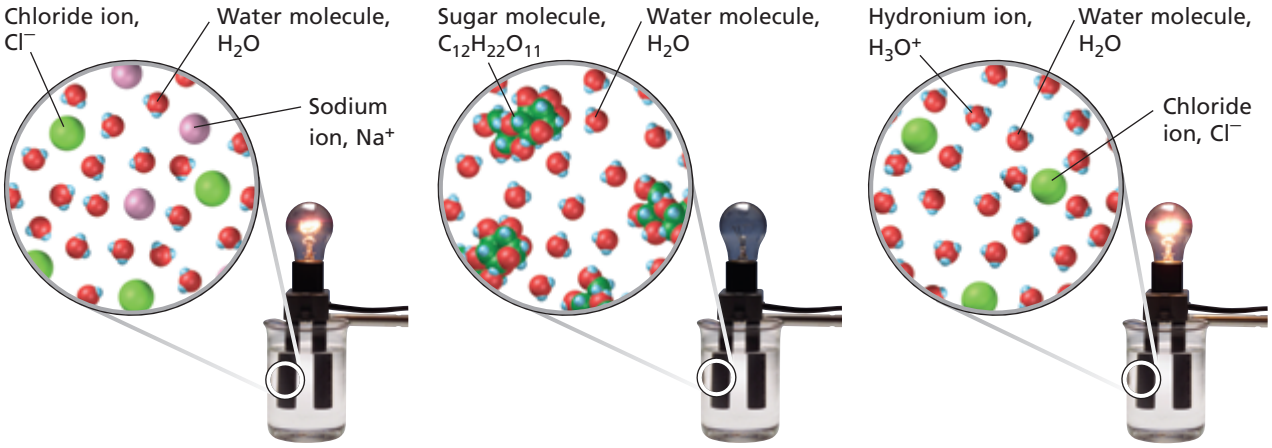

(a) Salt solution—electrolyte solute

(b) Sugar solution—nonelectrolyte solute

(c) Hydrochloric acid solution—electrolyte solute

FIGURE 5 (a) Sodium chloride dissolves in water to produce a salt solution that conducts electric current. NaCl is an electrolyte. (b) Sucrose dissolves in water to produce a sugar solution that does not conduct electricity. Sucrose is a nonelectrolyte. (c) Hydrogen chloride dissolves in water to produce a solution that conducts current. HCl is an electrolyte.

particles. *A substance that dissolves in water to give a solution that does not conduct an electric current is called a* **nonelectrolyte.** Sugar is a nonelectrolyte. **Figure 5** shows an apparatus for testing the conductivity of solutions. The electrodes are conductors that are attached to a power supply and that make electric contact with the test solution. For a current to pass through the light-bulb filament, the test solution must provide a conducting path between the two electrodes. A nonconducting solution is like an open switch between the electrodes, and there is no current in the circuit.

The light bulb glows brightly if a solution that is a good conductor is tested. Such solutions contain solutes that are electrolytes. For a moderately conductive solution, however, the light bulb is dim. If a solution is a poor conductor, the light bulb does not glow at all. Such solutions contain solutes that are nonelectrolytes. You will learn more about the strengths and behavior of electrolytes in Chapter 13.

SECTION REVIEW

1. Classify the following as either a heterogeneous or homogeneous mixture, and explain your answers.
   a. orange juice **b.** tap water
2. **a.** What are substances called whose water solutions conduct electricity? **b.** Why does a salt solution conduct electricity? **c.** Why does a sugar-water solution not conduct electricity?
3. Make a drawing of the particles in an NaCl solution to show why this solution conducts electricity. Make a drawing of the particles in an NaCl crystal to show why pure salt does not conduct.
4. Describe one way to prove that a mixture of sugar and water is a solution and that a mixture of sand and water is not a solution.
5. Name the solute and solvent in the following:
   a. 14-karat gold
   b. corn syrup
   c. carbonated, or sparkling, water

Critical Thinking

6. **ANALYZING INFORMATION** If you allow a container of sea water to sit in the sun, the liquid level gets lower and lower, and finally crystals appear. What is happening?