Name: _____ Unit I
Mr. Willis Biology – The Nature of Science
Biology: _____ Need extra help?
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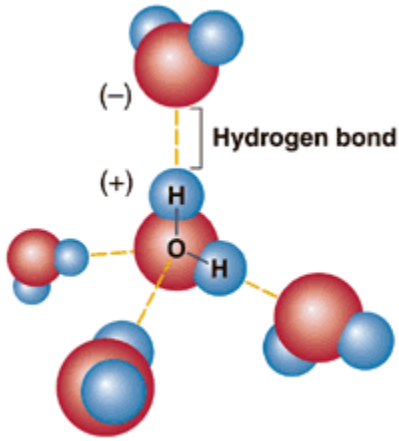
I

Read the short passage and respond to the question(s) below.

Rdg. 21 – Hydrogen Bonds (Chapter 2)

Because of their partial positive and negative charges, polar molecules such as water can attract each other, as shown in the figure below. The charges on a polar molecule are written in parentheses, (−) or (+), to show that they are weaker than the charges on ions such as Na^+ and Cl^-. The attraction between the hydrogen atom on one water molecule and the oxygen atom on another water molecule is an example of a hydrogen bond. Hydrogen bonds are not as strong as covalent or ionic bonds, but water's ability to form multiple hydrogen bonds is responsible for many of its special properties.

Hydrogen Bonds *The illustration shows the hydrogen bonds that form between water molecules.*



A single water molecule may be involved in as many as four hydrogen bonds at the same time. The ability of water to form multiple hydrogen bonds is responsible for many of water's properties. **Cohesion** is an attraction between molecules of the same substance. Because of hydrogen bonding, water is extremely cohesive. Water's cohesion causes molecules on the surface of water to be drawn inward, which is why drops of water form beads on a smooth surface. Cohesion also explains why some insects and spiders can walk on a pond's surface.

Adhesion is an attraction between molecules of different substances. Have you ever been told to read the volume in a graduated cylinder at eye level? The surface of the water in the graduated cylinder dips slightly in the center because the adhesion between water molecules and glass molecules is stronger than the cohesion between water molecules. Adhesion between water and glass also causes water to rise in a narrow tube against the force of gravity. This effect is called capillary action. Capillary action is one of the forces that draw water out of the roots of a plant and up into its stems and leaves. Cohesion holds the column of water together as it rises.

Distinguish between the terms cohesion and adhesion. Give an example of each.