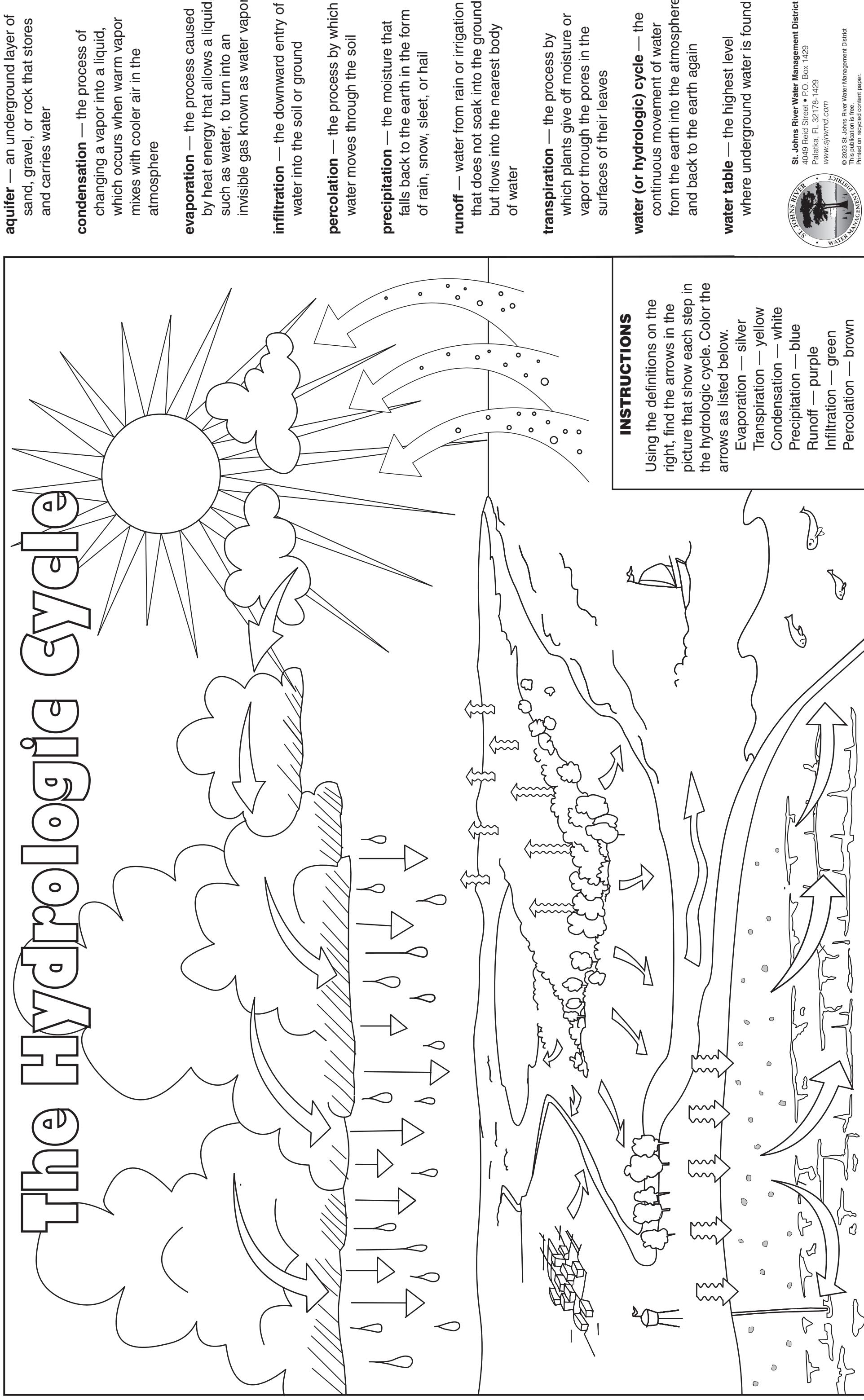


# The Hydrologic Cycle



## INSTRUCTIONS

Using the definitions on the right, find the arrows in the picture that show each step in the hydrologic cycle. Color the arrows as listed below.

- Evaporation — silver
- Transpiration — yellow
- Condensation — white
- Precipitation — blue
- Runoff — purple
- Infiltration — green
- Percolation — brown

**aquifer** — an underground layer of sand, gravel, or rock that stores and carries water

**condensation** — the process of changing a vapor into a liquid, which occurs when warm vapor mixes with cooler air in the atmosphere

**evaporation** — the process caused by heat energy that allows a liquid, such as water, to turn into an invisible gas known as water vapor

**infiltration** — the downward entry of water into the soil or ground

**percolation** — the process by which water moves through the soil

**precipitation** — the moisture that falls back to the earth in the form of rain, snow, sleet, or hail

**runoff** — water from rain or irrigation that does not soak into the ground, but flows into the nearest body of water

**transpiration** — the process by which plants give off moisture or vapor through the pores in the surfaces of their leaves

