Name: _____ **Date:** _____

Answer Key: Kinetic Curves & Phase Changes: 10th Grade Chemistry Quiz

Intermolecular forces, enthalpy of fusion, and triple point analysis. Ideal as a formative assessment or rigorous classroom review of molecular transitions.

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1. When examining a heating curve for an unknown substance, what occurs at the molecular level represented by a 'plateau' or horizontal line?

Answer: B) Potential energy increases as intermolecular forces are overcome.

During a phase change (plateau), temperature remains constant because the added thermal energy is used to weaken or break intermolecular forces (potential energy) rather than increasing particle speed (kinetic energy).

2. The specific temperature and pressure conditions at which the solid, liquid, and gas phases of a substance coexist in thermodynamic equilibrium is known as the _____.

Answer: C) Triple Point

The triple point is a unique set of conditions on a phase diagram where all three states of matter exist in a stable balance simultaneously.

3. True or False: In a vacuum with near-zero atmospheric pressure, it is possible for a substance to transition directly from a solid to a gas without ever becoming a liquid.

Answer: A) True

This process is called sublimation. At pressures below the triple point, a substance cannot exist as a liquid and will sublime directly to gas.

4. Which of the following substances would likely have the highest boiling point based on its predominant intermolecular forces?

Answer: B) Ammonia (NH3)

Ammonia (NH3) exhibits hydrogen bonding, which is a significantly stronger intermolecular force than the London dispersion forces found in the other listed non-polar molecules and atoms.

5. When a gas loses energy and transitions directly into a solid, bypassing the liquid phase, the thermochemical process is called _____.

Name: _____ **Date:** _____

Answer: C) Deposition

Deposition is the phase transition in which gas transforms into solid without passing through the liquid phase, such as the formation of frost.

6. True or False: According to the Kinetic Molecular Theory, the particles in a 'Plasma' state are unique because they have been stripped of their electrons, resulting in an ionized gas.

Answer: A) True

Plasma is an ionized state of matter consisting of free electrons and positive ions, typically found in stars or lightning, requiring extreme energy to form.

7. If you are cooking at a high altitude where atmospheric pressure is low, how does this affect the boiling point of water?

Answer: C) The boiling point decreases because vapor pressure equals atmospheric pressure sooner.

Boiling occurs when vapor pressure equals external pressure. At high altitudes, the external pressure is lower, so water reaches its boiling point at a lower temperature.

8. The amount of energy required to change one mole of a substance from a solid to a liquid at its melting point is the Molar Enthalpy of _____.

Answer: B) Fusion

Enthalpy of Fusion (ΔHfus) refers specifically to the energy transition between solid and liquid phases.

9. True or False: Amorphous solids, such as glass or plastic, possess a highly ordered, repeating geometric internal structure.

Answer: B) False

Amorphous solids lack a long-range ordered structure, unlike crystalline solids which have a repeating lattice pattern.

10. In the context of phase diagrams, what happens to a substance once it passes the 'Critical Point'?

Answer: A) It becomes a supercritical fluid where gas and liquid phases are indistinguishable.

Beyond the critical point, the distinction between liquid and gas disappears, resulting in a state called a supercritical fluid.