

## Lesson 8: Liquid Water & An Atmosphere

The water you drank this morning has been around for a very long time. The same water cycles endlessly around our planet, rising from the surface as invisible vapor, cooling into clouds, falling as rain or snow, flowing back to the sea. Scientists call this the **water cycle**, and it has been running for billions of years, moving the same water around and around our world. The drop on your tongue might once have watered a Jurassic fern, or been breathed out by a mammoth, or frozen in a glacier on a continent that no longer exists.

Early Earth had no liquid water at all. As the young planet cooled, volcanoes poured gases into the sky, including water vapor, nitrogen, and carbon dioxide, beginning to build an **atmosphere**. When Earth cooled enough, that vapor condensed and fell as rain. It rained for millions of years without stopping, until the first great **ocean** covered the planet. Some of Earth's water also arrived from space, carried inside icy comets and asteroids that pelted the early Earth. The ocean we swim in today is the ancient product of volcanoes, rain, and cosmic visitors.

The atmosphere does more than just hold rain. It wraps the planet like a blanket, trapping some of the Sun's heat through what is called the **greenhouse effect**. Without this natural warming, Earth's surface would average far below freezing, a world of permanent ice with no liquid water and no life. The early atmosphere had no oxygen, but it was warm enough to keep water liquid, and that made all the difference. **Evaporation** lifts water from the surface into the air. **Condensation** turns it back into liquid droplets that form clouds. Then **precipitation**, including rain, snow, and sleet, returns it to Earth. This cycle is what delivers fresh water to forests and meadows and mountain streams far from any ocean. Water and air working together created the conditions for life. In a very real sense, the water cycle is not just a feature of Earth. It is what makes Earth alive.