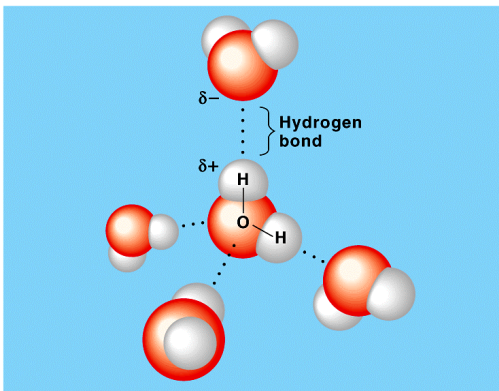


CHAPTER 3 WATER & ENVIRONMENT



1

Figure 3.1 Hydrogen bonds between water molecules



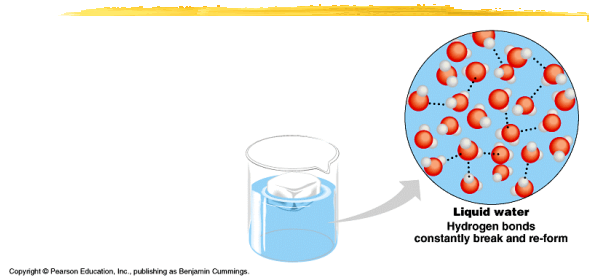
Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

BONDING OF WATER

- OXYGEN HAS SLIGHT - CHARGE
- HYDROGEN HAS + CHARGE
- POLAR MOLECULE FORMED
- BRING ABOUT SPECIAL PROPERTIES
- WATER MOLECULES CAN ATTACH TO 4 OTHER WATER MOLECULES

3

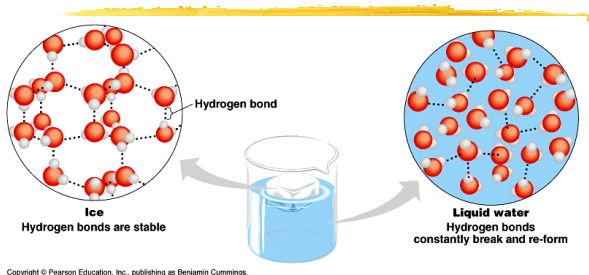
Figure 3.5 The structure of ice (Layer 1)



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

4

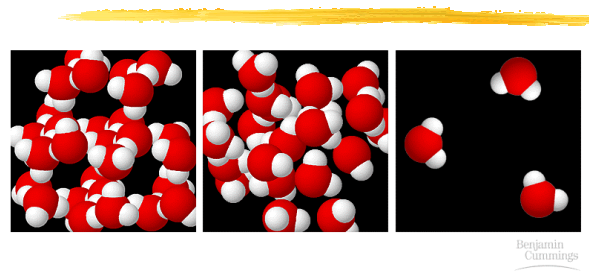
Figure 3.5 The structure of ice (Layer 2)



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

5

Figure 3.5x1 Ice, water, and steam



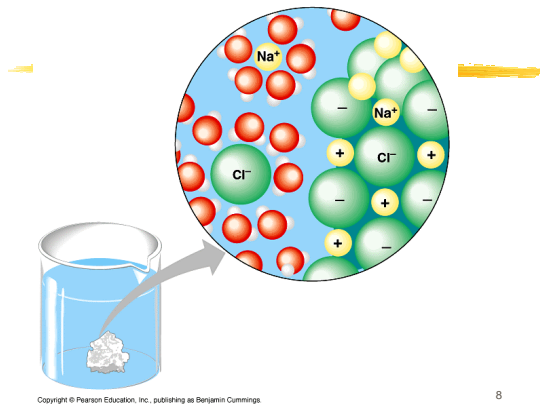
6

PROPERTIES OF WATER

- COHESION OF MOLECULES
- ADHESION OF MOLECULES
- SURFACE TENSION
- CAPILLARITY
- ATTRACTION
- DISSOCIATION
- UNLIKE MOLECULES
- LIKE MOLECULES
- ADHESION AND COHESION

7

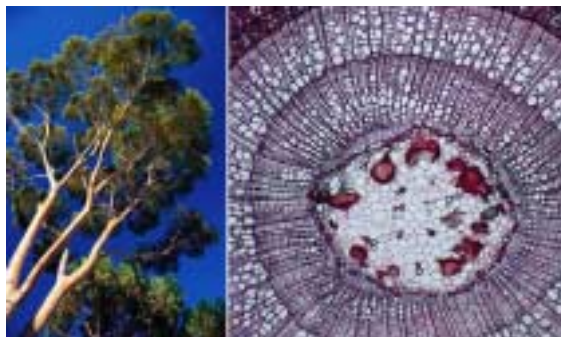
Figure 3.7 A crystal of table salt dissolving in water



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings

8

Figure 3.2 Water transport in plants



9

WATER/TEMPERATURE

- HIGH SPECIFIC HEAT
- STABILIZES TEMPERATURE
- RESISTS CHANGE OF TEMP
- LOOSES OR ABSORBS HEAT
- EVAPORATIVE COOLING
- MOLECULES BECOME UNHOOKED
- HEAT OF VAPORIZATION
- STABLIZES FROM OVERHEATING

10

WATER AND ICE

- ICE FLOATS
- WATER COOLS AND EXPANDS
- WATER IS LESS DENSE AS A SOLID
- BODIES OF WATER THEN TEND NOT TO FREEZE SOLID
- HELPING OUR BODIES?

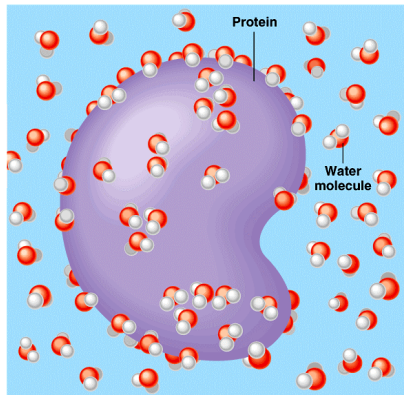
11

WATER /SOLVENT/LIFE

- WATER IS UNIVERSAL SOLVENT
- SOLUTES DISSOLVE IN WATER
- IONIC SOLUTIONS DISSOLVE IN WATER BECAUSE OF ELECTRICAL AFFINITY OF SALT AND WATER
- HYDROPHILIC/PHOBIC SUBSTANCES

12

Figure 3.8 A water-soluble protein



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

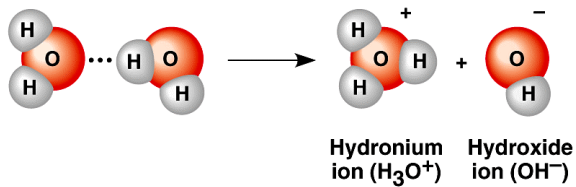
13

WATER AND pH

- pH Scale is from 0-14
- Measure H⁺ ion number
- low pH, high # of H ions
- high pH, low # of H ions
- Living systems operate best in pH of 6.8-7.2, blood is pH 7.5
- Buffers balance pH. Absorb ions

14

Unnumbered Figure (page 47) Chemical reaction: hydrogen bond shift



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

15

Figure 3.10x2 Acid rain damage to statuary, 1908 & 1968



19
