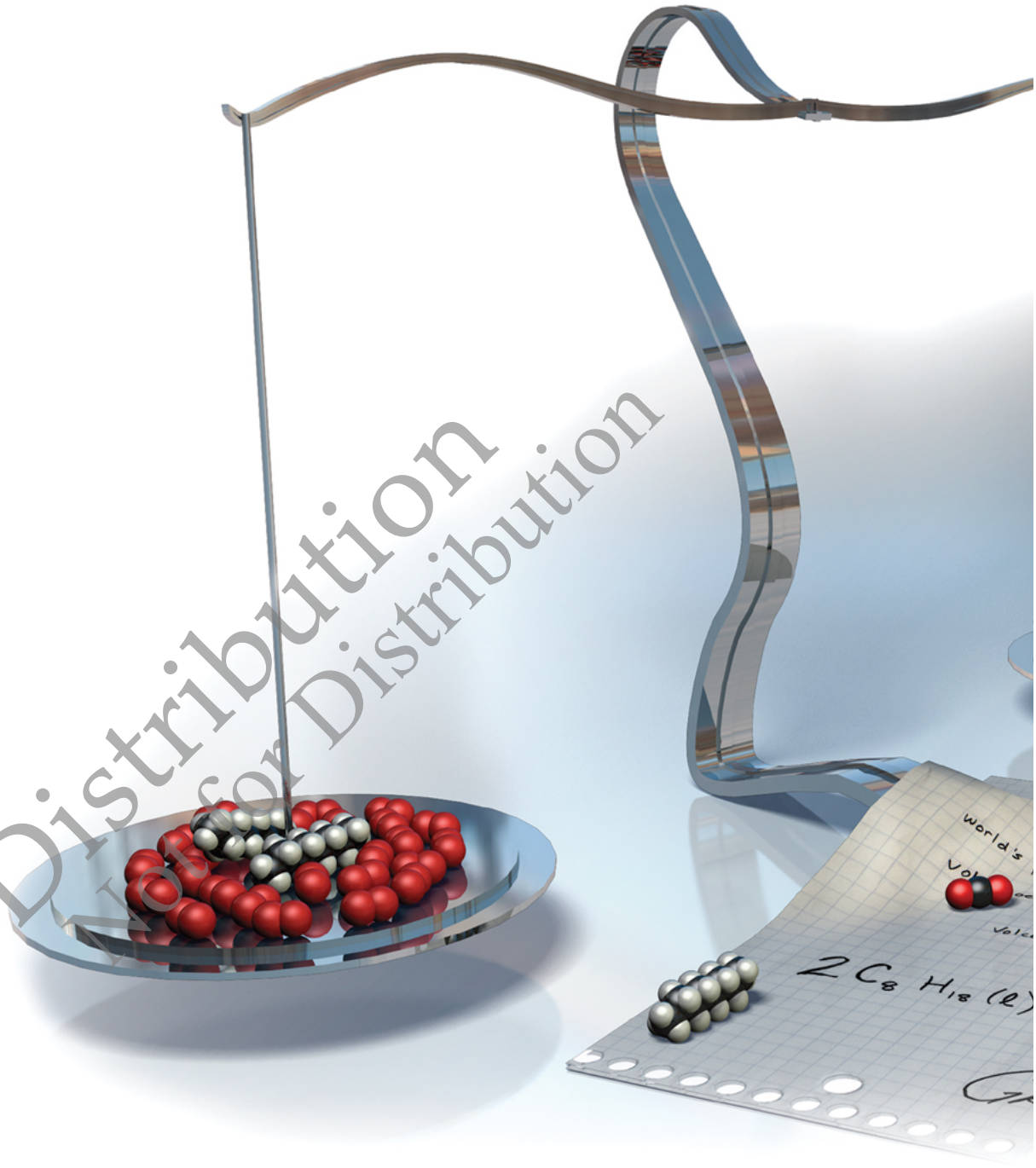
Pearson

Chapter 7
Chemical Reactions and Chemical Quantities



The molecular models on this balance represent the reactants and products in the combustion of octane, a component of petroleum. One of the products, carbon dioxide, is the main greenhouse gas implicated in global climate change.

"I feel sorry for people who don't understand anything about chemistry. They are missing an important source of happiness."

—Linus Pauling (1901–1994)

Learning Outcomes

WE HAVE SPENT THE LAST THREE CHAPTERS examining compounds and bonding within compounds. We now turn to the process that can create or transform compounds: *chemical reactions*. As we have seen, matter is composed of particles. Those particles can be atoms, ions, or molecules. The particles that compose matter are in constant motion, vibrating, jostling, and colliding with one another. In some cases, a collision between particles leads to a remarkable change. The electrons in one particle are drawn to the nuclei in the other particle and vice versa. If the conditions are right, a chemical reaction occurs and the particles are transformed. In this chapter, we examine chemical reactions. We learn how to write equations to represent reactions, and we look closely at chemical *stoichiometry*—the numerical relationships between the relative amounts of particles in a chemical reaction.