

Chapter 11-9: The Water Cycle

Water is the most abundant substance in living things. The human body, for example, is composed of about 70% water, and jellyfish are 95% water. Water participates in many important biochemical mechanisms, including photosynthesis, digestion, and cellular respiration. It is also the habitat for many species of plants, animals, and microorganisms, and it participates in the cycling of all of the materials used by living things. Water is distributed through the biosphere in a cycle known as the water, or hydrologic cycle. In this plate, we will examine some aspects of that cycle.

In this plate, we show the biosphere and layers of the atmosphere, and the movement of water through them. Our major emphasis will be on the oceans and precipitation over land, but we will also touch on other aspects of the biosphere.

We begin by looking at the atmosphere, which includes the clouds. When water vapor cools, it condenses and falls to Earth as rain. For instance, look at the arrow labeled (A), or **precipitation over land**; gravity draws the water back to Earth in the form of rain, sleet, and snow. Precipitation also occurs **over oceans (B)**.

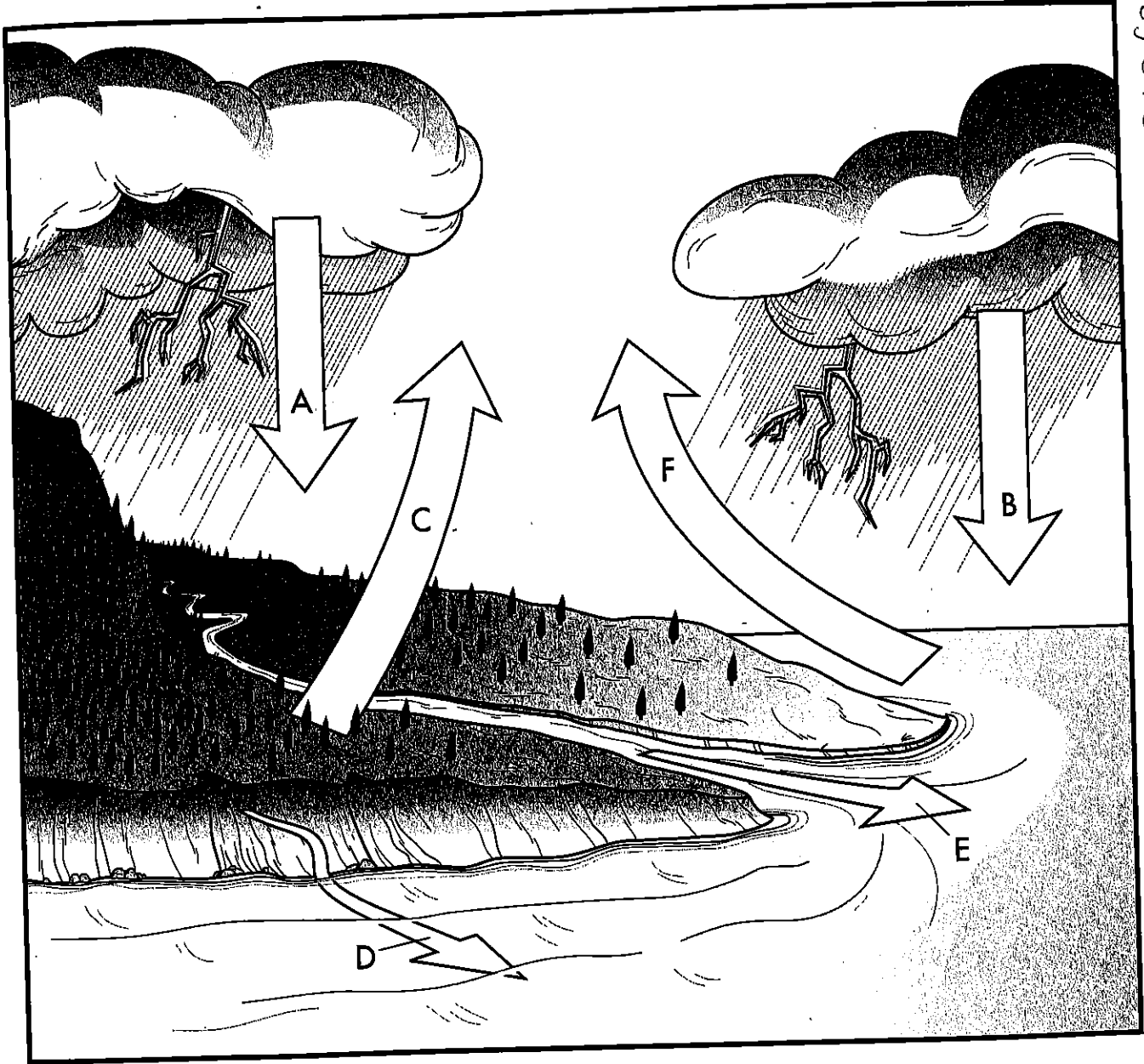
We have begun our discussion of the water cycle by showing the water going to the Earth. We will now look at the water going to the atmosphere. The living things on Earth are represented, in our diagram, by the trees. Water is absorbed by the roots of the trees and used in photosynthesis, but it is also lost from their leaves through the process of **transpiration (C)**. Water also returns to the atmosphere through evaporation from the soil and from numerous other sources. In general, the amount of precipitation received by an area helps determine what types of plants will grow there. The nature of the vegetation, in turn, determines the types of animals that inhabit a region.

Water from the land enters the ocean through **seepage from the ground (D)**; it percolates from the surface down to the water table. This water-saturated zone of soil and rock is called an aquifer, and water seeps from the aquifer to the ocean.

Water also reaches the ocean as **runoff from the surface (E)**. Runoff from the surface includes flow from rivers as well as melting snowfields and glaciers.

Now that we have described how water reaches the ocean, we will explore how it returns to the atmosphere, completing the hydrologic cycle. Continue reading below as you complete your reading.

The major reservoirs of water on Earth are the oceans. Oceans cover about three-quarters of Earth's surface and contain about 97% of its water. Solar radiation causes water's **evaporation from the ocean (F)**. Over 80% of the evaporated water in the hydrologic cycle enters the atmosphere in this way, and about 52% of this falls back into the oceans in the form of rain. The remainder remains in the atmosphere as clouds, ice crystals, and water vapor and then precipitates over land. On a global scale, the quantity of ocean water that evaporates each year is equivalent to a layer that's 120 cm deep and covers the entire surface of the ocean.



The Water Cycle

- Precipitation Over Land.....A
- Precipitation Over Ocean.....B
- TranspirationC
- Seepage From GroundD
- Runoff From SurfaceE
- Evaporation from OceanF