



Water Cycle Stories

Objective:

- Students will make critical observations.
- Predict and create stories about the different phases of the water cycle.

Grades: 6-12

Time: 2 class sessions

Background:

The energy that causes the phase changes in the water cycle comes from the sun. The sun is what drives weather patterns, the movement of water around the globe, and the resulting erosion that shapes our landscape. Water changes phase and moves around, it cannot be created nor destroyed. The water that exists on the planet today is OLD. At one time, the water molecules you drank this morning were once in the oceans when the Earth first formed and perhaps even were drunk by a dinosaur.

Pictures from www.supercoloring.com

Problems to Solve:

- Can I create a story by applying my background knowledge about the water cycle?
- Can I use my new knowledge of the water cycle to predict future changes to the Earth made by water?

Materials:

- Glass
- Different phases of the water cycle
- Sandwich sized zip lock bags
- Ice

DAY ONE:

Procedures:

Step 1. Pass out bags, sample cups and ice cubes. Place the ice cube in the sample cup and then place the whole thing in the Ziplock bag. Make sure there is a good quantity of air in the bags before sealing them so that any condensation that accumulates may be observed. Make sure the bags are tightly sealed.

Step 2. Have each student measure the mass of their bag and record that measurement in their lab notebook before taping the bag to the window or wall. Make sure the sample cup is right-side-up with the ice inside.

Fill out this table either as a class or have students complete this:

Predict: What will happen to the weight of the bag as the ice turns to water and then turns to water vapor? Draw a series of pictures with captions showing the plastic bag now, in two hours and tomorrow.

<u>NOW</u>	<u>TWO HOURS</u>	<u>NEXT DAY</u>

Step 3. The following day, make some observations of the bags before taking them down. The ice should have melted and some condensation will have appeared on the sides of the bag and run down the sides of the bag to collect below the cup. Take the bags down and remove any tape. Measure the mass of the bags and compare the measurement to the previous day.

<i>Phase</i>	<i>Day one (gms)</i>	<i>Phase</i>	<i>Day two (gms)</i>
Ice (solid)			

Analysis of mini-lab

1. Did anything surprise you?
2. Did everything happen according to your predictions?
3. Flow directly into the Water Cycle discussion below.

DAY TWO:

Procedures:

Step 1. Begin by setting the glass of ice water on the table at the front of the room.

Questions:

What is happening to the ice?

What is happening on the outside of the glass?

Why are these things happening?

Step 2. Invite nine volunteers to come to the front of the room. Each student represents one molecule of water. Have them stand closely together in 3 rows of 3 students and interlock arms. They now represent water in its solid form – ice. Tell them that they are cold. They may shiver and vibrate a little but should remain bound together.

Step 3. Now tell them you have placed the glass of water in a sunny window and the molecules of water in the ice cube have begun to get energized. They can now move around but should stay together in a cluster. They have melted and become liquid water. They should naturally unlink their arms and perhaps might join hands. Allow them to “flow” around the room and use that to illustrate the fluid motion of liquids.

Step 4. Now tell them that the sun has become really warm and they are very very excited and can move about freely. The cluster of 9 will soon disperse about the room, probably colliding with desks, other students and the walls of the room. You may need to have the water molecules “freeze” temporarily in order for your explanation to be heard by the students. They have evaporated and now represent water as a gas – water vapor or steam.

Step 5. Finally, tell them that the sun has set and it is beginning to become cold. When they collide with another water molecule, they should “stick together for warmth”. Soon all the water molecules will form a liquid again. They have now condensed back onto a liquid. You may take things all the way back to the beginning again and tell the molecules to freeze solid by linking arms once again.

Step 6. Thank your water molecules and have them return to their seats.

Observations:

Review the process of phase change that they observed, noting the way that temperature changed the behavior of the molecules.

Step 7. Give students the handout and turn on the overhead projector with the water cycle drawing.

Step 8. Invite students to name places on or around the planet where water can be found in any of its forms.

