

**Chapter 2: Properties of Water are Important to Life**

Supporting Videos:

<http://www.youtube.com/watch?v=zRSK4k3D-50>

***II. Water's Life-Supporting Properties***

**Module 2.11 Hydrogen bonds make liquid water cohesive.**

- A. Cohesion is the tendency of water molecules to stick together.
- B. Cohesion between water molecules allows them to form drops and be transported through the tissues of plants.
- C. Surface tension results from the cohesion of water molecules to each other so that a small aquatic insect such as a water strider can walk across the top of a pond without sinking.

*Preview: Transpiration (Module 32.3) is an example of how living systems take advantage of these characteristics of water.*

**Module 2.12 Water's hydrogen bonds moderate temperature.**

- A. Breaking hydrogen bonds requires a large amount of energy; therefore, as water is heated, it takes a large amount of energy to observe an increase in the temperature of the water. The temperature of water rises more slowly when heated than does the temperature of nonpolar liquids because water has so many hydrogen bonds.
- B. The opposite is true of water as it cools; formation of hydrogen bonds causes the temperature of water to lower more slowly when cooled because heat is released as the hydrogen bonds are formed.

**Module 2.13 Ice is less dense than liquid water (Figure 2.13).**

- A. Hydrogen bonds in ice result in an extremely stable, three-dimensional structure.
- B. A given volume of ice has fewer water molecules than an equal volume of liquid water and is therefore less dense.

## **Module 2.14 Water is the solvent of life.**

A. A solution is a homogeneous mixture of a liquid solvent and one or more solutes (solid or liquid compounds that dissolve in the solvent).

B. Because water is a polar molecule, it readily forms solutions with a wide variety of other polar compounds (for example, sugar) and with the charged ions of ionic compounds such as sodium chloride.