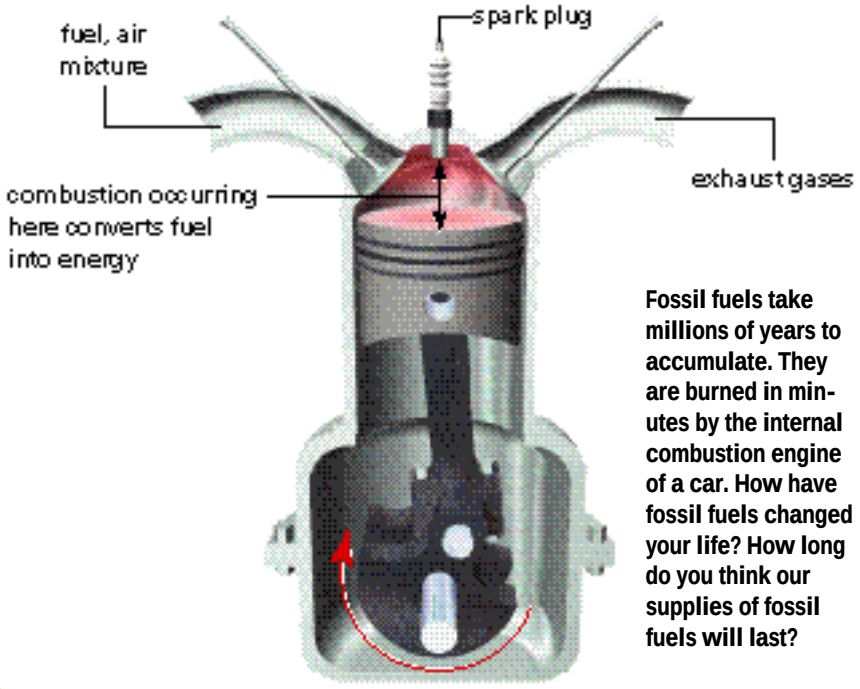
CHAPTER 14

Energy Trapped in Hydrocarbons

The whole world runs on energy—and so do you! Fossil fuels provide energy to power cars and heat buildings. Food provides energy to keep your body alive and warm. Both sources of energy come from organic compounds, such as hydrocarbons, sugars, and proteins.

Green plants, algae, and plankton trap the Sun's energy through the process of photosynthesis. After these organisms die, they are broken down by natural processes. Their remains accumulate on Earth's surface. In some areas, these remains build up in thick layers, which are eventually covered by rock and soil. Under certain conditions, over billions of years, pressure changes these layers into something new: fossil fuels. **Fossil fuels** (such as coal, natural gas, and petroleum) are fuels that are made from fossilized organic materials. The trapped energy from the Sun is still present in fossil fuels. To use this energy, we need to extract it. **Combustion**, or burning, is the most common way to extract energy from fossil fuels.

In this chapter, you will explore the ways in which our society obtains energy from fossil fuels. You will get a chance to measure exactly how much energy is obtained from an organic substance by doing your own combustion reaction. As well, you will learn how dangerous incomplete combustion reactions can be.



Fossil fuels take millions of years to accumulate. They are burned in minutes by the internal combustion engine of a car. How have fossil fuels changed your life? How long do you think our supplies of fossil fuels will last?

Chapter Preview

Concepts and Skills You Will Need

Before you begin this chapter, review the following concepts and skills:

- explaining bonding in molecular compounds (Chapter 3, section 3.3)
- writing and balancing chemical equations for different reactions (Chapter 4, section 4.1)
- significant digits (Chapter 1, section 1.2)
- problem solving in gas laws (Chapter 12, section 12.3)
- naming and drawing aliphatic compounds (Chapter 13, section 13.2)