



## Water Cycle Reading and Writing

*Students will practice English language arts skills by listening to or reading a story about the water cycle and then writing a similar tale.*

**Objectives:** Students will respond to the story in ways that require:

- reading, listening, and writing for information and understanding;
- reading, listening, and writing for literary response and expression;
- understanding that the water is recycled by natural processes including evaporation, condensation, precipitation, and runoff;
- understanding that matter, including water, is made up of particles whose properties determine its observable characteristics.

**Grade level:** Elementary (Grades 3-5)

**Subject Areas:** English Language Arts, Science

**New York State Learning Standards:**

English Language Arts Standards 1, 2

Mathematics, Science, & Technology Standard 4

**Skills:**

- Read and listen to acquire facts and ideas from texts.
- Gather and organize information about environmental phenomena.
- Write to interpret, apply, and transmit information.
- Write for literary response and expression.

**Duration:**

Preparation time: 5 minutes

Activity time: 15 minutes for reading; 30-45 minutes for writing

**Materials:** Each student should have:

- Sheets of lined paper
- Pencil or pen

## Background:

The water cycle describes the continuous circulation of water from water bodies and the land to the sky and back again. It is truly a cycle; there is no beginning or end. Water can change states—become a gas, liquid, or solid—at various places in the cycle.

The water cycle is powered by solar energy and gravity. Water evaporates into the atmosphere as water vapor. This gas then condenses into droplets that gravity pulls down to earth as precipitation and downhill back to the oceans as runoff. Some precipitation infiltrates the ground and becomes groundwater. It may stay there for millions of years, or bubble up in springs, or be taken up by plants and released back to the air through transpiration from their leaves. Water may also be frozen for centuries in snowpacks or glaciers before melting and rejoining the cycle.

There is about as much water on earth today as there was in the time of the dinosaurs. The water you drink today could have been in a waterhole used by dinosaurs, or frozen in the great glaciers that covered the Hudson Valley 20,000 years ago.

## Activity:

1. Introduce the lesson by telling students they will take a journey with Walter the water molecule. They will frolic in the ocean, float into the atmosphere, splash down on tree tops, slip between the leaves on the forest floor, and rush over waterfalls.
2. Read the story aloud. Point out how Walter's adventures relate to the water cycle. Use attached diagram and water cycle vocabulary if appropriate to grade level.
3. Have students write their own stories about Walter's further adventures in the water cycle (see introduction to the assignment at the end of the reading). Specify a length depending on the abilities of the students.

## Assessment:

- Collect and review students' stories or have the stories read aloud to the class.
- Have students identify the states of water that they encounter daily (liquid in puddles; water vapor from your breath; ice in ice cubes).
- Ask students to identify water cycle processes that Walter experienced.

## Resources:

- Berger, Melvin and Gilda. *Water, Water Everywhere*. A Discovery Readers Book: Ideals Children's Books, Nashville: 2003. Appropriate for ages 5-9.
- Locker, Thomas. *Water Dance*. Voyager Books, NY: 2002. Appropriate for ages 4-8.
- McKinney, Barbara. *A Drop Around the World*. Dawn Publications, Nevada City, California: 1998. Appropriate for ages 4-8.
- *River of Words* is an annual international poetry and art contest for K-12 students on the theme of watersheds. Visit their website, [www.riverofwords.org](http://www.riverofwords.org), for more information about the contest and an interdisciplinary watersheds curriculum guide.
- In the Hudson Valley, NYSDEC's Stony Kill Farm Environmental Education Center offers *River of Words* watershed poetry lessons for grades 3-12 as well as Project WET teacher trainings. Email [skfarm@gw.dec.state.ny.us](mailto:skfarm@gw.dec.state.ny.us) or call 845-831-8780.

