

# Round and Round

Science  
Standard

I

Objective

2

Connections

**Standard I:**

Students will understand that water changes state as it moves through the water cycle.

**Objective 2:**

Describe the water cycle.

**Intended Learning Outcomes:**

1. Use science process and thinking skills
3. Understand important science concepts and principles.
4. Communicate effectively using science language and reasoning.

**Content Connections:**

Language Arts VIII-6; Write in different forms and genres

## Background Information

Water is such a basic life sustenance that it is easy to take for granted. Water is a substance that can naturally occur in three different forms, solid, liquid, and gas. The solid form of water can be found in the glaciers and ice caps on the opposite poles of Earth. We are most familiar with water in its liquid form. We see it in our lakes, rivers, streams, and oceans. Water vapor rises into the atmosphere and condenses back into a liquid through clouds, fog, and mist. The water then falls to Earth in the form of rain, hail, sleet, and snow to nourish our planet and sustain life.

Much of Earth's water is in constant motion, and the water cycle describes the continuous movement of water on, above, and below the surface of Earth. The water cycle is truly a "cycle," with no beginning or end. The vocabulary words, *evaporation*, *condensation*, and *precipitation* describe the continuous movement of water into the air and ground, onto and over land and back.

This activity will take 2-4 class periods, depending on how involved the students are in creating the final product.

## Research Basis

Harlen, W. (2001). *Primary Science...taking the plunge; How to teach primary science more effectively for ages 5 to 12*. Portsmouth, NH: Heinemann.

An increase in student learning occurs when students have opportunities to discuss what they have observed and inferred in small groups and as a class. Elementary students' science learning needs to be scaffolded around a metacognitive approach, where students are

asked to think about what they know (what they can directly observe) and what they do not directly know (what they need to infer).

Kluger, B. B., (1999). *Inquiry thoughts, views, and strategies for the K-5 classroom*. National Science Foundation, Arlington, VA.

In inquiry-based classrooms, teachers support students as active learners as they explore, carefully observe, plan and carry out investigations, communicate through varied methods, propose explanations and solutions, propose thoughtful questions, and critique their science practices. Good science inquiry provides many entry points—ways in which students can approach a new topic—and a wide variety of activities during student work.

## Invitation to Learn

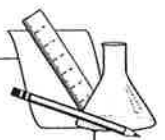
With a permanent marker write Evaporation, Condensation, and Precipitation around the perimeter of a Frisbee®. Write WATER CYCLE in the center of the disc. Have students stand in a circle. Toss the Frisbee® to a student. Have the student recite the steps of the water cycle from where their hand caught the disc. For example, if the disc is caught on the word “Evaporation,” the student will tell what happens when water evaporates and relate the next steps in the cycle after evaporation, which are condensation and precipitation. This can be repeated as often as desired. For the second round, play the song “Water Cycle Boogie” and toss the disc around the circle. When a student catches the disc on a water cycle “step” they will act out the word. For example, if the disc is caught on “precipitation,” the student will indicate a downward motion. If it is caught on “evaporation,” the student will indicate an “up” motion. To add to their movement have the students go “round and round” in the circle as they toss the Frisbee® back and forth to each other.

## Instructional Procedures

1. Divide the class into 4-5 groups. Provide each group with review resources about the water cycle. (See the booklist from the Dino Drool activity) There is a student reference guide at <http://www.schools.utah.gov/curr/science/core/4th/TRB4/default.htm> that can be downloaded and distributed to students.
2. On an easel sized Post-it®, have students write down the information they think is important to know for someone who is just learning about the water cycle. Tell them they are becoming authors of their own water cycle book. Play the

### Materials

- Frisbee®
- Black marker
- Singing in Our Garden*
- Chart paper
- Watercolors
- Crayons
- Paper



“Water Cycle Boogie” as they work. Instruct the groups to use the song’s organization to help them create their story.

3. Once the students have determined how they want their facts to be represented, give each group another easel sheet and have them create a rough draft “storyboard”, complete with text and illustrations.
4. The final draft can be on any type of paper. Markers, colored pencils, crayons, and watercolors can be used to create color and interest in the illustrations. The students can choose to make a book, a final storyboard, a DVD, or a mural.
5. Have students share their final product and teach the water cycle to a younger audience. If there is an opportunity for a school wide science fair or other school wide audience, have students share their product.

