Name: _____ **Date:** _____

Thermohaline Dynamics and Global Water Flux: 4th Grade Mastery Quiz

Students analyze complex interactions between salinity, thermal energy, and phase changes to evaluate the global distribution of Earth's water.

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1. If a large section of the Greenland ice sheet melts into the North Atlantic, how would the increase in freshwater affect the local ocean water density and current movement?

A. Density increases, causing the water to sink faster
B. Density decreases, potentially slowing down deep-sea currents
C. Density remains the same because the ocean is already salty
D. Density decreases, causing the water to become much warmer

2. The total amount of water on Earth remains relatively constant even as it changes states between gas, liquid, and solid.

A. True
B. False

3. Most of the thermal energy that fuels the water cycle by turning liquid water into vapor is sourced from _____.

A. Geothermal vents
B. The Earth's core
C. Solar radiation
D. Oceanic friction

4. In an arid region like the Dead Sea, evaporation rates are higher than freshwater input. What is the most likely result for the water that remains?

A. The water becomes more acidic
B. The water level rises due to condensation
C. The salinity increases as minerals are left behind
D. The temperature of the water drops significantly

5. Deep ocean currents are primarily driven by surface winds like the trade winds.

A. True
B. False

6. During the process of _____, water vapor loses thermal energy and transforms into liquid droplets, forming clouds.

A. Sublimation
B. Transpiration
C. Evaporation
D. Condensation

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7. If you were tracking a molecule of water that just fell as snow on a mountain, which path would it most likely take to return to the ocean?

A. Immediate evaporation into the stratosphere
B. Melting and becoming surface runoff or infiltration
C. Transforming into salt through chemical weathering
D. Sinking directly into the ocean's abyssal zone

8. The Kuroshio Current near Japan moves warm water toward the north, meaning it acts as a heat transfer system for the planet.

A. True
B. False

9. The continuous movement of water through the atmosphere, lithosphere, and hydrosphere is known as the _____.

A. Nitrogen Cycle
B. Hydrologic Cycle
C. Oceanic Gradient
D. Tidal Sequence

10. Analyze why coastal cities often have milder winters than inland cities at the same latitude. What property of the ocean causes this?

A. Water reflects all sunlight, keeping the air cold
B. The ocean has a high heat capacity and releases heat slowly
C. Ocean waves generate heat through friction with the sand
D. Salt in the water prevents the air from freezing