

# THE CLEAN WATER TEAM'S WATER CYCLE IN A BAG



## DESCRIPTION:

Students will draw out the water cycle to understand how water travels in a cycle. Students will identify each stage of the water cycle and identify what happens when the water cycle project is placed in the sun.

## OBJECTIVE:

Students will learn how energy from the sun changes the form and location of water while it distributes heat around the Earth.

## RECOMMENDED AUDIENCE AND SETTING:

This activity is suited for students in grades third through fifth. It can be performed indoors or outdoors.

## MATERIALS:

- Plastic zipper bags (gallon size preferred)
- Markers in a variety of colors.
  - Permanent markers are preferred. Solid markers will work, but as the plastic bag warms the coloring may flake off. Highlighter markers will write on the plastic zipper bag, however, the images will not be as strongly colored.
- Jug of water (and blue food coloring).
  - In a jug of water, place a few drops of blue dye or food coloring in it.  
(Optional)
- Masking tape (Painter's tape may become detached from the window as it warms.)
- A place to hang the finished project like a sunny window. If outside, the project can be suspended from a clothesline, a simple A- frame, or taped to a sunny wall.

- Cleaner (optional) to remove any tape residue from the window if it should appear after removing the masking tape (soapy water, rubbing alcohol; Goo Gone, WD-40 or similar products).

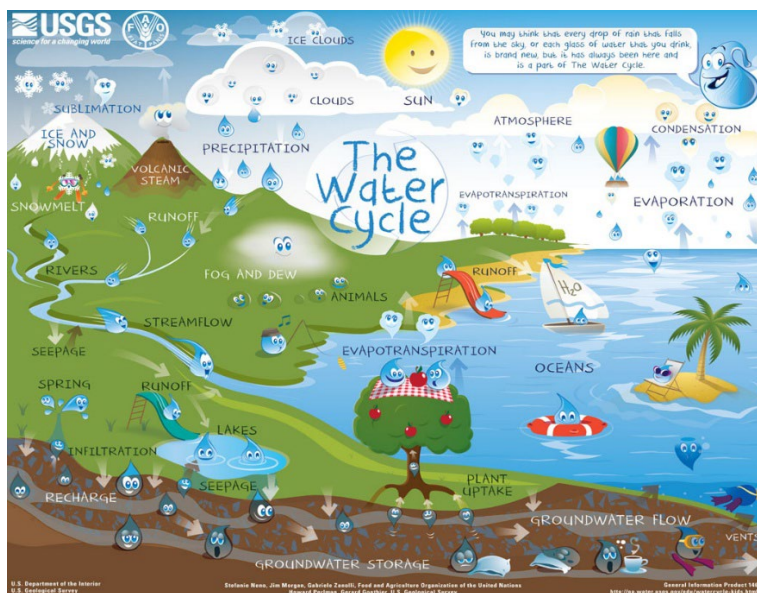
## OVERVIEW:

In this exercise a plastic zipper bag is used to represent our planet. Just like on Earth, the amount of water it has is limited. Like the water on Earth, the water in the plastic zipper bag is subject to the sun's energy and the force of gravity.

As the teacher discusses parts of the water cycle, students can draw on the plastic zipper bag each of the various water cycle states. After the plastic zipper bag has been written and drawn on, it will be hung with tape in a sunny window where students can track hourly the water's path through the water cycle.

## THE WATER CYCLE DISCUSSION:

Place an emphasis on the different parts of the water cycle including: precipitation (rain, snow), percolation (groundwater), runoff (streams, rivers), collection (lakes, seas, oceans), transpiration, evaporation, and condensation.



