

Name: _____ Period: _____ Date: _____

Open peebedu.com and navigate to **Water Properties Explorer**. Click the **Start Exploring** button to begin. Read the introduction popup, which describes four key properties of water: Polarity, Cohesion, Heat Capacity, and Density.

Free Response Questions

Question 1 – Conceptual Analysis

Simulation Task: Set the temperature slider to 0°C and note both the air temperature and water temperature values. Then slowly move the slider to 40°C and observe the difference between the two temperatures as air temperature increases.

(A) (1 pt) **Describe** the type of molecular interaction between water molecules that allows water to absorb large amounts of heat with minimal temperature change.

(B) (1 pt) **Explain** why the lake's water temperature changes less than the air temperature as air temperature increases from 0°C to 40°C .

(C) (1 pt) **Predict** what would happen to species diversity in a lake ecosystem during a heat wave if water had a significantly lower specific heat capacity.

(D) (1 pt) **Justify** your prediction.

Question 2 — Analyze Model / Visual Representation

Simulation Task: Move the temperature slider to -15°C and observe where the ice layer forms relative to the liquid water and note the fish swimming beneath it. Then move the slider to 20°C and observe the water strider on the lake surface.

(A) (1 pt) **Describe** the molecular arrangement that causes ice to be less dense than liquid water.

(B) (1 pt) **Explain** why the fish in the lake are able to survive in liquid water beneath the ice layer when the temperature drops to -15°C .

(C) (1 pt) **Represent** the structural difference between the arrangement of water molecules in ice and in liquid water.

Draw your diagram here.



(D) (1 pt) **Explain** why aquatic ecosystems with stable water temperatures tend to support greater species diversity than those with rapidly fluctuating temperatures.

1.1.A.1