



the water cycle

“The water cycle is an essential backdrop to all life. It nourishes the land, sustains flora and fauna, allows food to grow and carries away wastes ...”

Would it surprise you to discover that the ice in your glass of lemonade was once a snowflake? How about if the tears in your eyes, were, long ago, drops in a pool where dinosaurs came to drink? Well, both are possible. Nearly all of the water on Earth is the same water that has been here since our oceans formed nearly four billion years ago. Each raindrop and snowflake that falls is on an endless path from the sky to the ground (or ocean) and back to the sky again. This loop is called the hydrologic cycle, or water cycle.

Each drop of water takes a unique path on its quest. For instance, if a drop falls into a river it might stay there for three weeks. If it touches down in a glacier, it could remain frozen for hundreds of years. If it sinks into the soil, the drop could be trapped underground for as long as forty thousand years. Eventually, though, all water that falls finds its way back up into the air to keep the cycle going.

T Strain Trueit, *The water cycle*, Franklin Watts, USA, 2002, pp. 7–8.

We can't create new water – we can only use what already exists. Day after day, year after year, millennium after millennium, Mother Nature has moved vast quantities of water around the planet. This movement of water is the essential backdrop to all life, including human existence. However, we humans tend to notice only the more obvious signs of this ongoing exchange, such as clouds and rain.

This is an awe-inspiring cycle. Chances are, however, that you learned little about it in your school days, or if you did, you may be a bit rusty on it! It's worth reminding ourselves of its fundamentals.

All life functions against the backdrop of a continuous water cycle. The evaporation of water is the central feature of this cycle. Without evaporation there would be no rain. Water is continuously evaporating from all surfaces – from oceans, rivers and lakes, and from the land, vegetation and every breath

that every animal expires. This evaporated water passes into the atmosphere and forms moisture in the cooler layers of air. The moisture gathers to form clouds which are carried around the Earth by wind currents.

Under the right conditions these clouds release their moisture as rain, hail or snow. When this falls onto the land, much of it seeps into the soil. Some of it is taken up again by vegetation, some filters down into underground aquifers and the surplus flows as surface water into rivers, lakes and streams.

The seemingly endless quality of this cycle is deceptive. Superficially, it looks as though the supply of fresh water should be abundant. The reality is very different, however. Rising average temperatures mean that, in many places, less water vapour forms into rain. At the same time, the burgeoning global population is placing ever-increasing demands on the planet's reserves of fresh water.

THE BIG PICTURE the water cycle

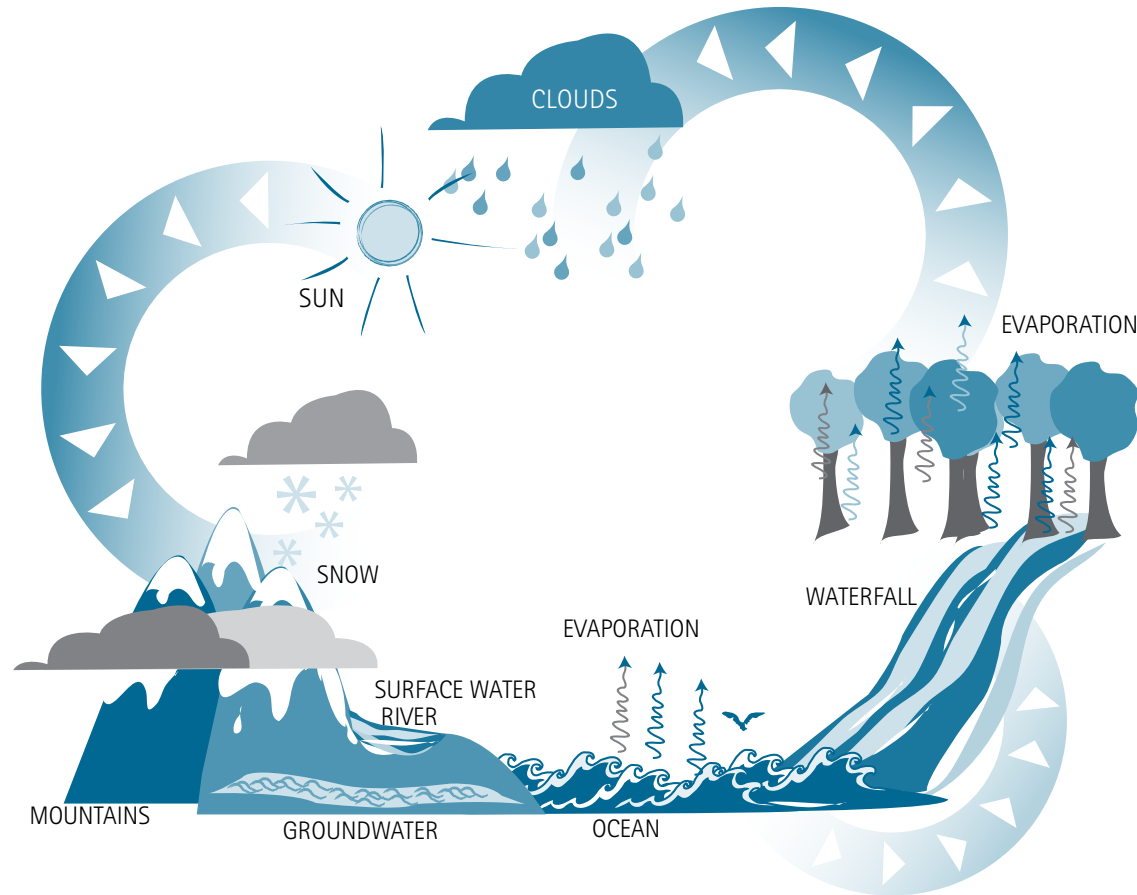


Figure 1. The basic water cycle

This diagram neatly illustrates the idea of the water cycle as a closed system, i.e. the total amount of water remains constant. It shows how, under varying conditions, this water is presented as liquid water, water vapour or snow and ice.

From our point of view, a particularly important section of this water cycle is where rain falls onto land. Rain first seeps into the soil and some of it becomes groundwater. Once the soil is saturated, some water flows across the land as surface water which enters streams that flow into rivers and lakes. In many places, surface water and groundwater are interconnected. The particular importance of this part of the water cycle is that it lies squarely within our capacity to manage it properly.

Source: The Watermark Team, 2007.

The biggest learning for me, arising from the first few sessions, is that the supply of water is based upon a closed system. No matter how much we try to do things differently – build new reservoirs, recycle water, desalinate – we cannot expand that closed system. The people in our *Watermark* group, and most of the people I have spoken to about this since, had (like me) never really thought about the implications of this truth.

Peter, Wet Williams Melbourne CBD *Watermark* group, May 2006

Some useful sources

- TS Trueit, *The water cycle*, Franklin Watts, USA, 2002.
- S Postel & A Vickers, *State of the world*, Worldwatch Institute, Washington, 2004.