

## Chapter 7 Acids, Bases, and Solutions ▪ Section 1 Summary

## Understanding Solutions

### Key Concepts

- What are the characteristics of solutions, colloids, and suspensions?
- What happens to the particles of a solute when a solution forms?
- How do solutes affect the freezing point and boiling point of a solvent?

A **solution** is a uniform mixture that contains a solvent and at least one solute. The **solvent** is the part of a solution present in the largest amount. It dissolves the other substances. A substance that is present in a solution in a smaller amount and dissolved by the solvent is the **solute**. **A solution has the same properties throughout. It contains solute particles (molecules or ions) that are too small to see.**

In many common solutions, the solvent is water. Life depends on water solutions. Water is the solvent in sap—a solution that carries sugar to tree cells. Water is the solvent in blood, saliva, and tears.

Solutions can be made with solvents other than water. A solution may be made of any combination of gases, liquids, or solids.

All mixtures are not solutions. Colloids and suspensions are mixtures that have different properties than solutions. A **colloid** is a mixture containing small, undissolved particles that do not settle out. **A colloid contains larger particles than a solution. The particles are still too small to be seen easily, but are large enough to scatter a light beam.** Fog, gelatin, mayonnaise, and shaving cream are colloids.

A **suspension** is a mixture in which particles can be seen and easily separated by settling or filtration. **Unlike a solution, a suspension does not have the same properties throughout. It contains visible particles that are larger than the particles in solutions or colloids.**

**When a solution forms, particles of the solvent surround and separate the particles of the solute.** When an ionic solid mixes with water, water molecules surround and separate positive and negative ions as the ionic solid dissolves into the solution. A molecular solid breaks up into individual neutral molecules. Solutions of ionic compounds dissolved in water conduct electricity. Solutions of molecular compounds dissolved in water do not conduct electricity.

Solutes affect the boiling and freezing points of a solvent. **Solutes lower the freezing point and raise the boiling point of a solvent.** The freezing point is lowered because the solute particles get in the way, making it harder for the solvent to form crystals. Thus, the temperature must drop in order for the solvent to freeze. Solutes also raise the boiling point of a solvent. More energy is needed for the solvent particles to escape as a gas.

**Acids, Bases, and Solutions** ▪ *Reading/Notetaking Guide*

## **Understanding Solutions** (pp. 256–261)

*This section explains what happens to particles of substances in a solution. It also describes properties of solutions.*

### **Use Target Reading Skills**

*As you read, make an outline about solutions. Use the red headings for the main ideas and the blue headings for the supporting ideas.*

<b>Acids and Bases in Solution</b>	
I. Acids in Solution	
A.	
B.	
II. Bases in Solution	
A.	
B.	
III.	
A.	
B.	
IV.	
A.	
B.	

**Acids, Bases, and Solutions** ▪ *Reading/Notetaking Guide*

**What Is a Solution?** (pp. 256–257)

1. A uniform mixture that contains a solvent and at least one solute is called a(n) \_\_\_\_\_.
2. Complete the table about solvents and solutes.

Parts of a Solution		
Part	Definition	Which Part of Sugar Water Solution?
a.	The part of a solution present in the largest amount	c.
b.	A substance present in a solution in a smaller amount	d.

3. In a solution, the \_\_\_\_\_ is dissolved by the \_\_\_\_\_.
4. Why is water called the “universal solvent”?  
\_\_\_\_\_  
\_\_\_\_\_
5. Is the following sentence true or false? Solutions can only be made with liquid solvents. \_\_\_\_\_

**Colloids and Suspensions** (p. 258)

6. What is a colloid?  
\_\_\_\_\_  
\_\_\_\_\_
7. A colloid contains \_\_\_\_\_ particles than a solution.
8. Circle the letter of each example of a colloid.
 

a. fog	b. salt water
c. milk	d. snow globe
9. What is a suspension?  
\_\_\_\_\_  
\_\_\_\_\_

**Acids, Bases, and Solutions** ▪ *Reading/Notetaking Guide*

**Understanding Solutions** *(continued)*

10. How does a suspension differ from a solution?

---

---

---

---

**Particles in a Solution** (p. 259)

11. What happens to the solute's particles whenever a solution forms?

---

---

---

12. Circle the letter of each sentence that is true about particles in a solution.

- a. When an ionic solid mixes with water, its ions repel water molecules.
- b. When a molecular solid mixes with water, the covalent bonds within molecules are broken.
- c. When an ionic solid mixes with water, water molecules surround each ion.
- d. When a molecular solid mixes with water, the solute breaks down into individual molecules.

13. Which solution will conduct electric current, a sugar solution or a salt solution?

---

**Effects of Solutes on Solvents** (pp. 260–261)

14. Circle the letter of each sentence that is true about the effects of solutes on solvents.

- a. Solutes raise the boiling point of a solvent.
- b. The temperature must drop lower than 0°C for water to freeze when a solute is dissolved in the water.
- c. Solutes raise the freezing point of a solvent.
- d. Antifreeze boils at a lower temperature than pure water.