Lesson Outline for Teaching

Lesson 2: Earth's Interior

A. Clues to Earth's Interior

1. Scientists explore the geosphere by going into deep mines.

2. Scientists learn about the inside of Earth by sending down instruments and bringing up rock samples from wells.

B. Temperature and Pressure Increase with Depth

1. The deeper you go below Earth's surface, the higher the temperature is.

2. The deeper you go below Earth's surface, the higher the pressure is.

3. The pressure increases because of the weight of the overlying rocks.

C. Using Earthquake Waves

1. Scientists learn about Earth's interior by studying waves from earthquakes.

2. These waves move in different ways through different kinds of materials.

D. Earth's Layers

1. The crust is the brittle, rocky outer layer of Earth.

2. Earth's outermost layer is similar to the shell of an egg: It is the thinnest layer.

3. There are two types of crust—continental crust and oceanic crust. Continental crust is much thicker than crustal rocks under the oceans.

E. Mantle

1. Below the crust is the mantle, the thick middle layer of Earth.

2. The rocks of the mantle are denser than crustal rocks.

3. Scientists group the mantle into four different layers.

a. The topmost layer of the mantle is a rigid layer called the lithosphere.

b. The rocks in the mantle's second layer are so hot that they melt and become plastic, which means that they begin to flow.

c. The layer of melted rock in mantle is the asthenosphere.

d. The lowest two layers of the mantle are solid because great pressure in these layers prevent(s) the rock from melting.

e. The upper mantle and lower mantle form the largest of Earth's layers.

F. Core

1. Earth's core is the dense, metallic center of the planet.

2. The central part of Earth is made of metal. When the planet was young, these dense materials melted and were pulled by gravity toward Earth's center.

Lesson Outline continued

3. Earth's core has a(n) outer layer that is liquid and a(n) inner layer that is solid.
4. The inner core spins a little faster than the rest of Earth. It is made of iron crystals.
5. The core causes a(n) force field to form around Earth.

G. Earth's Magnetic Field

1. The movement of molten iron in Earth's core makes the planet act like a giant bar magnet, with one pole near the top of the planet and one pole near the bottom.
2. Over time, Earth's magnetic field has varied in strength and direction.

H. Magnetosphere

1. Earth's magnetic field protects the planet against cosmic rays and charged particles from the Sun.
2. The magnetosphere is the outer part of Earth's magnetic field. It interacts with cosmic rays and charged particles from the Sun, trapping some particles and pushing away others.

Discussion Question

Name the three main layers of Earth and give a detailed description of each layer.

The crust is the brittle, rocky outer layer of Earth; it is the least dense of all the layers; there are two types of crust: oceanic crust, which is thinner and denser than the thicker continental crust, which is less dense. The mantle is the thick middle layer of Earth. The mantle has four layers—a brittle, rigid uppermost layer; a plastic layer of melted rock called the asthenosphere; the solid upper mantle; and the solid lower mantle. The core is the dense, metallic center of Earth; the outer core is liquid, and the inner core is solid.