## Vocabulary from Walter the Water Molecule Story:

**brook:** a small stream

**creek:** a stream of water usually smaller than a river

**crest:** a peak, highest part, or topmost edge

**current:** movement of water

**drift:** to move along without effort

**erode:** to wear away by or as if by the action of water, wind, or glacial ice

**exhale:** to breathe out

**fin:** a thin extension of a water-living animal's body, used in guiding its movement

**horizon:** the line where the earth or sea seems to meet the sky

**lull:** to cause to sleep or rest

**molecule:** the smallest particle of a substance that has all the characteristics of the substance

**particle:** a very small piece

**river:** a natural stream of water larger than a brook or creek

**scales:** small flat plates that form an outer covering on the body of some animals

**seawater:** water in the ocean that contains salt

**spout:** a hole that shoots liquid out with force

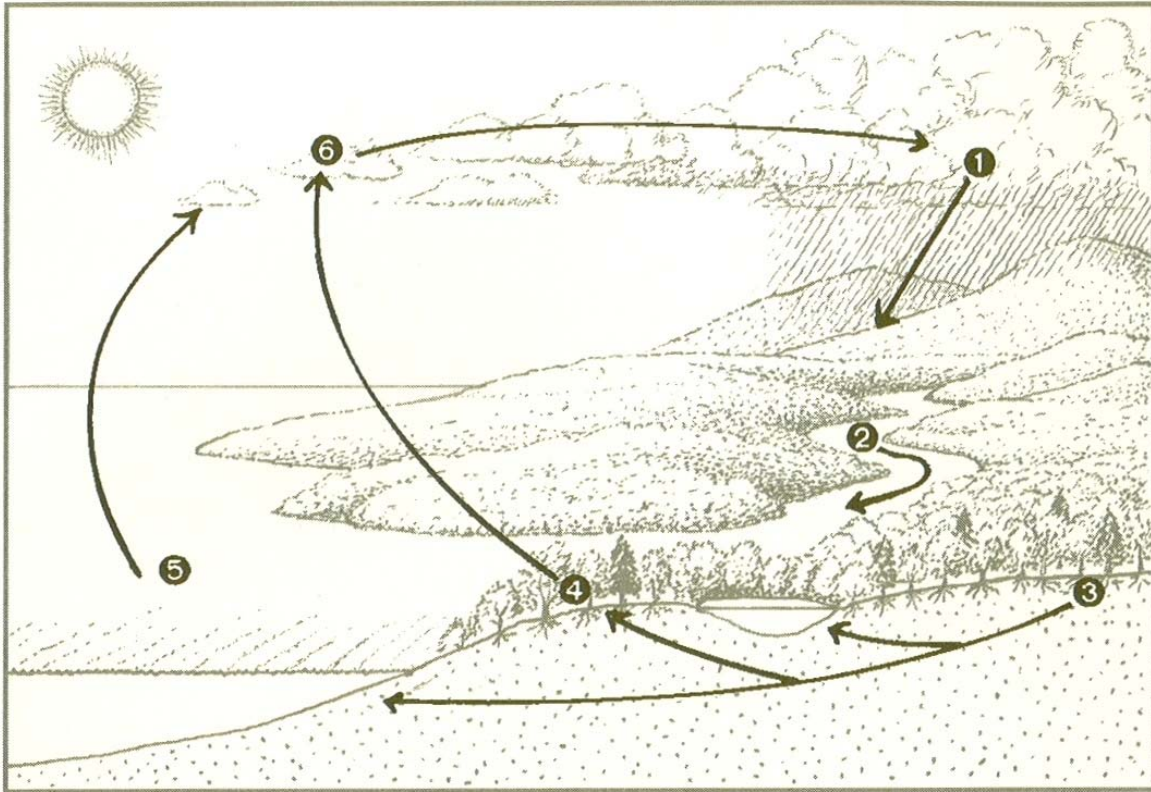
**stream:** a small body of running water

**tides:** the alternate rising and falling of the surface of the ocean

**valley:** an area of lowland between ranges of hills or mountains

**whirlpool:** water moving rapidly in a circle

# The Water Cycle



In this illustration of the water cycle, **precipitation** falls to earth (1) and enters streams flowing seaward as **runoff** (2) or **infiltrates** into the ground (3). **Groundwater** feeds streams and lakes and is taken up by plants (4), from which it **transpires** into the atmosphere as water vapor. **Evaporation** from the sea (5) and other surface waters also supplies water vapor to the atmosphere. There, the vapor **condenses** to form clouds (6) and eventually falls to earth again as precipitation.

Illustration from Stanne et al, *The Hudson: An Illustrated Guide to the Living River*, used by permission of Hudson River Sloop Clearwater.

**condense:** to change from a gas to a liquid state of matter

**evaporate:** to change from a liquid to a gas

**groundwater:** water present in soil and rock underground

**infiltrate:** to enter [ground] by moving into spaces between particles

**precipitation:** water falling from the sky as rain, snow, hail, or sleet

**runoff:** water, from rain or melting snow, that flows over the ground

**transpire:** to give off vapor through the outer covering of a living thing

# Walter the Water Molecule

## Take a Journey Through the Water Cycle



Walter is having a blast, dancing on the surface of the Atlantic Ocean in the bright sun. Waves bounce him against zillions of other water **molecules** like himself, not to mention all the salt molecules in **seawater**. As he reaches the **crest** of a wave, a gust of wind carries Walter and his buddies off in a drop of spray. They shriek wildly as the drop whips through the air to land "Plop!" back in the water.

