**The Water Cycle Travel Log**

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**Grade:**

4

**Length:**

45 minutes

**Standards:**

Fourth Grade Science Core Curriculum

* Standard 1: Students will understand that water changes state as it moves through the water cycle.
  + Objective 2: Describe the water cycle.
    - Locate examples of evaporation and condensation in the water cycle (e.g., water evaporates when heated and clouds or dew forms when vapor is cooled).
    - Identify locations that hold water as it passes through the water cycle (e.g., oceans, atmosphere, fresh surface water, snow, ice, and ground water).
    - Construct a model or diagram to show how water continuously moves through the water cycle over time.

2014 National Theatre Arts Standards

* TH:Pr5.1.4.a. Practice selected exercises that can be used in a group setting for drama/theatre work.
* TH:Pr6.1.4.a. Share small-group drama/theatre work, with peers as audience.
* TH:Re8.1.4.a. Compare and contrast multiple personal experiences when participating in or observing a drama/theatre work.

**Objective:**

Students will demonstrate their understanding of how water changes state as it moves through the water cycle by acting in role as a scientist and/or water molecule in a dramatization of the journey of a water molecule through locations that hold water (e.g., oceans, atmosphere, rivers, mountains) and the processes of evaporation, condensation, and precipitation.

**Big Idea:**

* Cycles
* Evaporation
* Condensation
* Precipitation

**Essential Questions:**

* What happens when theatre artists and observers share a drama experience?
* How can the same drama experience communicate different messages to different people?

**Enduring Understandings:**

* Theatre artists share and present stories, ideas, and envisioned worlds to explore the human experience.
* Theatre artists’ interpretations of drama/theatre work are influenced by personal experiences and aesthetics.

**Prior experience:**

It is expected that students have had some traditional classroom instruction about the water cycle before coming to this arts integration lesson in the drama classroom. They need to have a foundational knowledge of the three states of matter and how water changes state through the water cycle.

**Materials Needed:**

* Posters labeled with water cycle locations: ocean, cloud, stream, groundwater, iceberg, plants & animals, and mountain
* Copies of the Water Molecule Travel Log
* Clipboards
* Pencils

**Preparation:**

Hang the water cycle location posters equidistant around the room. Clear enough space near each location for students to move in and out of that area. Consider placing 1-2 of the locations in the center of the classroom, so that students can move in and out of a cyclical, fluid pattern through the water cycle stations.

Write the following fill-in-the-blank chart on the white board:

solid🡪liquid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

liquid🡪solid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

liquid🡪vapor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

vapor🡪liquid: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

liquid falling from the sky: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lesson Plan:**

**Hook (10 min):**

Play Machine with the students. To build a machine, each participant in the group chooses a repeated action/gesture and a sound to accompany it. Players should coordinate their sounds and gestures with each other to make a cooperative machine whole.

Ask for four volunteers to model a machine for the whole class first. Help them build a drama machine and then take their seats.

Divide the class into 3-5 groups. For their first machine, assign each group of students a theme related to their school day, such as a “recess machine” or “school lunch machine.” Explain that this first machine should be linear, like a factory assembly line. There should be a definite beginning and ending.

Have them present their machines for each other, either in group pair shares or as a whole class.

Keep the students in their groups and ask what the word ‘cycle’ means. Encourage the students to make small changes to their machine so that it is now a ‘cycle’ now with no beginning or ending. A cycle is not linear, so they should not be standing in a line. Help them create shapes and levels.

**Step 2 (2 min):**

Ask the students to take their seats again. Explain that a ‘cycle’ feeds itself by reusing its materials over and over again. The water on Earth is recycled through the water cycle. It is the same water the earth has had since the beginning of time. Water changes state in this cycle between solid, liquid, and vapor.

**Step 3 (8 min):**

Invite six volunteers to come up and demonstrate the states of water. “Imagine that each of these students is a water molecule.”