**Image 1 - Interactive Water Cycle Diagram for Kids – Advanced (USGS)**

<https://water.usgs.gov/edu/watercycle-kids-adv.html>

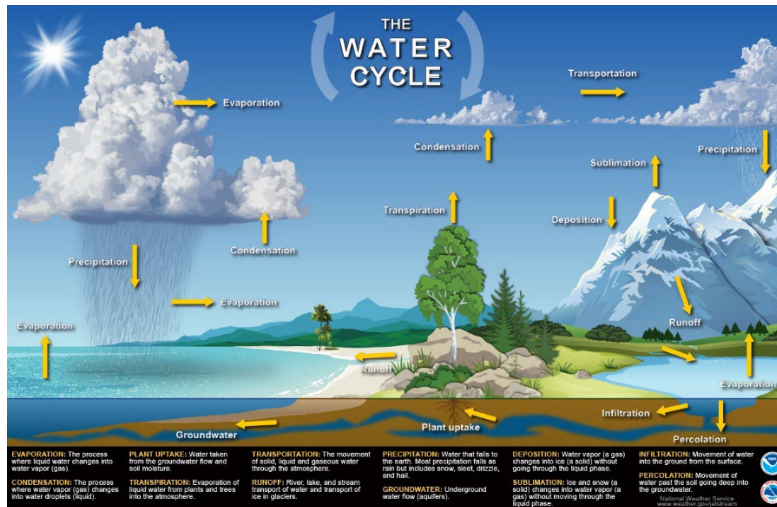


Image 2 - Water Cycle (NOAA)

<https://www.noaa.gov/education/resource-collections/freshwater/water-cycle>

### What are the three forms of water?"

Water can be a solid, liquid, or gas.

- Solid forms of water: Hail, snow, sleet, and ice.
- Liquid forms of water: Rain and dew.
- Gas form of water: Water vapor (humidity, clouds, fog)

### What is the water cycle?

- The water cycle describes the continuous movement of water within the Earth and atmosphere through the three phases of water.

### Where does the water cycle start?

The water cycle really has no real starting point or ending point, so you could start at any point within the cycle.

### What powers the water cycle?

The sun is the primary driver of the water cycle. The sun's energy causes liquid water to evaporate into water vapor. Evaporation and transpiration (together called evapotranspiration) are the main ways water moves into the atmosphere from the land and water surfaces. Gravity causes water to flow downward on land or even into soils. Gravity also causes rain, snow, and hail to fall from clouds.

## What are the 7 stages of the water cycle?

- **Collection:** Collection is the part of the water cycle where water is temporarily collected and stored, like in lakes and oceans.
  - Students can draw an ocean at the bottom of their plastic zipper bag.
- **Evaporation:** Evaporation is when the sun heats up water in rivers or lakes or the ocean and turns it into vapor.
  - Students can draw a sun in a top corner of the plastic zipper bag and draw marks of water evaporation leaving the ocean and going upwards.
- **Condensation:** Rising air currents move water vapor from evaporation and transpiration into the atmosphere where cooler temperatures cause it to condense and form clouds.
  - Students can draw clouds at the top of the plastic zipper bag.
- **Transpiration:** Transpiration is the process of water movement through a plant and its evaporation from plant parts, such as leaves, stems and flowers.
  - Students can draw a tree and marks of water transpiration leaving the tree and going upwards.
- **Precipitation:** Precipitation occurs when water vapor has condensed into clouds so much that the air cannot contain it anymore. This water falls from the clouds back to the earth in the form of rain, hail, sleet or snow.
  - Students can draw marks of precipitation falling onto the land surface and snow-covered mountains.
- **Runoff:** Surface runoff is the flow of water over the ground surface, in. It occurs when excess rainwater, stormwater, meltwater, or other sources, can no longer infiltrate into the soil.
  - Students can draw marks of water flowing down the mountains and into rivers and the ocean.
- **Percolation (Infiltration):** Snowmelt and rain can seep into ground and percolate through the soil into underlying aquifers. Even though groundwater is unseen, it is moving below the surface and can supply flow to rivers and streams.
  - Students can draw rocky soil and water flowing through the crevices in between the rocks.

