



The Earth Inside and Out

A HUMAN PERSPECTIVE A quick look at a world map will convince you that the **continents**, landmasses above water on earth, fit together like a huge jigsaw puzzle. South America and Africa are good examples. With imagination, you can see how other continents might fit together as well. The first person to suggest that the seven continents were once all one supercontinent was Englishman Francis Bacon in 1620. Bacon's idea received support in the early 1900s, when scientists found rocks in Africa that matched rocks in South America. Other evidence also supported the idea of a supercontinent millions of years ago.

The Solar System

The "home address" of the earth is the third planet in the solar system of the sun, which is a medium-sized star on the edge of the Milky Way galaxy. Its distance from the sun is 93 million miles. The **solar system** consists of the sun and nine known planets, as well as other celestial bodies that orbit the sun. The solar system also contains comets, spheres covered with ice and dust that leave trails of vapor as they race through space. Asteroids—large chunks of rocky material—are found in space as well. As you can see in the diagram, our solar system has an asteroid belt between the orbits of Jupiter and Mars.

Main Ideas

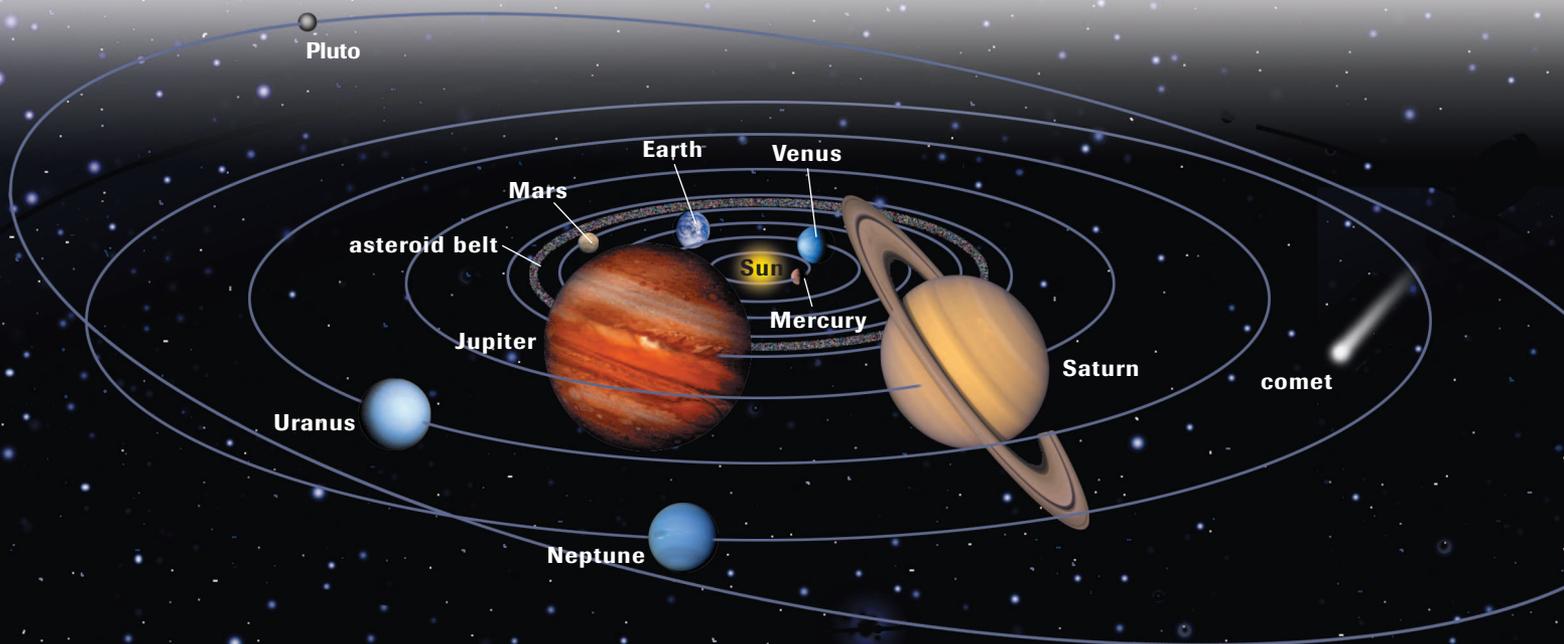
- The earth is the only habitable planet in the sun's solar system.
- The drifting of the continents shaped the world we live in today.

Places & Terms

| | |
|---------------------|--------------------------|
| continent | atmosphere |
| solar system | lithosphere |
| core | hydrosphere |
| mantle | biosphere |
| magma | continental drift |
| crust | |

LOCATION This not-to-scale illustration shows the nine planets and other objects in our solar system.

