The first part of the answer relates to the basic components of the planet. Earth is thought to have received a larger proportion than its neighboring planets of hydrous (watery) compounds from which a sufficient quantity of surface water could be produced.

The second part of the answer to this question comes from a process inherent in the Earth's formation. When the Earth first condensed and congealed into a solid body, it trapped gases and water vapor in tiny pores within its rocks. Given enough heat, the rocks could release the water vapor and gases into the atmosphere in the same way that baking an apple releases steam. This process is known as *outgassing*. This same process operates today when volcanoes belch out huge vaporous clouds of gases from molten sources deep within the Earth. The initial outgassing of the Earth is thought to have been immense with much volcanic activity. Huge quantities of water vapor and other gases were released from the Earth's interior to produce a dense continuous black cloud which surrounded the Earth.

The third part of the answer is the Earth's temperature, which allowed the water to remain in a liquid form. The Earth's temperature is neither so hot that the water turns to a gas nor so cold that it turns to ice.

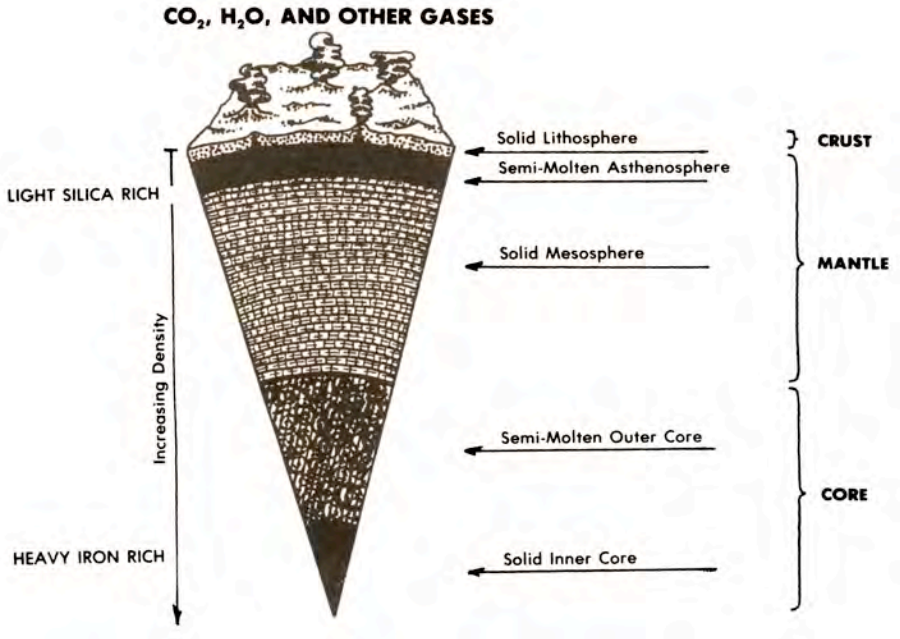

FIGURE 4.7

The Earth's interior after it had been stratified (sorted) by density 3.8 billion years ago