

### What is the earth?

Many people think of the earth as a ball of rock and soil. Maybe there was a time when you did, too. The earth is more than just rock and soil. The earth is made up of all three forms of matter. Part of the earth is solid. Part of the earth is liquid. And part of the earth is gas.

Much of what you learn about the earth this year will relate to the earth's structure. The earth's structure can be thought of as having four divisions or layers. From the inside out, the earth consists of an interior, a lithosphere, a hydrosphere, and an atmosphere.

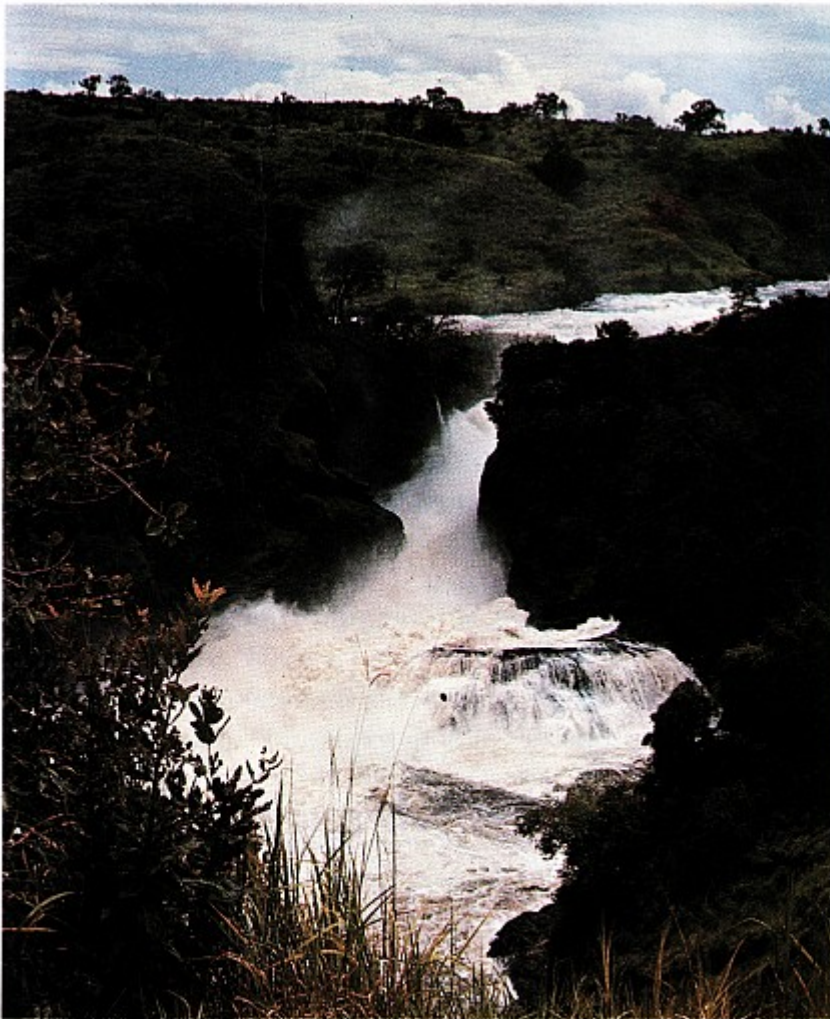
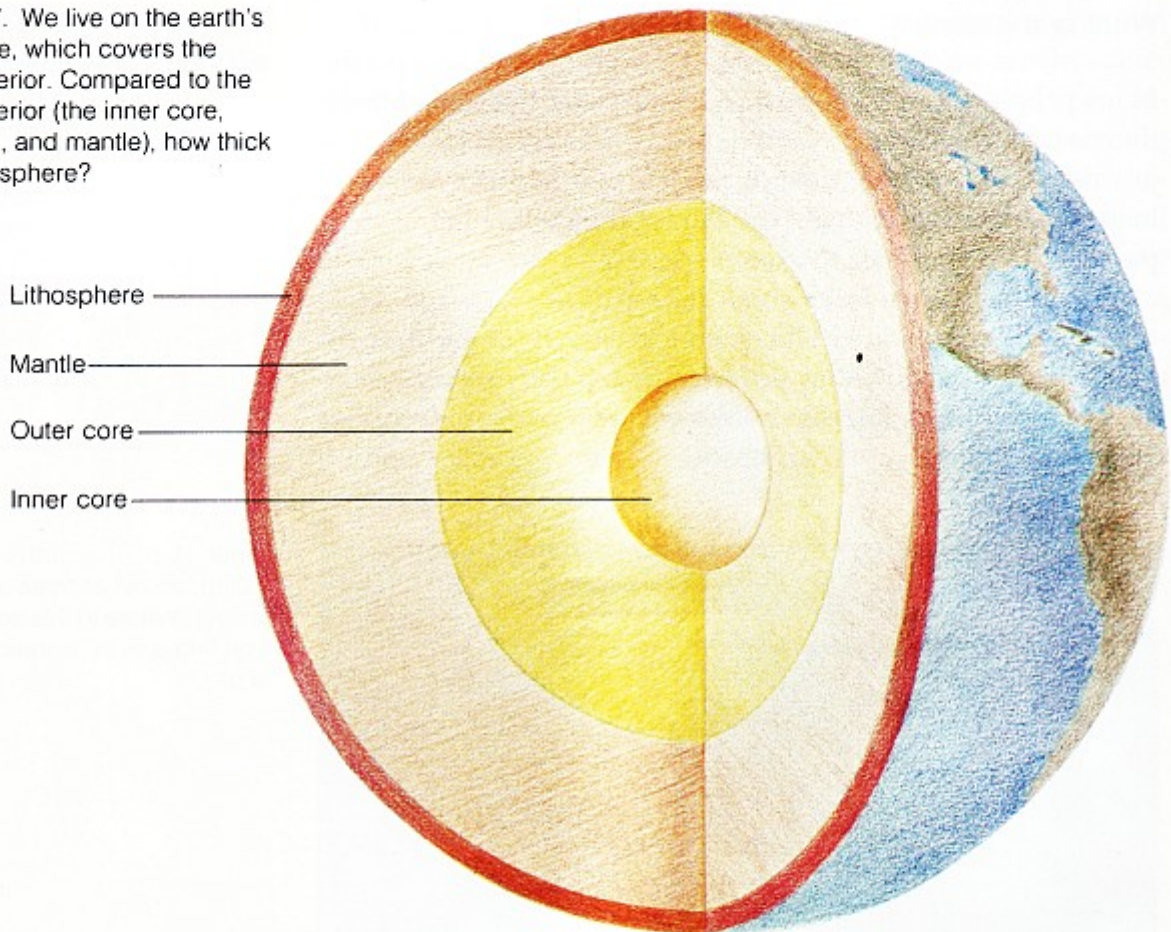


