Name: _____ **Date:** _____

Answer Key: Chef Salt and the Great Aqueous Exchange: 5th Grade Marine Quiz

Analyze thermo-haline circulation and phase change dynamics to predict how salt and heat distribution fuels global weather patterns.

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1. If a large ship drops a load of fresh water icebergs into the high-salinity Mediterranean Sea, what is the most likely result for the local water column?

Answer: C) The fresh meltwater will remain near the surface due to its lower density.

Fresh water is less dense than salt water, even when cold, causing it to float on top of the saline sea water until mixing occurs.

2. When sunlight provides energy for molecules to escape the ocean's surface, the process is called _____, which leaves the remaining ocean water slightly saltier.

Answer: C) Evaporation

Evaporation removes pure water molecules as gas, leaving the dissolved salts behind, which increases the salinity of the remaining liquid.

3. Deep ocean currents are primarily driven by the same wind patterns that create surface waves.

Answer: B) False

Deep ocean currents are driven by differences in density caused by temperature and salinity (thermohaline circulation), not surface winds.

4. Imagine a coastal town where the ocean water is unusually warm. How would this most likely affect the local water cycle and weather?

Answer: B) Increased evaporation leading to more frequent or intense storms.

Warmer water provides more thermal energy for evaporation; more water vapor in the atmosphere provides the 'fuel' for cloud formation and storm systems.

5. The _____ Current is a cold-water current that flows along the western coast of South America, significantly cooling the local climate compared to other regions at the same latitude.

Answer: A) Humboldt

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The Humboldt (or Peru) Current brings cold water from the Antarctic up the coast, affecting both the water cycle (less evaporation) and local temperatures.

6. Which scenario would cause the 'Great Ocean Conveyor Belt' to slow down significantly?

Answer: B) A massive influx of fresh water from melting glaciers in the North Atlantic.

If the North Atlantic receives too much fresh water, the water becomes less dense and fails to sink, which is the 'engine' that pulls the conveyor belt along.

7. The water cycle is a closed system, meaning the total amount of water on Earth stays relatively constant despite changing forms.

Answer: A) True

While water changes state between liquid, solid, and gas, the total mass remains stable within Earth's atmosphere and crust.

8. Why does the center of a large continent usually experience drier air than a coastal region at the same latitude?

Answer: C) Water vapor often precipitates out as rain before it reaches the inland areas.

As moist air moves inland from the ocean, it loses its water through precipitation, leaving less moisture for the interior—a process often heightened by mountain ranges.

9. Even though your drinking water is fresh, the primary source of the water vapor in the atmosphere that created that rain is the _____.

Answer: C) Ocean

Over 85% of global evaporation occurs from the oceans, making them the ultimate origin of most terrestrial precipitation.

10. Water molecules spend the same amount of time in the atmosphere as they do in the deep ocean before cycling to the next stage.

Answer: B) False

Water typically stays in the atmosphere for about 9 days, whereas it can take over 1,000 years for a water molecule to complete a deep-ocean current circuit.