Name: _____ **Date:** _____

Solve the Mystery of Your Disappearing Molecules: A 4th Grade Phase Change Quiz

Analyze molecular behavior across diverse environments while predicting phase changes like deposition using the principles of kinetic energy and thermal transfer.

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1. A chef in a high-altitude mountain kitchen notices that water boils faster than at sea level. Which statement best explains this phenomenon from a molecular perspective?

A. Gravity is stronger at high altitudes, forcing molecules apart.
B. Lower air pressure makes it easier for liquid molecules to escape into a gas state.
C. The air contains more oxygen, which adds heat to the water molecules.
D. Water molecules grow larger in size when the air pressure is low.

2. When a gas undergoes deposition to become a solid, the molecules must gain a significant amount of thermal energy.

A. True
B. False

3. Imagine you leave a block of solid 'dry ice' on a table. It seemingly vanishes without leaving a puddle. This process of a solid turning directly into a gas is called _____.

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

4. If you were to observe the molecules of molten volcanic lava (a liquid) and compare them to the molecules of a solidified basalt rock, what is the primary difference in their behavior?

A. The rock molecules have completely stopped moving.
B. The lava molecules are smaller than the rock molecules.
C. The lava molecules have more kinetic energy and slide past one another.
D. The rock molecules are lighter and float above the lava.

5. A scientist is studying a substance that has no fixed shape and expands to fill the entire volume of any container it is placed in. This substance must be in the _____ state.

A. Gas
B. Solid
C. Liquid
D. Frozen

6. Evaporation can only occur if a liquid reaches its specific boiling point.

A. True
B. False

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7. On a very cold morning, you see 'hoar frost' (ice crystals) appearing on a tree branch, even though it did not rain or snow. Which phase change describes the transition from water vapor in the air directly to these ice crystals?

A. Freezing
B. Condensation
C. Deposition
D. Melting

8. When you boil a pot of soup, you see a 'cloud' rising above it. This cloud is actually tiny water droplets formed when steam cools down. This specific process is known as _____.

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

9. A substance in its solid state has a definite volume and a definite shape because its particles are arranged in a rigid, fixed pattern.

A. True
B. False

10. Which of these scenarios would lead to the GREATEST increase in the kinetic energy of a substance's molecules?

A. Placing a glass of water in a dark cupboard.
B. Moving an ice cube from a freezer to a refrigerator.
C. Heating a beaker of liquid water until it turns into steam.
D. Leaving a metal spoon in a bowl of cold cereal.