Walter reaches the peak of another wave. "Hang on! Here we go again!" But this time the water molecules don't hang together. The warm sunlight gives them a boost of energy, and each goes flying off like a balloon set loose. Walter is now part of a wild party of molecules in the air—oxygen, carbon dioxide, nitrogen, and other water molecules—rising higher and higher into the atmosphere.

The winds take Walter to the west. Floating in the sky, Walter looks down at a beach, where the waves he rode a while ago pound against the sand. He is way up now, far above towns, ballfields, and roads. Looking ahead, he can see a range of mountains approaching—the Catskills, overlooking a broad **river valley**.

The winds carry Walter higher as they reach the Catskills. It is getting colder now, and Walter and his buddies have lost some of the energy they had earlier. He and a few others rest against a **particle** of dust floating

nearby. Other water molecules are doing the same thing nearby, forming tiny drops of water around the dust particles. Looking down, Walter sees that the crowd of tiny water drops around him is casting a shadow on the treetops below. It has become a cloud.

More water molecules pile on to Walter's drop, making it bigger and heavier. The wind can't keep it up anymore. The drop starts falling, faster and faster. Walter waves to other molecules in the air as he zips past, his raindrop racing other drops as they fall towards the ground. He reaches out to tap the leaves of trees just before—splat!—his raindrop hits the ground and splashes into smaller droplets.

The droplets bounce and settle back down. Some slip between the leaves on the forest floor and into the soil beneath, off to explore underground. Walter's droplet combines with others running downhill in tiny **streams**. These meet to form larger **brooks**, sliding down the slopes into still bigger **creeks**. As Walter's creek flows over a large flat rock, it starts to pick up speed. Suddenly Walter is falling again, deafened by the roar of the creek pouring into the pool at the base of a waterfall. A few minutes later, he plunges over another cliff, the second drop in the Kaaterskill Falls, 260 feet tall.



Rushing onward, Walter enters the Kaaterskill Creek in the Kaaterskill Clove, a steep valley that the creek has **eroded** in the mountainside. For Walter, it is as wild a time as he had on the ocean's waves. He rides rapids, spins in **whirlpools**, and nearly flies into the air again from the foam under another waterfall. But soon the creek reaches flat land at the foot of the Catskills and slows down. Walter relaxes, wondering what lies ahead as the Kaaterskill Creek joins the Catskill Creek.

**Lulled** by the lazy **current**, Walter is about to take a nap when a large dark shadow looms up before him. Next thing he knows, Walter is sucked into the gaping mouth of a fish—a big carp. Before he has time to blink, Walter is pushed past the carp's red **gills** and back into the creek. Three feet of golden **scales** and **fins** slip by as the great fish swims on.

The Catskill Creek takes Walter to the Hudson **River**, and he notices that the Hudson behaves oddly for a river. Its current keeps reversing direction. Twice each day it flows back towards the mountains. At the same time, the river level rises and falls—rising as the current flows towards the mountains, falling as it flows the other way. Walter realizes that this is the motion of the **tides**—the same tides he felt out in the ocean. He also sees fish that he remembers from the sea, like striped bass. “But where are all the salt molecules?” he asks himself. “There are only a few here.”

It takes time to answer this question. **Drifting** south for six hours, then north for the next six hours, Walter doesn't seem to be going anywhere. But as days pass, he notices that he always drifts further going south than he does going north. Eventually, at a place where steep mountains crowd up against the river, he starts to see more salt molecules. Their number increases each day as he drifts further south towards the Atlantic Ocean. Reaching a great city, with tall buildings lining the river's shores, Walter knows the ocean isn't far away. He can't believe that seahorses and flounder are now swimming past him.

Sure enough, in a few more days land is far behind. The tall buildings disappear over the **horizon**. Walter is back among ocean waves, sparkling in the bright sun. He is just starting to wonder what his next adventure might be when a huge shape appears under him. It's bigger—much, much bigger—than the carp in Catskill Creek. Just as Walter realizes he's on top of a whale, the great animal **exhales**. Its **spout** blasts him upwards, and he finds himself floating in the air again. But this time, the wind is blowing him east, heading out over the Atlantic. “Maybe I'll make it to Europe,” Walter says to himself, settling in for the ride.

*Walter has had many adventures. You have heard only a few of them here. He has been sucked up by tree roots and pulled high into the tips of tall trees. He's journeyed from reservoirs to kitchen sinks, and through thirsty fifth graders. He's been underground, flowing through tiny cracks in bedrock and then bubbling up in springs. He's been frozen in glacial ice for thousands of years (Brrr and Bor-ing!).*

*Your assignment is to write a story describing more of Walter's adventures. You may continue from where this story left off, or write a completely separate tale.*