

Chapter 7 Acids, Bases, and Solutions ▪ Section 2 Summary

Concentration and Solubility

Key Concepts

- How is concentration measured?
- Why is solubility useful in identifying substances?
- What factors affect the solubility of a substance?

Concentration is the amount of solute dissolved in a certain amount of solvent. A **dilute solution** has only a little solute dissolved in a certain amount of solvent. A **concentrated solution** has a lot of solute dissolved in a certain amount of solvent. You can change the concentration of a solution by adding more solute. You can also change the concentration by adding or removing solvent. **To measure concentration, you compare the amount of solute to the total amount of solvent.**

Solubility is a measure of how much solute can dissolve in a solvent at a given temperature. When you've added so much solute that no more dissolves, you have a **saturated solution**. If you can continue to dissolve more solute, you still have an **unsaturated solution**. The solubility of a substance tells you how much solute you can dissolve before a solution becomes saturated. **Solubility can be used to help identify a substance because it is a characteristic property of matter.**

The solubilities of solutes change when conditions change. **Factors that affect the solubility of a substance include pressure, the type of solvent, and temperature.** Pressure affects the solubility of gases. The higher the pressure of the gas over the solvent, the more gas can dissolve.

Sometimes you can't make a solution because the solute and solvent will not mix. Ionic and polar compounds usually dissolve in polar solvents. Nonpolar compounds do not usually dissolve in polar solvents.

Many solids dissolve better when the temperature of the solvent increases. Unlike most solids, gases become less soluble in a liquid when the temperature of the liquid goes up. When heated, a solution can dissolve more solute than it can at cooler temperatures. A **supersaturated solution** has more dissolved solute than is predicted by its solubility at the given temperature. Dropping a crystal of the solute in a supersaturated solution will cause the extra solute to come out of the solution.

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Concentration and Solubility (pp. 262–267)

This section describes how concentration is measured. It also describes the usefulness of solubility and factors that affect it.

Use Target Reading Skills

After you read the section, for each Key Term write a meaningful sentence that incorporates that Key Term.

dilute solution

concentrated solution

solubility

saturated solution

unsaturated solution

supersaturated solution

Concentration (pp. 262–263)

Match the term with its definition.

Term	Definition
____ 1. dilute solution	a. A mixture that has a lot of solute dissolved in it
____ 2. concentrated solution	b. A mixture that has only a little solute dissolved in it

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3. What are two ways in which you can change the concentration of a solution?

4. How do you measure the concentration of a solution?

Solubility (pp. 263–264)

5. What is solubility?

6. A mixture that has so much solute in it that no more will dissolve is called a(n)

_____.

7. A mixture in which more solute can be dissolved is called a(n)

_____.

8. Which is more soluble in water, baking soda or sugar? _____

9. Is the following sentence true or false? Solubility can be used to identify an unknown substance. _____

Factors Affecting Solubility (pp. 264–267)

10. What are three factors that affect the solubility of a substance?

a. _____ b. _____
c. _____

11. The higher the pressure of the gas, the _____ gas can dissolve in a solvent.

12. Is the following sentence true or false? Nonpolar compounds usually dissolve in polar solvents. _____

13. Circle the letter of each sentence that is true about temperature and solubility.

- a. Most solids become more soluble as the temperature goes up.
- b. Most gases become less soluble as the temperature goes up.
- c. Sugar dissolves better in cold water than in hot water.
- d. Carbon dioxide dissolves better in cold water than in hot water.