## Assessment Suggestions

- Photograph interview – see Dino Drool activity.
- Card sorts – This type of assessment measures student attitude and knowledge toward science and what type of science student they are.

Print individual cards with the water cycle vocabulary and attitude descriptions. Allow students to group the cards according to the water cycle and have them match science attitude cards to their science knowledge. Attitude cards such as, “Thinks up good questions” or “Thinks up own ideas to study” are paired with knowledge cards such as “Precipitation is\_\_\_\_\_”. (Student fills in the blank.) You can use this assessment at the beginning, middle and end of an activity to measure understanding.

## Curriculum Extensions/Adaptations/Integration

- Science - Cover a medium sized box with question marks. Put a container of water inside the box. Invite students to ask questions so they can determine what is inside. Instruct students to ask three types of questions:
  - Does it \_\_\_\_\_? / Can it \_\_\_\_\_? (verbs)
  - Is it \_\_\_\_\_/ (adjectives)
  - Does it have \_\_\_\_\_? (nouns)

They may want to ask specific questions like, “Is it a leaf?” or “Is it a spider?” right off the bat. The purpose of asking the above questions is to help the students gather information so they can make an educated inference about what is in the mystery box, not a lucky guess.

A student/teacher exchange might go like this:

Student: “Can it move?”

Teacher: “Yes, it can move?”

Student: “Does it have six or more legs?”

Teacher: “No, it does not have six or more legs?”

Student: “Does it have four legs?”

Teacher: “No, it doesn’t have four legs.”

Student: “Does it have legs?”

Teacher: “No, it does not have legs.”

Student: “Is it a snake?”

Teacher: “No, it is not a snake.”

This exchange may give you an idea of how to answer and guide the inquiry. You can introduce the properties of water through this type of question/answer activity. Just because it moves, does not mean it is an animal! Water also conducts electricity, but it is not metal!

As the teacher and student exchange information, write down the responses on three pieces of chart paper with the headings, verbs, adjectives, and nouns. Stop the questioning when you feel the students can make an educated inference about the mystery box’s content. Ask them to write or draw what they think the mystery object is using this lead, “I think/infer that the mystery object is \_\_\_\_\_.” You can also ask, “Are you 100% certain?” Point out that the questioning process is vital to science understanding and discovery.

At the end of the questioning, the container of water is revealed. Make the list of nouns, verbs, and adjectives available to help the class continue their inquiry into water and to journal their science experience.

- Divide students into four groups to participate in four stations. Students will record their observations, draw pictures, and make inferences about each step in the water cycle in their journals.

*Evaporation Station*

*Condensation Station*

*Precipitation Station*

*Water Cycle Station*

- Read the book *Water Dance* by Thomas Locker. identify the nouns, verbs, and adjectives that describe each part of the water cycle from the book, under the word strips, evaporation, condensation, precipitation, and water cycle.
- Invite students to highlight and identify the words on the posters that best describe the water cycle according to what they have come to understand through their experiments and experience and highlight them on the posters.
- Ask students, “What have you learned?” Direct them to write a reflection about their learning over the past few days. Have them look at their predictions, their observations and their inferences about the water cycle in their journals. Instruct them that they will need to use the water cycle vocabulary in a meaningful way, using the parts of speech displayed and discussed in class to help the reader understand the water cycle and its importance to our planet.
- Language Arts/Visual Arts – Have students create their own “Water Dance “ book using their reflection vocabulary and watercolors.
- Science /Social Studies – Have students do Internet research on different world biomes, rain forest, desert, wetland, etc and graph the different amounts of annual rainfall in these areas. Do the same for Utah counties and compare and contrast Utah’s rainfall with other world biomes.

## Family Connections

- Have students share their water cycle reflection with their family. Discuss other parts of speech that describe the water cycle to help create understanding of the water cycle process.
- Students can perform a “Water Cycle Boogie” for their family.
- Students can use their final product to teach their family about the water cycle.

## Additional Resources

### Books

*Water Dance*, by Thomas Locker; ISBN 0-15-216396-4

*Where the River Begins*, by Thomas Locker; ISBN 0-14-054595-6

*The Earth Science Book – Activities for Kids*, by Dinah Zike; ISBN 0-471-57166-0

*Daily Warm-ups – Earth Science*, by Walch Publishing; ISBN 0-8251-4454-X

*Picture-Perfect Science Lessons*, by Karen Rohrich Ansberry and Emily Morgan; ISBN 0-87355-243-1

*More Picture-Perfect Science Lessons*, by Karen Ansberry and Emily Morgan; ISBN 978-1-93353-112-0

## Media

*Singing in our Garden*, CD, Banana Slug Band; ISBN 680598 00272 5

*What's the Weather*, Puppets - 6 hand puppets that facilitate this activity. Oriental Trading, Hands on Fun Catalog, Summer 2008 MV-58/1017, pg. 86.