Figure 1-6. The earth is composed of all three states of matter. Where in this scene would you find a solid, a liquid, and a gas?

Figure 1-7. We live on the earth's lithosphere, which covers the earth's interior. Compared to the earth's interior (the inner core, outer core, and mantle), how thick is the lithosphere?



### Library research

The interior of the earth is thought to have an inner core, an outer core, and a mantle. How do these regions differ from each other?

As shown in Figure 1-7, the interior of the earth is thought to have an inner core, an outer core, and a mantle. The mantle is the layer of material that extends from the earth's crust downward to the outer core. Some scientists believe that the mantle is also divided into layers, but this has not yet been proved.

Some evidence indicates that the material in the earth's interior has some properties of both solids and liquids. It is unlikely that we will really know what makes up the interior of the earth. Scientists do, however, have some theories about the earth's interior.

The earth's **lithosphere** (LITH'-uh-sfir) is the solid part of the earth that is made up of rock and soil. The word *lithosphere* comes from two Greek words that mean a stone (*lithos*) and a ball (*sphaira*). The lithosphere is that part of the earth upon

which we live. No one knows for sure how thick the lithosphere is. One estimate puts it at between 60 and 130 km thick. Compared to the entire earth, the thickness of the lithosphere would be like the thickness of the skin of an apple.

The word *hydrosphere* (HĪ'-druh-sfir) comes from the Greek words for water (*hudor*) and ball. The earth's **hydrosphere** is composed of all the oceans and inland seas, lakes, and streams. The hydrosphere is all the water found on earth. It includes the water that is below the ground and the water that is found in the atmosphere.

The word *atmosphere* (AT'-muh-sfir) comes from the Greek words for vapor or smoke (*atmos*) and ball. The earth's **atmosphere** is the blanket of air, dust, water droplets, ice particles, etc. that completely covers the earth's lithosphere and hydrosphere. We actually live at the bottom of an ocean of air. As you go up into the atmosphere, the air thins out very quickly.

The earth's atmosphere is divided into zones or regions. Figure 1-8 shows only one of the ways that scientists divide the atmosphere. Where the atmosphere actually ends and outer space begins is still not defined.

Another of the earth's zones is called the **biosphere** (BĪ'-uh-sfir). The word *biosphere* comes from the Greek words for life (*bios*) and ball. The biosphere is not really a division of the earth's structure. Rather, the biosphere includes part of the earth's lithosphere, hydrosphere, and atmosphere. The biosphere is the region near the earth's surface where all life is found.

One of the most important ideas to remember throughout your study of earth science is that there is a constant exchange of energy and materials among the lithosphere, atmosphere, and hydrosphere. This exchange of energy and materials takes place at their boundaries or between each sphere.

### Check yourself

1. How do the earth's lithosphere, hydrosphere, and atmosphere show that the earth is made up of solid, liquid, and gas?
2. What is constantly happening at the boundaries of the different spheres?

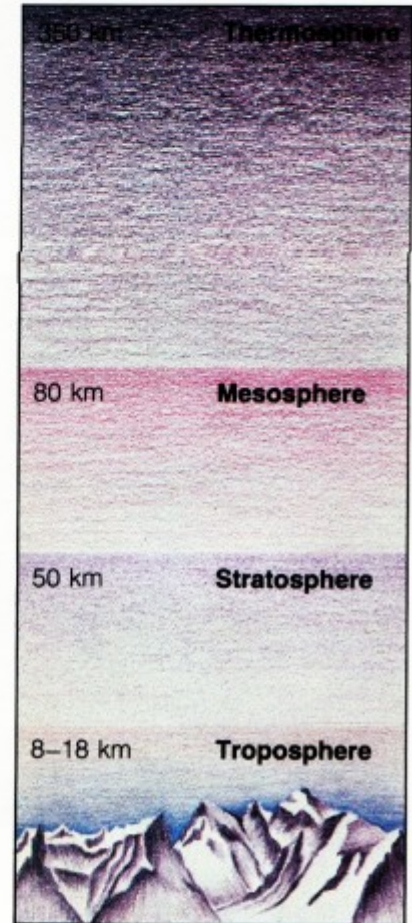


Figure 1-8. The earth's atmosphere is divided into zones or regions. What zone meets the earth's crust?