

The Water Cycle

Hydrological Cycle

The hydrologic cycle is the process, powered by the sun's energy, which moves water between the oceans, the sky, and the land.

We can start our examination of the hydrologic cycle with the oceans, which hold over 97% of the planet's water. The sun causes evaporation of water on the surface of the ocean. The water vapour rises and condenses into tiny droplets which cling to dust particles. These droplets form clouds. Water vapour usually remains in the atmosphere for a short time, from a few hours to a few days until it turns into precipitation and falls to the earth as rain, snow, sleet, or hail.

Some precipitation falls onto the land and is absorbed (infiltration) or becomes surface runoff which gradually flows into gullies, streams, lakes, or rivers. Water in streams and rivers flows to the ocean, seeps into the ground, or evaporates back into the atmosphere.

Water in the soil can be absorbed by plants and is then transferred to the atmosphere by a process known as transpiration. Water from the soil is evaporated into the atmosphere. These processes are collectively known as evapo-transpiration.

Some water in the soil seeps downward into a zone of porous rock which contains groundwater. A permeable underground rock layer which is capable of storing, transmitting, and supplying significant amounts of water is known as an aquifer.

More precipitation than evaporation or evapotranspiration occurs over the land but most of the earth's evaporation (86%) and precipitation (78%) take place over the oceans.

The amount of precipitation and evaporation is balanced throughout the world. While specific areas of the earth have more precipitation and less evaporation than others, and the reverse is also true, on a global scale over a few year period, everything balances out.

The locations of the water on the earth is fascinating. You can see from the list below that very little water is among us in lakes, the soil and especially rivers.

World Water Supply by Location

Oceans	97.08%
Ice Sheets and Glaciers	1.99%
Ground Water	0.62%
Atmosphere	0.29%
Lakes (Fresh)	0.01%
Inland Seas and Salt Water Lakes	0.005%
Soil Moisture	0.004%
Rivers	0.001%

Only during the ice ages are there noticeable differences in the location of water storage on the earth. During these cold cycles, there is less water stored in the oceans and more in ice sheets and glaciers.

It can take an individual molecule of water from a few days to thousands of years to complete the hydrologic cycle from ocean to atmosphere to land to ocean again as it can be trapped in ice for a long time.

For scientists, five main processes are included in the hydrologic cycle: 1) condensation, 2) precipitation, 3) infiltration, 4) runoff, and 5) evapo-transpiration. The continuous circulation of water in the ocean, in the atmosphere, and on the land is fundamental to the availability of water on the planet.

