Pearson

Chapter 13
Solutions

The wood frog protects its cells by flooding them with glucose, which acts as an antifreeze.

> "One molecule of nonsaline substance (held in the solvent) dissolved in 100 molecules of any volatile liquid decreases the vapor pressure of this liquid by a nearly constant fraction, nearly 0.0105."
>
> *—François-Marie Raoult (1830–1901)*

Learning Outcomes

13.1 Antifreeze in Frogs

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13.2 Types of Solutions and Solubility

13.3 Energetics of Solution Formation

13.4 Solution Equilibrium and Factors Affecting Solubility

13.5 Expressing Solution Concentration

13.6 Colligative Properties: Vapor Pressure Lowering, Freezing Point Depression, Boiling Point Elevation, and Osmotic Pressure

13.7 Colligative Properties of Strong Electrolyte Solutions

Key Learning Outcomes

RECALL FROM Chapter 1 that matter often exists in the form of a mixture, two or more different types of particles mixed together. In this chapter, we focus on homogeneous mixtures, also known as solutions. Solutions are mixtures in which atoms, ions, and molecules intermingle on the molecular and atomic scale. Common examples of solutions include ocean water, gasoline, and air. In this chapter we answer the question: Why do solutions form? We also discuss how the properties of solutions differ from the properties of the pure substances that compose the solutions. As you read this chapter, keep in mind the large number of solutions that surround you at every moment, including those that exist within your own body.