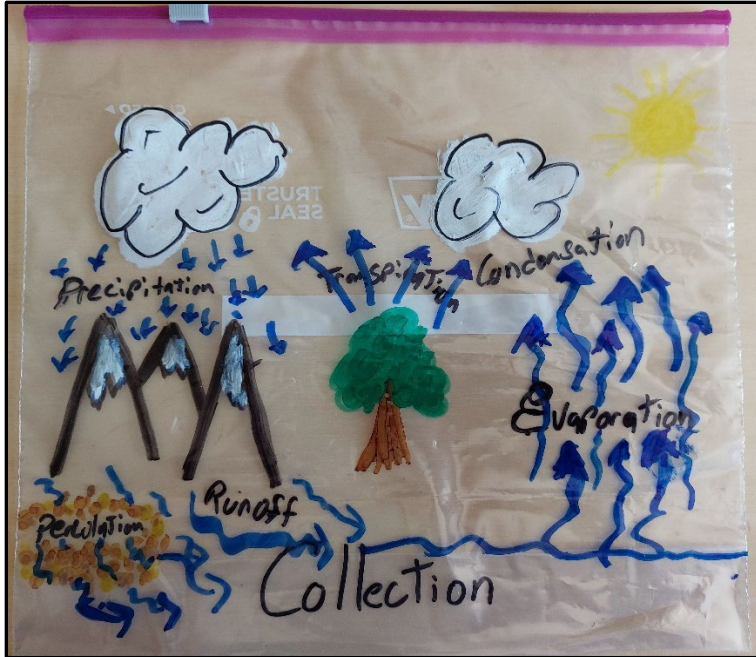


Photo 1 – Water Cycle Elements Drawn on a Zipper Plastic Bag

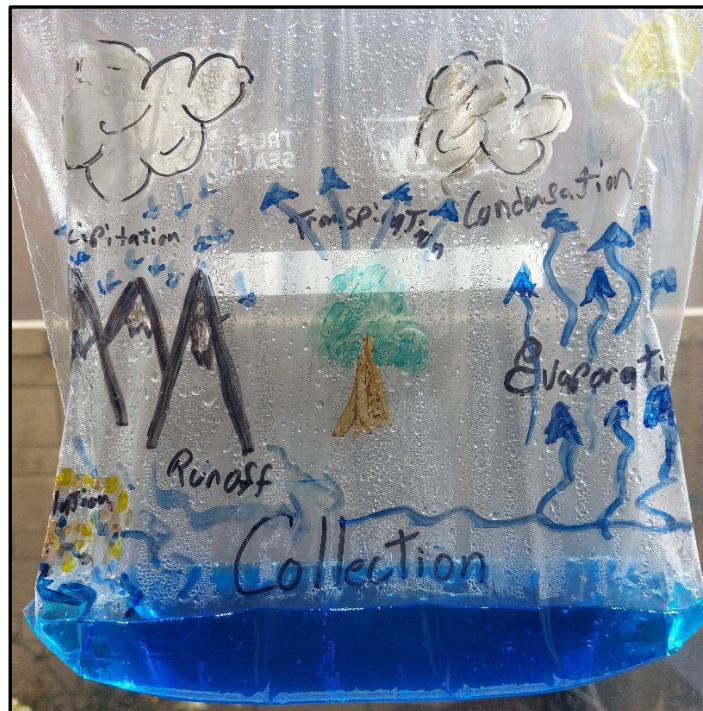


Photo 2 – Water Cycle Elements Drawn on a Zipper Plastic Bag with Water (Earth)

Hanging in a South Facing Sunny Window

## PROCEDURE:

1. Have your students draw the water cycle elements on their plastic zipper bags.
  2. Pour 1 cup of water into the bag and seal it tight so it does not spill.
  3. Place the bag on a sunny window or wall using the masking tape. Heat from the sun will start the condensation process (water will start to accumulate along the inside of the bag).
  4. Students should examine their “Earth” each hour to observe and record what they see throughout the day as the window warms and cools. You can also make this a longer experiment by having your students create an observational log that spans several days. You may also have the students place an “Earth” in a sunny window and another in a shady window and they can track the differences that they observe between the two.
  5. Observations and questions for the class (examples):
    - a. Ask yourself: What did I see? What did I notice? What did I observe?
    - b. Does the bag look the same each time you observe it?
    - c. What was the weather like when you were making your observations?
    - d. What caused water droplets to form inside the bag?
    - e. What would happen if we had moved the bag placed it in a shaded window?
    - f. How do you think the outside temperature impacts the experiment?
    - g. How does this project represent the water cycle on our planet?
  6. Cleanup
    - a. Drain the water from the bags into the sink.
    - b. If the plastic zipper bag is labeled #2 or #4, you can place it in a recycle bin, just make sure each bag is dry.
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[https://www.waterboards.ca.gov/water\\_issues/programs/swamp/clean\\_water\\_team/](https://www.waterboards.ca.gov/water_issues/programs/swamp/clean_water_team/)