**water (or hydrologic) cycle** — the continuous movement of water from the earth into the atmosphere and back to the earth again

**water table** — the highest level where underground water is found

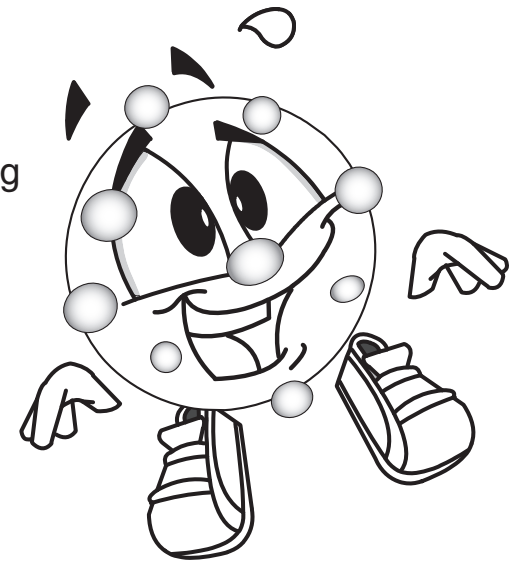


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# Adventures in the Water Cycle

The water cycle, also known as the hydrologic cycle, is the cycling and recycling of water through the biosphere. That means that all of the water that has been on Earth for perhaps billions of years is continuously circulating through the atmosphere, the land and the ocean.



Water enters the atmosphere by a process known as **evaporation**.

Evaporation is the change of liquid water into a vapor. Sunlight aids this process as it raises the temperature of liquid water in oceans, lakes, and other water bodies. As the liquid heats, molecules are released and change into a gas.

Along with these water molecules are tiny particles called condensation nuclei. These particles might be little pieces of salt left over after seawater evaporates, or a particle of dust or smoke. When the warm air rises up into the atmosphere as water vapor and meets cold air, the vapor condenses, collecting on the small particles. The process known as condensation occurs when the water vapor wraps itself around the tiny particles. Each particle (surrounded by water) becomes a tiny droplet between 0.0001 and 0.005 centimeter in diameter.



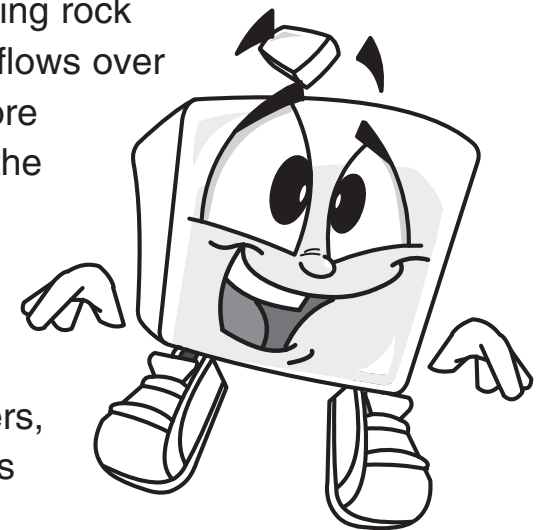
Once the water droplets are formed, they begin to flow freely within the swirling winds from the atmosphere and form clouds. As the movement of the waterdrops within the cloud occurs, the smaller drops bond with the larger drops, rapidly increasing their size.

As the droplets get larger, they become too heavy for the cloud and begin to fall back to the Earth as **precipitation**. The waterdrops continue to bond with other drops and grow as they fall. When the growing drop reaches the size of 0.5 millimeters in diameter or bigger, it becomes a raindrop. Raindrops that become larger than 4 millimeters will usually split into two separate drops.

The raindrop will continue falling until it reaches the ground. As it falls, sometimes a gust of wind will force the drop back up into the cloud where it continues bumping into other droplets and getting bigger. When the drops finally reach the ground, the biggest drops will be the ones that bumped into and coalesced with the most droplets. The smaller drops are the ones that didn't run into as many droplets. Raindrops are different sizes for two primary reasons. The first is the initial differences in the particle size that the water molecule as a vapor wrapped itself around. The second reason is the difference in the rates of coalescence or the number of bumps made by the drops.

As precipitation occurs, some water is absorbed by vegetation or evaporates before it reaches the ground. Some evaporates after it reaches the surface. Some soaks into the ground and is taken up by the roots of plants and then released back into the air through the leaves of the plants in a process called **transpiration**. Some rain soaks beneath the **water table** into underground units of water-bearing rock called **aquifers**. Some of the water becomes surface or stormwater runoff that flows over the ground to wetlands, lakes, ponds, rivers, and oceans. The remainder — more than 2.5 trillion gallons — returns to the atmosphere through evaporation, and the process begins again.

At any given time, just 0.005 percent of the world's total water supply is moving through the hydrologic cycle. Once a drop of water returns to Earth as precipitation, it can spend thousands and thousands of years either in glaciers, underground, or in other bodies of water such as oceans. Every drop of water is part of the hydrologic cycle — an essential part of life on our planet.



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