Lesson 1 Where Is Earth's Freshwater?

Objectives

After reading this lesson, you should be able to

- describe the water cycle.
- explain how groundwater collects and moves.
- describe how a river develops.

Groundwater
Water that sinks into the ground.

Precipitation
Water that falls to Earth from the atmosphere.

Runoff
Water that runs over Earth's surface and flows into streams.

Water cycle
Movement of water between the atmosphere and Earth's surface.

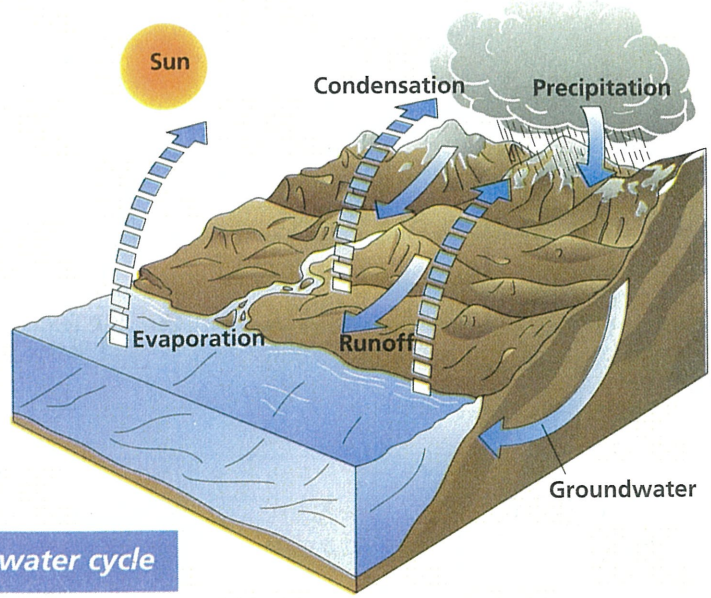
Three-fourths of Earth's surface is covered with water. Water is everywhere. Most of it is in the oceans. It is also in rivers, in lakes, in the air, and even in your own body.

The Water Cycle

Earth's water is in continuous motion. It moves from the atmosphere to Earth's surface and back to the atmosphere. This movement of water is called the **water cycle.** Study the diagram below and notice the different forms that water takes as it goes through a complete cycle.

The sun powers the water cycle. Heat from the sun evaporates surface water, and the water vapor rises into the atmosphere. The rising water vapor cools and condenses into clouds. Water droplets or ice crystals in the clouds grow larger, then fall to Earth as **precipitation.**

What happens after precipitation falls? Some of it sinks into the ground and becomes **groundwater.** Precipitation that does not sink into the ground is called surface water. Some surface water evaporates. But most of it becomes **runoff**—surface water that flows into streams.



The water cycle

Drainage basin
Land area that is drained by a river and its tributaries.

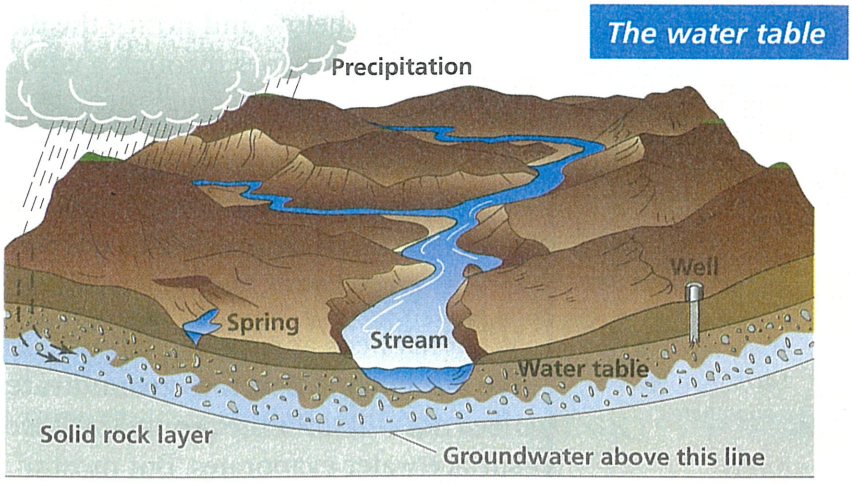
Porous
Containing many spaces through which air and water can move.

Tributary
River that joins another river of equal or greater size.

Water table
Top of the groundwater layer.

Groundwater

Precipitation and runoff can sink into the ground because most soil is **porous**, or has spaces between its particles. The bedrock below the soil may also be porous. Water trickles around broken rock pieces and through cracks. Eventually, water comes to a solid rock layer. The water collects on top of the rock layer, filling the spaces above it. The top of this wet earth layer is the **water table.**



Rivers

Much of the freshwater above ground flows as rivers. Rivers begin as runoff moves over the land, carving small paths in the ground. These paths get wider and deeper as water continues to flow through them. The paths become tiny streams. As the streams flow, they join and become larger rivers. These rivers then join and form even larger rivers. Rivers that join other rivers are called **tributaries.** The land area in which runoff drains into a river and its tributaries is a **drainage basin.**

Lakes

Surface water does not always flow along a path. Some of it collects in depressions, or low areas. Water eventually fills the depressions, forming lakes. Even though some of the water evaporates, lakes continue to be fed by precipitation, runoff, springs, and rivers.

Self-Check

1. How does water move between the atmosphere and the oceans?
2. What is runoff?
3. What is a water table?
4. How can runoff in a mountain end up in the ocean 2,000 kilometers away?
5. What is a tributary?

SCIENCE IN YOUR LIFE

What is your water budget?

A water budget describes the amount of water coming in and going out of an area. By creating your own personal water budget, you can cut down on wasted water. Use the information in the table to find out how much water is used in your household in one week. Think of ways to save water to lower these numbers. Then try to set and keep a weekly limit on water use.

Average water use for one person (gallons)

Daily		Weekly	
Washing hands	0.5	Doing laundry (1 load)	30
Shower	20	Washing car	20
Bath	30	Watering lawn (30 min.)	240
Flushing toilet	1.5		
Brushing teeth	0.5		
Washing dishes	12		