

Understanding Solutions (pages 222–227)

What Is a Solution? (pages 222–223)

Key Concept: A solution has the same properties throughout. It contains solute particles (molecules or ions) that are too small to see.

- A **solution** is a well-mixed mixture. In a solution, you cannot see the separate parts of the mixture. All samples of a solution have the same properties. Tree sap is a solution. Soft drinks are solutions, too.
- A solution has two parts. The **solvent** is the largest part of a solution. The solvent dissolves the other parts of a solution. Water is the solvent in soft drinks and tree sap.
- The **solute** is the smaller part of a solution. The solute is dissolved by the solvent. Sugar is one of the solutes in soft drinks and tree sap.
- Many solutions are not made of liquids. Air is a mixture of gases. Brass is a mixture of solids.

Answer the following questions. Use your textbook and the ideas above.

1. Draw a line from each term to its meaning.

Term	Meaning
solution	a. the largest part of the solution
solvent	b. the smaller part of a solution
solute	c. a well-mixed mixture

2. Is the following sentence true or false? Air is an example of a solution. _____

Colloids and Suspensions (page 224)

Key Concept: A colloid contains larger particles than a solution. Unlike a solution, a suspension does not have the same properties throughout.

- A **colloid** (KAHL oyd) is a mixture that contains small, undissolved particles that do not settle out. Examples of colloids are gelatin, milk, and fog.
- The particles in a colloid are too small to be seen. However, the particles in a colloid are big enough to scatter light. You cannot see through a colloid.
- A **suspension** (suh SPEN shun) is a mixture in which the particles are big enough to see. An example of a suspension is orange juice with pulp.
- Because the particles in a suspension are so large, the particles are easy to remove by filtering or by letting them settle out.

Answer the following questions. Use your textbook and the ideas above.

3. Read each word in the box. In each sentence below, fill in one of the words.

colloid	solution	suspension
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- a. A mixture in which the particles are big enough to see is a _____.
- b. A mixture that contains small, undissolved particles that do not settle out is a _____.
4. Circle the letter of the kind of mixture that has the largest particles.
- a. solution b. colloid c. suspension

Particles in a Solution (page 225)

Key Concept: When a solution forms, particles of the solute leave each other and become surrounded by particles of the solvent.

- Table salt is an ionic solid. When an ionic solid mixes with water, water molecules completely surround the positive ions and the negative ions. The positive ions and negative ions are separated from each other.
- Table sugar is a molecular solid. When a molecular solid mixes with water, the covalent bonds within the sugar molecules are not broken. Sugar breaks up into individual neutral sugar molecules. The individual sugar molecules are completely surrounded by water molecules and are separated from each other.
- A solution of ionic compounds in water can conduct electricity. Separate positive ions and negative ions let electricity flow.
- A solution of molecular compounds in water cannot conduct electricity. Electricity cannot flow when the particles of the solution are all electrically neutral.

Answer the following questions. Use your textbook and the ideas above.

5. Circle the letter of each sentence that is true about particles in a solution.
 - a. An ionic solid separates into positive ions and negative ions when it dissolves.
 - b. A molecular solid separates into neutral molecules when it dissolves.
 - c. Table sugar is an ionic solid.
6. Is the following sentence true or false? A solution of ionic compounds in water cannot conduct electricity.

Effects of Solutes on Solvents

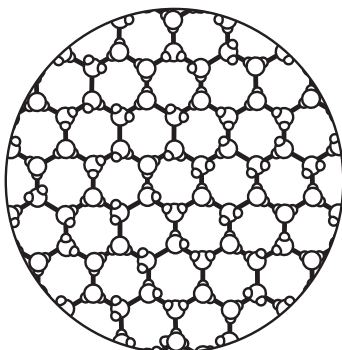
(pages 226–227)

Key Concept: Solutes lower the freezing point and raise the boiling point of a solvent.

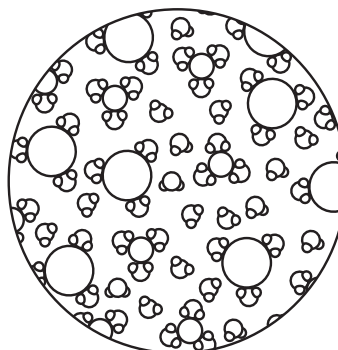
- You can change the freezing point of water by adding solutes to the water. You can also change the boiling point of water by adding solutes to the water.
- Solutes lower the freezing point of a solvent. Pure water freezes at 0°C . A solution of salt water freezes at a colder temperature. The salt particles (solute) make it harder for the water molecules to form crystals.
- Solutes raise the boiling point of a solvent. Pure water boils at 100°C . A solution of salt water boils at a higher temperature. The salt particles (solute) make it harder for water molecules to gain energy and escape into the air as a gas. More energy is needed.

Answer the following questions. Use your textbook and the ideas above.

7. Look at the pictures of water particles. Which water will freeze first—the water in a freshwater lake or the water in a saltwater bay? _____



a. Freshwater lake



b. Saltwater bay

8. Is the following sentence true or false? Water boils at lower temperatures when salt is added to it.
