

## SECTION 1-1

## SECTION SUMMARY

## Earth's Interior

### Guide for Reading

- 1
- ◆ What does a geologist do?
  - ◆ What are the characteristics of Earth's crust, mantle, and core?

The modern science of **geology**, the study of planet Earth, began in the late 1700s. **Geologists** are scientists who study the forces that make and shape planet Earth. They study the chemical and physical characteristics of **rock**, the material that forms Earth's hard surface. They map where different types of rocks are found and describe landforms, the features sculptured in rock and soil by water, wind, and waves. **Geologists study the processes that create Earth's features and search for clues about Earth's history.**

Once geologists knew only a few facts about Earth. They knew it was a sphere with seven great landmasses, or **continents**. Now they know that Earth looks different today than it did millions of years ago. Geologists divide the forces that change the surface of Earth into two groups. **Constructive forces** shape the surface by building up mountains and landmasses. **Destructive forces** are those that slowly wear away mountains and, eventually, every other feature on the surface.

One of the most difficult questions that geologists face is, What's inside Earth? They must rely on indirect evidence to answer this question, such as by studying the paths of **seismic waves** produced by earthquakes. Using such data, geologists have learned that Earth's interior is made up of several layers. **Three main layers make up Earth's interior: the crust, the mantle, and the core. Each layer has its own conditions and materials.** The **crust** is the layer of rock that forms Earth's outer skin. It includes both dry land and the ocean floor. The crust beneath the ocean, called oceanic crust, consists mostly of **basalt**, a dark, dense rock with a fine texture. The crust that forms continents, called continental crust, consists mostly of **granite**, a rock that has larger crystals than basalt and is not as dense.

Below the crust is the **mantle**, a layer of hot rock. The crust and the uppermost part of the mantle together form a rigid layer called the **lithosphere**. In general, temperature and pressure in the mantle increase with depth. **Pressure** is the force pushing on a surface or area. The increased heat and pressure make the part of the mantle just beneath the lithosphere somewhat soft. This soft layer is called the **asthenosphere**. The lithosphere floats on top of the asthenosphere. The rest of the mantle down to the core is solid.

Earth's core consists of two parts. Both parts of the core are made of the metals iron and nickel. The **outer core** is a layer of molten metal that surrounds the inner core. The **inner core** is a dense ball of solid metal.

Currents in the liquid outer core force the solid inner core to spin at a slightly faster rate than the spinning of the whole Earth. This movement creates Earth's magnetic field, which causes the planet to act like a giant bar magnet.