* Clump the students into a group tightly side-by-side. “When water is in a solid state, forming ice, the molecules are packed tightly together in a rigid state. They move very slowly.”
* Separate the students now. “When water is in a liquid state, the water molecules are a little bit freer. They move a little bit quicker.”
* Now have each of the students move independently and quickly through the room. “When water is in a vapor state, the molecules are much more spread out. They move quickly.”

**Step 4:**

Ask the class to name and describe the processes by which these molecules can change state. Record their responses on the white board in the fill-in-the-blank chart. For example, “if liquid water is heated, the molecules begin moving faster and spreading out until eventually they start escaping into the air in vapor form. Conversely, water vapor that cools has molecules that slow down and clump closer together. They condense into clouds or dew.” Help the students name each of these processes as evaporation, condensation, and precipitation. Water vapor given off by plants is transpiration. You might use the six students to model these processes. (This should be a quick review for students rather than a large instructional block.)

solid🡪liquid: melting

liquid🡪solid: freezing

liquid🡪vapor: evaporation

vapor🡪liquid: condensation

liquid falling from the sky: precipitation

**Step 5 (5 min):**

Pass out the Travel Logs and announce that now each of them will have the chance to experience what it is like to be a water molecule in the water cycle. Point out the seven locations marked by posters around the room. Their job is to cycle through the locations and use at least four of the vocabulary words in their travel log. When they move between stations, they need to move as molecules would move in their states of matter in terms of speed. For example, if they are moving as rain freezing into an iceberg, they need to move very slowly between the stations. When moving as a vapor, they can move quickly.

Students may take their travel log worksheets with them into the water cycle to track their movements in role as water molecules. They should note their state of matter and write what would have happened to their molecule in order to change locations.

Ask for a volunteer who feels like he or she has a firm grasp of the three states of water and each of the processes to change states. Have this student model moving as a water molecule between the stations for 2-3 rounds as the whole class tracks his or her movements on the travel log. Discuss as a class the locations, states of matter, and processes used in this example. When the class is ready to work independently, have the volunteer take a seat and have the class complete the rest of their travel logs on their own.

Variation: Students work in partnerships. One partner’s job is to act as the molecule in the water cycle while the other partner acts in role as a scientist and documents his or her movements on the travel log. Partners should check each other for accuracy and completeness in their movements through the water cycle. Encourage the students to make creative acting choices by putting on their goggles and lab coats to get into character.

**Step 6 (20 min):**

Assign the students into their partnerships and give each a starting location. Give the students enough time to form their pairs, assign roles, and work through the cycle. When they’re ready, announce that it’s time to switch roles. The other partner needs to act as the water molecule and the first partner needs to document the molecule’s journey on the travel log.

**Extra Activity (if needed):**

Gather the class back together and review the process. Ask students to discuss how they got from one specific location to another. Were any movements between locations more difficult? Ask if any other students found a different method of moving between the locations or the cycle. Reflect on how the water cycle is indeed a *cycle* with many working parts and variations. If it were not so, the earth’s water would not be recovered after being used up.

**Assessment:**

Students can be assessed on their participation in the water cycle dramatization, considering how well they worked with others and if they were on task. Their travel logs can be assessed for completion and accuracy.

**Bibliography:**

Utah State University Water Quality Extension. [extension.usu.edu/waterquality](file:///C:\Users\Shawnda\AppData\Local\Temp\Temp1_Anderson_elementary%20lessons.zip\extension.usu.edu\waterquality)

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Partner \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Water Molecule Travel Log

Instructions:Record your journey as a water molecule through the water cycle. Make sure you use at least four of the vocabulary words on the bottom of this page.

|  |  |  |  |
| --- | --- | --- | --- |
| Location | What happened? | State  (solid, liquid, vapor) | Where are you going? |
| Example:  Cloud | Through **precipitation,** I fell as rain onto a mountain. | Liquid | Mountain |
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Vocabulary:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| condensation | dew | evaporation | precipitation | temperature | transpiration |

**Cloud**

**Stream**

**Groundwater**

**Iceberg**

**Animals**

**Plants**

**Mountain**

**Ocean**