



## Observing Solutions, Suspensions, and Colloids

### Procedure

1. Prepare seven mixtures, each containing 250 mL of water and one of the following substances.
  - a. 12 g of sucrose
  - b. 3 g of soluble starch
  - c. 5 g of clay
  - d. 2 mL of food coloring
  - e. 2 g of sodium borate
  - f. 50 mL of cooking oil
  - g. 3 g of gelatin

#### Making the gelatin mixture:

Soften the gelatin in 65 mL of cold water, and then add 185 mL of boiling water.

2. Observe the seven mixtures and their characteristics. Record the appearance of each mixture after stirring.

3. Transfer to individual test tubes 10 mL of each mixture that does not separate after stirring. Shine a flashlight on each mixture in a dark room. Make note of the mixtures in which the path of the light beam is visible.

### Discussion

1. Using your observations, classify each mixture as a solution, suspension, or colloid.
2. What characteristics did you use to classify each mixture?

### Materials

- balance
- 7 beakers, 400 mL
- clay
- cooking oil
- flashlight
- gelatin, plain
- hot plate (to boil  $\text{H}_2\text{O}$ )
- red food coloring
- sodium borate ( $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ )
- soluble starch
- stirring rod
- sucrose
- test-tube rack
- water

## Solutes: Electrolytes Versus Nonelectrolytes

Substances that dissolve in water are classified according to whether they yield molecules or ions in solution. When an ionic compound dissolves, the positive and negative ions separate from each other and are surrounded by water molecules. These solute ions are free to move, making it possible for an electric current to pass through the solution. *A substance that dissolves in water to give a solution that conducts electric current is called an **electrolyte**.* Sodium chloride,  $\text{NaCl}$ , is an electrolyte, as is any soluble ionic compound. Certain highly polar molecular compounds, such as hydrogen chloride,  $\text{HCl}$ , are also electrolytes because  $\text{HCl}$  molecules form the ions  $\text{H}_3\text{O}^+$  and  $\text{Cl}^-$  when dissolved in water.

By contrast, a solution containing neutral solute molecules does not conduct electric current because it does not contain mobile charged



**Module 8:** Strong and Weakly Ionized Species, pH, and Titrations

