



Water falls to the ground as precipitation, then evaporates into the air, condenses to form clouds, and falls again. These are all parts of the water cycle.

What Makes Water Move?

Water is always on the move. In fact, water on Earth goes around and around in a cycle with no beginning and no end. This endless cycle is driven by many factors, including energy from sunlight and the force of gravity.

The water cycle doesn't really begin anywhere, but let's start by thinking of water in the soil. A process called transpiration moves water upward out of the soil and into the air. Through transpiration, plants suck up water from the soil with their roots. The water moves through a system of tubes inside the plants, from the roots upward into trunks, stems, branches, and leaves. The tallest trees carry water upward more than 100 meters (about 300 feet)! Once it reaches the leaves, the liquid water changes into a gas called water vapor. This is called evaporation.

Evaporation happens from the leaves of plants, but it also happens all over the surface of Earth. Water evaporates from the ocean, lakes, and other bodies of water, as well as from the surface of the soil. This part of the water cycle is powered by the sun: energy from sunlight causes water to evaporate from Earth's surface. Evaporation moves water upward into the atmosphere, in the form of vapor.

Another way that water vapor can form is through sublimation—turning directly from a solid into a gas. In Antarctica and other places where the weather is cold and dry, energy from sunlight can cause the top layer of snow and ice to sublimate, turning into water vapor. The snow and ice appear to vanish into the air, without melting first.

High in the atmosphere, water vapor from all of these different sources cools and condenses to form tiny droplets of liquid water. This process of condensation produces many clouds. However, not all clouds are made of liquid droplets. . . some clouds are actually made of solid ice crystals! When it gets cold enough, water can turn directly from a gas into a solid, without becoming a liquid in between. This process is called deposition, and clouds of tiny ice crystals can form this way. Deposition is also one way that snowflakes can form and grow: the delicate crystal structures of a snowflake take shape out of invisible water vapor, as if by magic.

Gravity powers the next part of the water cycle. Earth is always pulling the droplets and ice crystals that make up clouds downward with the force of gravity. When the droplets and crystals are tiny, the effect of that force isn't very strong and they stay suspended in the air. If the droplets or crystals begin to stick together and gain more mass, the force of gravity on them becomes strong enough to pull them down to the ground. These falling drops of water and ice

crystals are known as precipitation. Rain, snow, sleet, and hail are all types of precipitation.

The role of gravity in how and where water travels doesn't end when water leaves the clouds. When water hits the ground, some of it sinks right in through a process called infiltration. Infiltration is an effect of gravity—Earth is pulling the water down, forcing it between the particles of dirt and rock that make up the outer layer of Earth.

When the dirt and rock are full of water and can't hold any more, the water stops sinking in and begins to flow over the surface. This water flowing over the surface of the ground is called runoff. Again, gravity comes in. Earth pulls runoff downhill with the force of gravity. All that runoff flowing downhill tends to gather in certain low-lying areas and keep on flowing—that's how rivers form. All rivers flow downhill, sometimes for thousands of miles, until they reach the ocean. From the clouds to the ocean, gravity keeps water moving downward. Then transpiration and evaporation move it upward again, and the cycle continues on and on.



Gravity causes rivers to flow downhill, sometimes for thousands of miles, until they reach the ocean.