## Web sites

<http://www.surfnetkids.com/watercycle.htm>

This site links you to a number of “kid friendly” sites related to the water cycle.

<http://www.schools.utah.gov/curr/science/core/4th/TRB4/default.htm>

This is the USOE website for 4th grade science core curriculum.

## Card Sorts

**Define the water cycle.**

**Describe the process of condensation.**

**Name 4 types of precipitation.**

**What is evaporation?**

**What is the energy source of the water cycle?**

**Use 3 adjectives to describe the water cycle.**

<p><b>What would happen to the water cycle if the sun didn't shine?</b></p>	<p><b>Where will evaporation happen faster on a sunny day, in the morning or afternoon?</b></p>
<p><b>Use 3 nouns to describe the water cycle.</b></p>	<p><b>Use 3 verbs to describe the water cycle.</b></p>
<p><b>Where are some places in your home that you can observe condensation?</b></p>	<p><b>I can think up good questions.</b></p>



**I can think up my own ideas for study.**

**I can ask for more time to finish my experiments.**

**I can complete my work on time.**

**I can work together with my peers to find answers to our questions.**

**I can use different resources to answer my questions.**

**I can write and draw with care in my journal.**

<p><b>My reflections in my journal are important and meaningful.</b></p>	

# Evaporation Station

– Ask the question, “How does water get into the air?”

## Materials:

Three small plastic plates  
Three different colored markers  
Water

## Directions:

Make a shallow puddle of water on each plate. Trace each puddle with the same color marker to indicate the size of the puddles.

Number the plates and place them in three different areas: direct sun, complete dark, and in the middle of the classroom.

Write a prediction in your journal about what will happen on each plate.

Sun \_\_\_\_\_

Dark \_\_\_\_\_

Partly sunny (classroom) \_\_\_\_\_

Check the puddles after one hour and trace each puddle with the second color marker.

Describe, in your journal, how they puddles have changed.

Check the puddles the next day. Trace each puddle the third color marker.

Draw pictures of the plates in your journal using the 3 different colors to show what happened.

Answer these questions:

Which puddles shrank?

Why do you think the puddles shrank at different rates?

What do you think happened to the water?

What other questions do you think are important to ask about evaporation?

# Condensation Station

**- Ask the question, "How does condensation form?"**

## **Materials:**

Pint glass jar  
Water  
Ice cubes

Observe the jar as it rests at room temperature, without any water. Write your observations in your journal. How does the jar feel? What does it look like?

Fill the jar with ice and water. How does the jar feel on the outside? After a few minutes what does the jar look like?

Leave the jar full of ice water for about a half hour. Write your observations about what the jar looks like and feels like.

Explain how you think water appeared on the outside of the jar.

# Precipitation Station

**- Ask the question, "How is rain made?" (teacher directed)**

## **Materials:**

Quart glass jar with a lid  
Ice cubes  
Boiling water

Predict: What do you think will happen when ice cubes are put on top of the jar of hot water?

The teacher will add about one inch of boiling water to the jar. Place the lid upside down on the mouth of the jar to create a lip. Place three to four ice cubes in the lid.

Draw two pictures in your journal – One picture of the jar of hot water as soon as the ice is placed on the lid. And the other picture after 5 minutes have passed.

Write your observations at:

- 1 minute
- 2 minutes
- 3 minutes
- 4 minutes
- 5 minutes

Why do you think water formed at the top of the lid?

How do your observations compare with your prediction?

# Water Cycle Station

**- Ask the question, "How does the water cycle work?  
Does the water cycle need an energy source?"**

## **Materials:**

Song: *Water Cycle Boogie*

Watch and/or listen to the Water Cycle Boogie. Draw in your journal a visual representation of the water cycle.

Where would you have the cycle begin?

Could we have the water we need if one of the steps were eliminated?

Why is the sun important to the water cycle?

What do you think it means for the water cycle to go "round and round" and "up and down?"

Why is the water cycle important to life on Earth?