is turning into a liquid.

Answer: B) False

During a phase change like melting, the temperature remains constant because the added energy is used to break the bonds between molecules rather than increasing kinetic energy.

3. When a windshield becomes covered in frost on a cold morning without it raining first, it is an example of _____, where a gas turns directly into a solid.

Answer: C) Deposition

Deposition is the phase transition where water vapor (gas) loses enough thermal energy to transform directly into ice (solid) without becoming a liquid.

4. If you move a gallon of milk from a square jug to a round bowl, why does the volume remain the same even though the shape changes?

Answer: B) Molecules are close together but can slide past one another

In a liquid, attractive forces keep molecules close (fixed volume), but they have enough kinetic energy to flow and adapt to the shape of their container.

5. The phase change known as _____ occurs when a substance at its boiling point gains enough latent heat for molecules to break free from the surface.

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Answer: B) Vaporization

Vaporization describes the transition from liquid to gas, which includes both boiling and evaporation.

6. Substances in a solid state possess kinetic energy.

Answer: A) True

Even in solids, atoms and molecules vibrate in place. Kinetic energy is only absent at absolute zero.

7. A block of dry ice is left on a table at room temperature. It seems to disappear without leaving a puddle. What is the molecular explanation for this?

Answer: B) The molecules are gaining energy and transitioning directly to gas

Dry ice (solid CO_2) undergoes sublimation; it absorbs heat and turns directly into gas, bypassing the liquid phase.

8. The density of most substances increases when they transition from a liquid to a solid.

Answer: A) True

For most matter, molecules pack more tightly in a solid form, making it denser. (Water is a rare exception where the solid is less dense).

9. In a laboratory, a student notices beads of water forming on the outside of a beaker containing ice cubes. This process is called _____.

Answer: C) Condensation

Condensation occurs when water vapor in the warmer air touches the cold surface of the beaker, losing energy and returning to a liquid state.

10. Which scenario best demonstrates how thermal energy impacts molecular motion?

Answer: A) A balloon shrinking in a cold freezer

When the temperature drops, gas molecules lose kinetic energy and move slower, exerting less pressure and causing the balloon to shrink as the space between molecules decreases.