

Chemistry Is a Physical Science

SECTION 1-1

OBJECTIVES

- Define *chemistry*.
- List examples of the branches of chemistry.
- Compare and contrast basic research, applied research, and technological development.

The natural sciences were once divided into two broad categories: the biological sciences and the physical sciences. Living things are the main focus of the biological sciences. The physical sciences focus mainly on nonliving things. However, because we now know that both living and nonliving matter have a chemical structure, chemistry is central to all the sciences, and there are no longer distinct divisions between the biological and physical sciences.

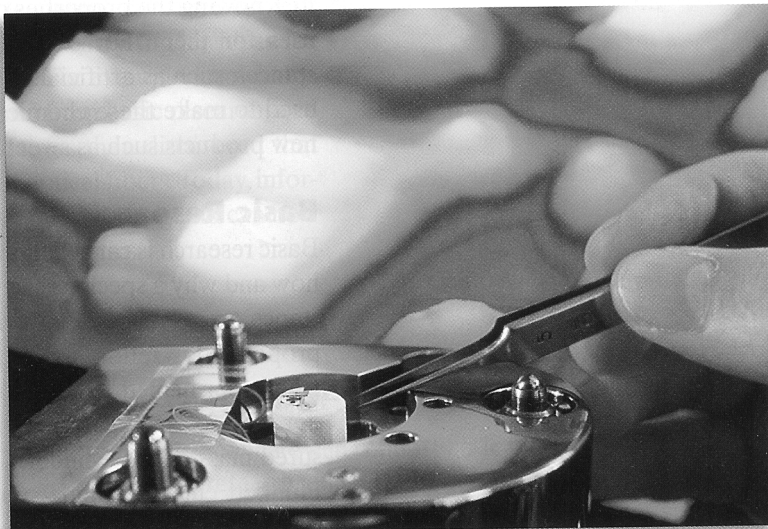
Chemistry is the study of the composition, structure, and properties of matter and the changes it undergoes. Chemistry deals with questions such as, What is that material made of? What is its makeup and internal arrangement? How does it behave and change when heated, cooled, or mixed with other materials and why does this behavior occur? Chemists answer these kinds of questions in their daily work.

Instruments are routinely used in chemistry to extend our ability to observe and make measurements. Instruments make it possible, for example, to look at microstructures—things too tiny to be seen with the unaided eye. The scanning electron microscope reveals tiny structures by beaming particles called electrons at materials. When the electrons hit a material, they scatter and produce a pattern that shows the material's microstructure. Invisible rays called X rays can also be used to

FIGURE 1-1 A balance (a) is an instrument used to measure the mass of materials. A sample of DNA placed in a scanning tunneling microscope produces an image (b) showing the contours of the DNA's surface.



(a)



(b)