Types of Mixtures

SECTION 1

Objectives

- Distinguish between heterogeneous and homogeneous mixtures.
- List three different solute-solvent combinations.
- Compare the properties of suspensions, colloids, and solutions.
- Distinguish between electrolytes and nonelectrolytes.

It is easy to determine that some materials are mixtures because you can see their component parts. For example, soil is a mixture of substances, including small rocks and decomposed animal and plant matter. You can see this by picking up some soil in your hand and looking at it closely. Milk, on the other hand, does not appear to be a mixture, but in fact it is. Milk is composed principally of fats, proteins, milk sugar, and water. If you look at milk under a microscope, it will look something like **Figure 1a.** You can see round lipid (fat) droplets that measure from 1 to 10 μm in diameter. Irregularly shaped casein (protein) particles that are about 0.2 μm wide can also be seen. Both milk and soil are examples of heterogeneous mixtures because their composition is not uniform.

Salt (sodium chloride) and water form a homogeneous mixture. The sodium and chloride ions are interspersed among the water molecules, and the mixture appears uniform throughout. A model for a homogeneous mixture such as salt water is shown in **Figure 1b.**

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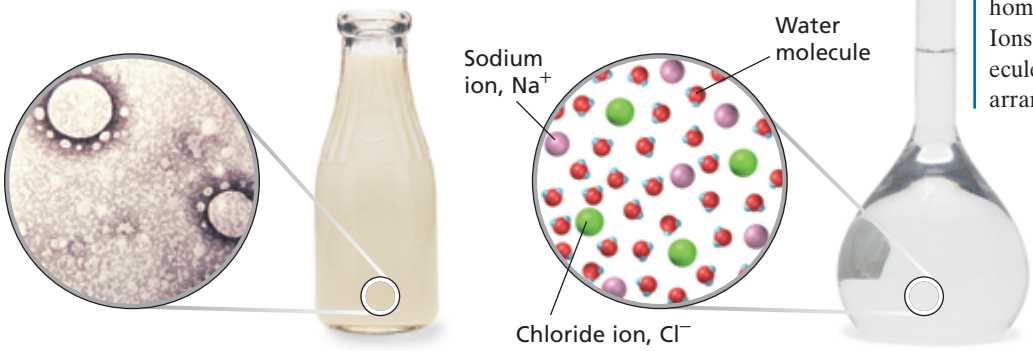
Module 1: States of Matter/Classes of Matter

Solutions

Suppose a sugar cube is dropped into a glass of water. You know from experience that the sugar will dissolve. Sugar is described as "soluble in water." *By* **soluble** *we mean capable of being dissolved.*

What happens as sugar dissolves? The lump gradually disappears as sugar molecules leave the surface of their crystals and mix with water molecules. Eventually all the sugar molecules become uniformly distributed among the water molecules, as indicated by the equally sweet taste of any part of the mixture. All visible traces of the solid sugar are



(a) Heterogeneous mixture—milk

(b) Homogeneous mixture—salt solution

FIGURE 1 (a) Milk consists of visible particles in a nonuniform arrangement. (b) Salt water is an example of a homogeneous mixture. Ions and water molecules are in a random arrangement.