What is the earth's relative location in the solar system?



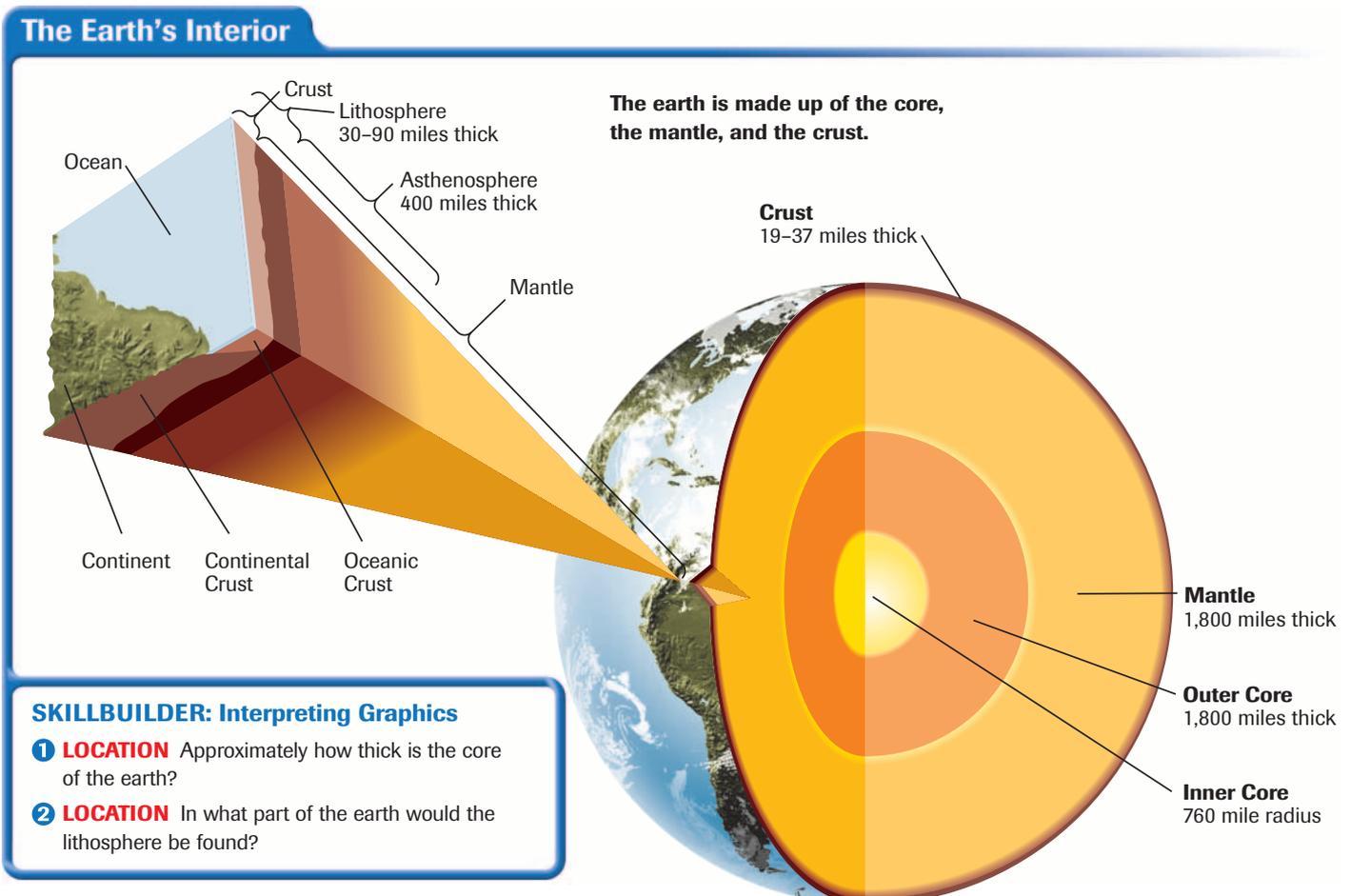
The Structure of the Earth

The earth is about 24,900 miles in circumference and about 7,900 miles in diameter. Although the earth seems like a solid ball, it is really more like a series of shells that surround one another.

INSIDE THE EARTH The **core** is the center of the earth and is made up of iron and nickel. The outer core is liquid, but the inner core is solid. Surrounding the core is the **mantle**, which has several layers. The mantle contains most of the earth's mass. **Magma**, which is molten rock, can form in the mantle and rise through the **crust**, the thin layer of rock at the earth's surface. Study the diagram below to learn more about the earth's interior.

