

## CHAPTER 3 WATER AND THE FITNESS OF THE ENVIRONMENT

### Learning objectives

#### The Properties of Water

1. With the use of a diagram or diagrams, explain why water molecules are:
  - a. polar
  - b. capable of hydrogen bonding with 4 neighboring water molecules
2. List four characteristics of water that result from its ability to form hydrogen bonds.
3. Describe the difference between **cohesion** and **adhesion**. Explain how water's cohesion and adhesion contribute to the movement of water from the roots to the leaves of a tree.
4. Explain which of the four characteristics of water contribute to the following observations:
  - Coastal areas have milder climates than adjacent inland areas.
  - Ocean temperatures fluctuate much less than temperatures on land.
  - Insects like water striders can walk on the surface of a pond without breaking the surface.
  - If you slightly overfill a water glass, the water will form a convex surface above the top of the glass.
  - If you place a paper towel so that it touches spilled water, the towel will draw in the water.
  - Ice floats on water.
  - Humans sweat and dogs pant to cool themselves on hot days.\*\* Note that there could be different examples on the exam and you will need to be able to recognize the property of water displayed or described.

#### The Solvent of Life

5. Distinguish between a **solute**, a **solvent** and a **solution**.
6. Define aqueous solution and understand how water is able to dissolve different substances.
7. Distinguish between **hydrophobic** and **hydrophilic** substances.

#### The Dissociation of Water Molecules

8. Name the products of the dissociation of water and give their concentration in pure water.
9. Define **acid**, **base**, and **pH**.
10. Explain how buffers work.
11. Briefly explain how the burning of fossil fuels may affect:
  - a. Acid precipitation
  - b. Ocean acidification