

1 FOCUS

Objectives

- 1.3.1 **Describe** how Lavoisier transformed chemistry.
- 1.3.2 **Identify** three steps in the scientific method.
- 1.3.3 **Explain** why collaboration and communication are important in science.

Guide for Reading

Build Vocabulary

Word Forms When discussing the two types of variables, explain that one meaning of *manipulate* is “to manage or control” and one meaning of *response* is “to answer or act in turn.”

Reading Strategy

Use Prior Knowledge Before students read the section, ask them what they know about the scientific method.

2 INSTRUCT

Connecting to Your World

Have students read the opening paragraph and look at the photo. Ask, **What made Fleming different from other scientists who had seen this mold?** (Fleming recognized the importance of this discovery. He assumed that the mold had released a chemical that prevented the growth of bacteria.)

Alchemy

Relate

Students who have read the Harry Potter books will be familiar with the name of one alchemist, Nicolas Flamel (1330–1414), who wrote a book about the philosopher’s stone. Alchemists believed that the philosopher’s stone could change base metals into gold.

Guide for Reading



Key Concepts

- How did alchemy lay the groundwork for chemistry?
- How did Lavoisier help to transform chemistry?
- What are the steps in the scientific method?
- What role do collaboration and communication play in science?

Vocabulary

scientific method
observation
hypothesis
experiment
manipulated variable
responding variable
theory
scientific law

Reading Strategy

Building Vocabulary After you read this section, explain the difference between a theory and a scientific law.



20 Chapter 1

Connecting to Your World

In 1928, Alexander Fleming, a Scottish scientist, noticed that a bacteria he was studying did not grow in the presence of a yellow-green mold. Other scientists had made the same observation, but Fleming was the first to recognize its importance. He assumed that the mold had released a chemical that prevented the growth of the bacteria. That chemical was penicillin, which can kill a wide range of harmful bacteria. In 1945, Fleming shared a Nobel Prize for Medicine with Howard Florey and Ernst Chain, who led the team that isolated penicillin. In this section you will study the methods scientists use to solve problems.



Alchemy

The word *chemistry* comes from alchemy. Long before there were chemists, alchemists were studying matter. Alchemy arose independently in many regions of the world. It was practiced in China and India as early as 400 B.C. In the eighth century, Arabs brought alchemy to Spain, from where it spread quickly to other parts of Europe.

Alchemy had a practical side and a mystical side. Practical alchemy focused on developing techniques for working with metals, glass, and dyes. Mystical alchemy focused on concepts like perfection. Because gold was seen as the perfect metal, alchemists were searching for a way to change other metals, such as lead, into gold. Although alchemists did not succeed in this quest, the work they did spurred the development of chemistry.

Alchemists developed the tools and techniques for working with chemicals. Alchemists developed processes for separating mixtures and purifying chemicals. They designed equipment that is still used today, including beakers, flasks, tongs, funnels, and the mortar and pestle in Figure 1.15. What they did not do was provide a logical set of explanations for the changes in matter that they observed. That task was left for chemists to accomplish.

Figure 1.15 A bowl-shaped mortar and a club-shaped pestle are used to grind or crush materials such as herbs, spices, and paint pigments. The mortar and pestle in the photograph is made of porcelain, which is a hard material.



Section Resources

Print

- [Guided Reading and Study Workbook, Section 1.3](#)
- [Core Teaching Resources, Section 1.3 Review](#)
- [Transparencies, T5–T6](#)
- [Laboratory Manual, Lab 1](#)
- [Small-Scale Chemistry Laboratory Manual, Lab 1](#)

Technology

- [Interactive Textbook with ChemASAP, Assessment 1.3](#)
- [Go Online, Section 1.3](#)

Prentice Hall Chemistry Chapter 3 Study Guide

JA Banks



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