IR-14: Vocabulary Prediction Chart

Before reading, I think it means . . .	Term	After reading, I know it means . . .	Visual cue to help me remember . . .
	water hemisphere		
	biosphere		
	salt water		
	freshwater		
	hydrologic cycle		

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Before reading, I think it means . . .	Term	After reading, I know it means . . .	Visual cue to help me remember . . .
	evaporate		
	precipitation		
	groundwater		
	aquifer		
	scarcity		

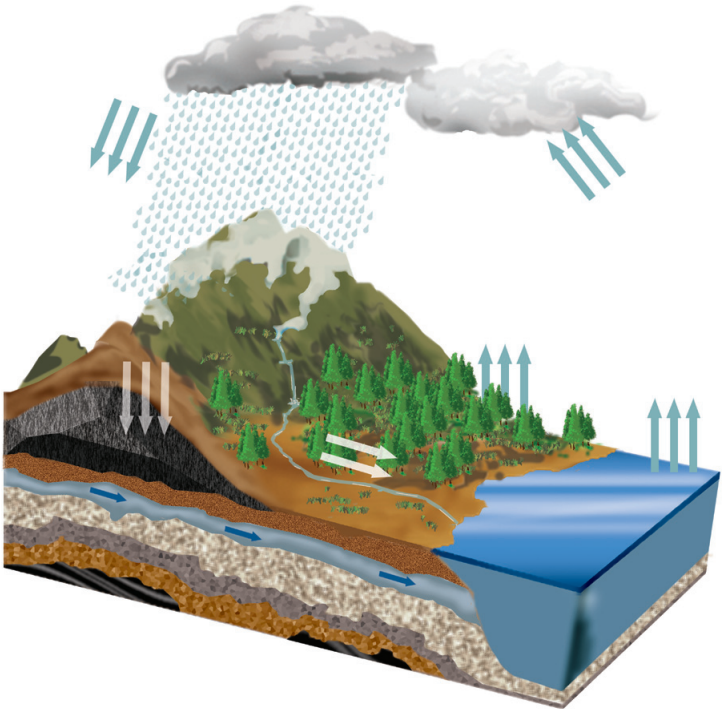
Water Hemisphere

There are two main components or fields of the study of Earth: the physical world and the human world. What specifically falls under the category of physical geography? Geographers use the terms *physical world or environment* when referring to what naturally occurs. Consider these questions: Do mountains occur naturally or are they the result of human actions? What about things such as climate, oceans, or erosion?

Another component to the study of geography is the interaction between human beings and the environment. In what ways has the physical environment affected human beings and their activities? In what ways have human beings adapted to the physical environment? In what ways have human beings modified the physical world around them? Because the spatial analysis of the human-environment interaction is critical to understanding geography, one must understand the physical systems of water, land formations, erosion and soil deposition, and climate.

The vast majority of Earth's surface is covered by water. The **water hemisphere** accounts for about 71% of Earth's surface. How do humans interact with water? Have you ever been swimming in the Gulf of Mexico, Caribbean Sea, or one of the oceans and felt your eyes sting? That sensation occurs because oceans, seas, gulfs, and bays contain salt water. The **biosphere**, the ecosystem that comprises all living organisms on Earth, needs water in order to survive. However, 97% all the water in the world is **salt water**, and human beings cannot use salt water to drink, cook, flush a toilet, or irrigate crops unless it is treated. Even with the advanced technology available to some groups of people today in the economically developed regions of the world, desalination is a very expensive activity and thus not a practical idea for the majority of people. Of the remaining 3% of water, which is considered to be **freshwater**, humans can only use 1%. The other 2% of water is unavailable to humans, or it is in a form humans cannot use, primarily in the polar regions and glaciers. The single largest accumulation of freshwater in the world is the Great Lakes of North America, which accounts for about 20% of all of Earth's freshwater. However, freshwater is considered one of the most important and valued commodities to the world's population, which is more than 7 billion.

An important process of the physical world is the **hydrologic cycle**. This is a physical process that is fueled by the energy of the Sun. Liquid water **evaporates** into a gaseous state, condenses in the upper atmosphere, cools, and returns to Earth's surface as **precipitation**, either as a liquid (rain) or solid (snow, hail, or sleet). The majority of rainwater accumulates on the surface of Earth in streams, rivers, and lakes and serves as a source of freshwater for Earth's flora and fauna.