ON AND ABOVE THE EARTH Surrounding the earth is a layer of gases called the **atmosphere**. It contains the oxygen we breathe, protects the earth from radiation and space debris, and provides the medium for weather and climate. The solid rock portion of the earth's surface is the **lithosphere**, which includes the crust and uppermost mantle. Under the ocean, the lithosphere forms the seafloor. The huge landmasses above water are called continents. There are seven continents: North America, South America, Europe, Asia, Africa, Australia, and Antarctica. The **hydrosphere** is made up of the water elements on the earth, which include oceans, seas, rivers, lakes, and water in the atmosphere. Together, the atmosphere, the lithosphere, and the hydrosphere form the **biosphere**, the part of the earth where plants and animals live.

BACKGROUND Part of the upper portion of the mantle is known as the asthenosphere. It is the hot, but still mostly solid, rock below the cold, brittle rock of the lithosphere.

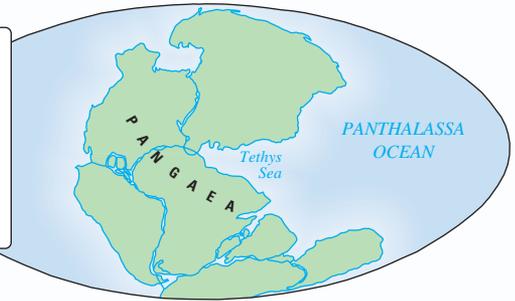


CONTINENTAL DRIFT In 1912, Alfred Wegener of Germany presented a new idea about continents—the **continental drift** hypothesis. It maintained that the earth was once a supercontinent that divided and slowly drifted apart over millions of years. Wegener called the supercontinent Pangaea (from a Greek word meaning “all earth”). An ocean called Panthalassa surrounded it. The supercontinent split into many plates that drifted, crashed into each other, and split apart several times before they came to their current positions. This process occurred over millions of years.

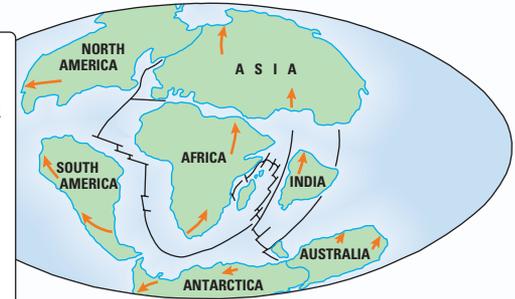
In the 1960s, scientists studying the sea floor discovered that the youngest rocks were in the middle of the ocean, at long cracks in the crust. This suggested that the new sea floor was being added, pushing the continents apart. Later in this chapter, you will learn how the rocks of Earth’s surface are broken into giant plates that move and continue to shape the earth.

Continental Drift Theory

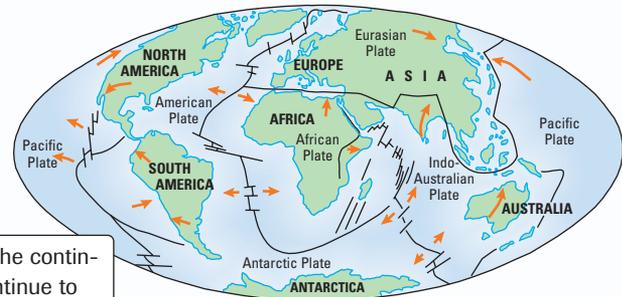
200 million years ago The supercontinent was named *Pangaea*. An ocean called Panthalassa surrounded it.



65 million years ago The supercontinent split apart and began moving in different directions. Notice that India broke away from Antarctica and drifted toward Asia.



Today The continents continue to drift even today.



Assessment

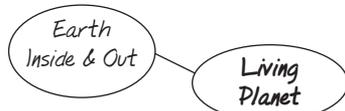
1 Places & Terms

Identify and explain where on the earth these terms would be found.

- continent
- mantle
- magma
- crust
- biosphere

2 Taking Notes

PLACE Review the notes you took for this section.



- What are the three basic parts of the earth’s interior?
- What are four basic spheres found on or above the earth?

3 Main Ideas

- What makes up the interior of the earth?
- What makes up the biosphere?
- How can the presence of seven continents on the earth’s surface be explained?

4 Geographic Thinking

Making Inferences How do the earth’s spheres influence one another? **Think about:**

- the function of the atmosphere
- the makeup of the biosphere

S See Skillbuilder Handbook, page R4.



MAKING COMPARISONS Study the diagrams of continental drift on this page. Write a **description** of the location of the continents in the past in comparison with their current location.