

The Water Cycle

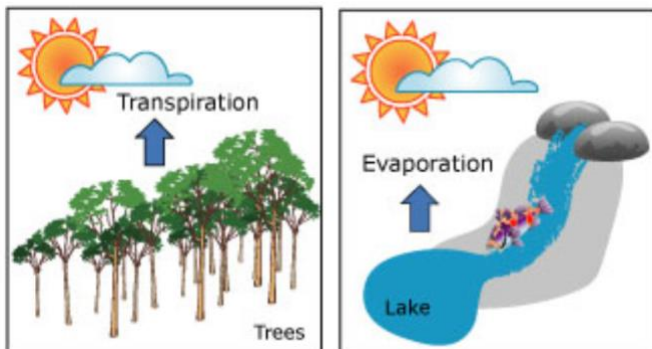
Real World Ecosystems
 Backgrounder
 Grade Level: 5-8



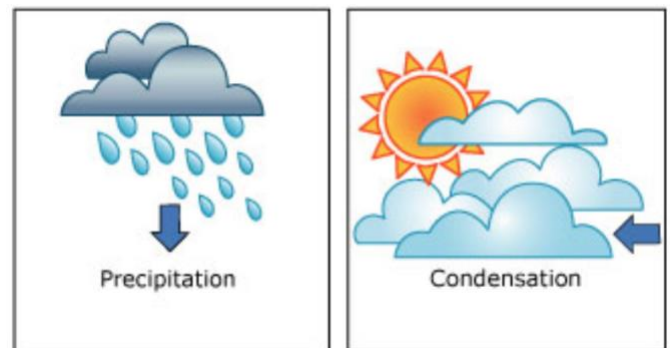
Water is one of the most important nutrients for living creatures. Water makes up anywhere from 70 to 95 per cent of the mass of most living organisms and is involved in just about every process and chemical reaction carried on by living cells. Having fresh water is one of the most important needs for **terrestrial** (any organism that lives on dry land) plants and animals.

Amazingly, the fresh water that is needed makes up less than 1 per cent of the amount of water found on Earth and much of that is locked up deep underground. The rest of the water on Earth is found as the salt water of the oceans or locked up in glaciers or the polar ice caps. Fortunately, the fresh water that we need to survive is constantly being renewed as water cycles between the Earth's surface and the **atmosphere** (The mixture of gases (air) that surrounds the Earth).

process in which a liquid changes from that form to its gaseous form. E.g. Water may become steam when it evaporates) from water and land surfaces with solar heating, and as the result of **transpiration** (The process in which living plants draw water through their roots to their leaves and release water vapour into the atmosphere) in which plants draw water up from their roots to their leaves. A smaller amount of water vapour is released by animals as they breathe.



Water enters the atmosphere through two main processes – as water vapour **evaporates** (The



Water returns to the Earth's surface as water vapour undergoes **condensation** (The process in which a substance changes from a gas to a liquid) forming clouds in the process, and **precipitates** (the action in which condensed water in clouds falls back to the Earth as rain, hail, sleet, or snow) out of the atmosphere as rain, snow or hail. Since the atmosphere is constantly moving, it is not likely that the water vapour will be returned to the same geographic location from which it came.

Of the water that returns to the Earth's surface, most will remain locked up as ice and snow. Of the remainder, some will form **surface runoff** and flow back into lakes or oceans, and some will seep into the soil. Of the water that seeps into the soil, some remains as soil moisture and will be withdrawn from the soil by plant transpiration, but the majority sinks downwards to form **groundwater** (Water held in porous rock layers deep beneath the ground) reservoirs called **aquifers** deep under the ground. This water may eventually seep back into the oceans, but very slowly. This water is available to us only if we dig or drill down to get it.

One of the major issues facing human populations is that supplies of fresh water are becoming more and more difficult to find. Many of the streams, rivers and lakes that make up the surface runoff are being affected by pollutants and present serious health issues for those people forced to use that water. In addition to withdrawing ground water from underground sources for human consumption, so much is being taken for agricultural and industrial use that those sources are being used up faster than they can be replaced. Finally, rainfall patterns are expected to shift as the effects of global warming become more apparent. One serious result would be decreasing rainfall in areas with large populations of humans, to increase the demand on already scarce amounts of fresh water.

Think About...

- Some scientists believe that climate change will decrease the amount of rainfall and deplete the ground water. What do you think could happen?
- When pollutant become a part of the water cycle, how does the pollution circulate in the water cycle?