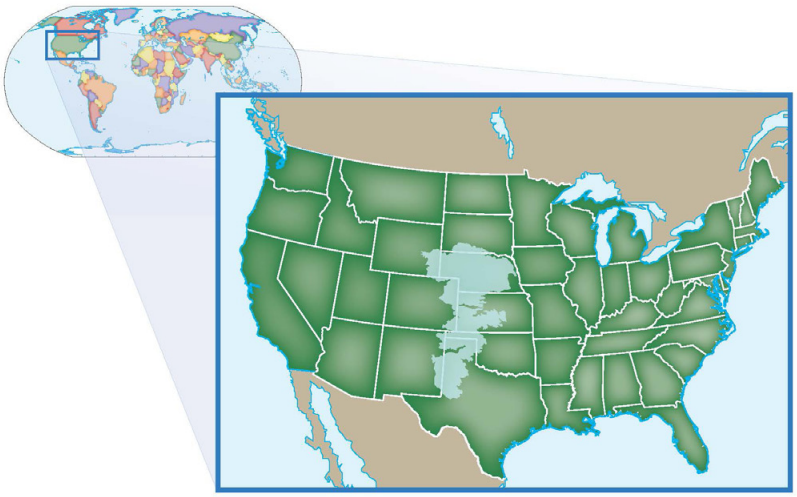


What are the potential problems if something human or natural causes interruptions to the hydrologic cycle?

Some of the precipitation may seep into the ground. **Groundwater** is freshwater that is held under the soil and in the pores of some rocks. This water is not exposed to the Sun's heat and thus does not evaporate. Large accumulations of groundwater make up an **aquifer**. The largest and best known aquifer in the United States is the Ogallala Aquifer, which stretches through eight different states from South Dakota to Texas. Humans can access this water and consume it as drinking water or use it to irrigate farmland.

Do you remember how much freshwater is available for human beings to consume? That's right, about 1% of all the water on Earth. That does not seem like very much, does it? Yet you may have an abundance of water in your neighborhood. You have access to water whenever you want it. When you get thirsty for a cold drink of water, you can just go to the water fountain or get a bottle of water out of the refrigerator. You use freshwater when you take a shower or bath, water the lawn, flush the toilet, or fill the swimming pool with water. What accounts for the discrepancy between the statistics, which indicate that there is a limited water supply, compared with our seemingly endless access to water?

Freshwater, like most other natural resources, is unevenly distributed across Earth. You can better understand this inequity when you recognize some physical geographic patterns and processes such as climate distribution, glaciation, and the hydrologic cycle. Because Americans and Canadians have access to the Ogallala Aquifer and the Great Lakes, it appears that there is an abundance of freshwater. In reality, however, there is a **scarcity** of freshwater, an insufficient amount to satisfy demand, in places like Latin America, northern Africa, the Middle East, and South Asia. Consequently, you can see that the quality of life in some of these regions is very poor, and in some cases, conflicts have arisen over who controls sources of freshwater. Because of its scarce supply, freshwater continues to be one of the most valuable commodities in the world.



What might be some of the consequences of the extended drought combined with overuse of the Ogallala Aquifer in the past few decades?

IR-16: Case Study—Southeastern Anatolia Project

One example of conflict over the control of freshwater occurred in Turkey with the Southeastern Anatolia Project. Begun officially in 1977, this endeavor attempted to construct 22 dams, 19 hydroelectric power plants, and an intricate irrigation system. When the project was completed in 2010, it was expected that Turkey would be able to irrigate nearly 20% of its irrigable land and produce about 22% of its total energy needs.

However, conflict has arisen over the control of the flow of freshwater of the Euphrates River. Syria and Iraq are downstream from Turkey, and they depend upon the freshwater from the Euphrates River. Turkey signed separate agreements with Syria and Iraq to allow a certain amount of water to flow downstream, but in January 1990, the Turkish military had to stand guard while 75% of the Euphrates was temporarily diverted so the Ataturk reservoir could be filled. There is no question about the economic and social benefits of the Southeastern Anatolia Project for Turkey, but grave concerns exist about its effect on Syria and Iraq. Strong international pressure is being placed on Turkey by the World Bank, which refused any loans to Turkey for the development of the Anatolia Project.