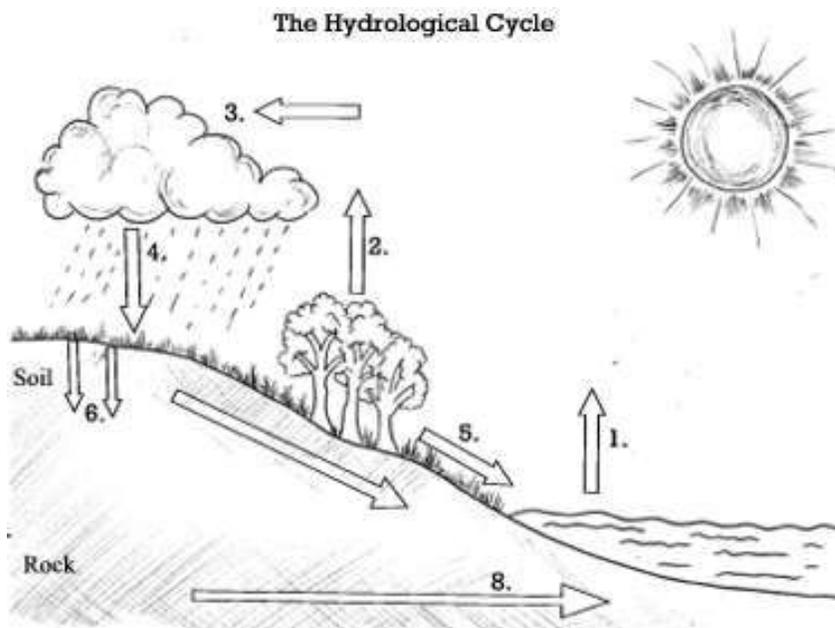
Step 9. Brainstorm 6 major locations where water is stored (**surface water, atmosphere, precipitation, glaciers, groundwater, living organisms**) fill in that area on the water cycle diagram and have students copy the labels onto their own diagrams. Classroom discussion on the importance of each of the storage areas as you label it.

Step 10. Discuss how water moves from one place to place. As they point out each part of the water cycle (**evaporate, condense, melt, freeze, percolate, transpire, drink, excrete**) introduce an arrow and a label for the diagram.

Step 11. Once the diagrams are completed, read or tell the students a story of a water molecule that makes a journey through the water cycle. A link for a list of water cycle books are listed at the link below.

<https://buggyandbuddy.com/childrens-books-about-the-water-cycle/>

Step 12. Assign the students the job of telling the story of a water molecule that makes its own journey through the water cycle. Notice that each of the locations where water is stored has a number. Students will roll a dice to figure out where each water molecule will begin and end its journey. On its way, the water molecule must travel through at least 4 different locations including a living organism. Allow students time to outline their stories during class and check that each student has a reasonable story outline. The story itself can be completed as homework.



Assessing the Learning:

Assess the student learning by discussing with them the details of the experiment. Collect student writing to judge to level of understanding of the water cycle and the impact the sun has on it.

Extending the Learning: Water Cycle Stories Going Further

The quantity of water in the bag stayed the same just like the quantity of water on the planet has stayed the same since the planet was formed. The water on the planet continually changes state and moves around from place to place. *Using the stories that students write as a rough draft, help students edit and revise their story and turn the stories into illustrated children's books. These books can be shared with elementary school students.*

Finding Out More!

Read through the article attached and go through the Water Cycle trivia. Follow the questions and discussion the trivia inspires.

https://www3.epa.gov/safewater/kids/water_trivia_facts.html

Aligning to the Standards:**Grade 8:**

Science- A.8.1, A.8.3, A.8.5, B.8.1, B.8.5, C.8.1, C.8.4, C.8.11, D.8.2, D.8.7, E.8.1, E.8.5, G.8.4, G.8.6

Grade 12:

Science- A.12.1, A.12.3, B.12.1, B.12.5, C.12.1, C.12.3, D.12.11, E.12.2, G.12.1