Pearson

Chapter 10
Gases

A pressurized suit protected Felix Baumgartner from the vacuum of space during his record-breaking skydive. Any significant damage to the suit carried the risk of uncontrolled decompression, which would likely result in Baumgartner's death.

> "So many of the properties of matter, especially when in the gaseous form, can be deduced from the hypothesis that their minute parts are in rapid motion, the velocity increasing with the temperature, that the precise nature of this motion becomes a subject of rational curiosity."
>
> *—James Clerk Maxwell (1831–1879)*

Learning Outcomes

PEOPLE CAN SURVIVE FOR WEEKS without food, days without water, but only minutes without air. Fortunately, we live at the bottom of a vast ocean of air, held to Earth by gravity. The air around us is matter in the gaseous state. The behavior of gases can be explained (and in fact predicted) by a model called the *kinetic molecular theory*. The core of this model is that *gases are composed of particles in constant motion.* Here, we again see the main theme of this book played out: *Matter is particulate, and its behavior can be understood in terms of particles.* In this chapter, we first look at this model for gases. We then turn to the observations and the laws that confirm the model.