Lesson 3a: Water Planet: How the Water Cycle Works

OVERVIEW

The water cycle is Earth’s natural mechanism for circulating water on, above, and below the surface of the planet. Although the balance of water on Earth remains fairly consistent over time, climate change is affecting parts of the water cycle and the distribution of our water resources. In this lesson, students examine all the stages in the water cycle to gain a deeper understanding of how this process works.

ESSENTIAL QUESTIONS

1. What is the water cycle? (the continuous process by which water is circulated throughout Earth and its atmosphere)
2. What are the different stages of the water cycle? (evaporation, condensation, precipitation, transpiration, storage, runoff, and infiltration)

MEDIA RESOURCE

Interactive animation: “Climate Change and the Water Cycle”
Link: http://www.kqed.org/education/educators/clue-into-climate/water-cycle.jsp
Through viewing this animation, students will learn:
- Where water is stored on Earth
- How the water cycle works
- What happens at each stage of the water cycle

EARTH SCIENCE LITERACY PRINCIPLES

#5: Earth is the water planet. (5.1, 5.2, 5.5, 5.8)
#7: Humans depend on Earth for resources. (7.5)
condensation
the process by which a gas or vapor turns into a liquid

evaporation
the conversion from a liquid to a gaseous state

groundwater
water that exists below Earth’s surface in underground streams and aquifers

hydrologic cycle
the continuous process by which water is circulated throughout Earth and its atmosphere; another term for the water cycle

infiltration
the process by which water on Earth’s surface enters the soil

precipitation
any form of water, such as rain, hail, or snow, that falls to Earth’s surface

runoff
the water flow that occurs when soil is infiltrated to full capacity and the excess water, from rain, snowmelt, or other sources, flows over the land

transpiration
the process that occurs in plants when they release water through their leaves

ACTIVITY 1: THE WATER CYCLE

Time: 30-45 minutes
Materials:
- Computer and projector or computer lab
- Internet access
- Drawing paper
- Colored pencils
- Markers or pens
- Handout: Student Worksheet

Procedure:
1. Explain that in this lesson, students will be learning about the water cycle. Share with students that by the end of this lesson, they should be able to answer these essential questions:
   - What is the water cycle and why is it important on Earth?
   - What are the different stages of the water cycle?
2. Discuss the water cycle. Ask students the following questions: How does the water cycle work? What happens to water as it goes through the water cycle? Why is it important that we understand the water cycle?
3. Make copies of and hand out the attached Student Worksheet. Have students play only the water cycle portion of the “Climate Change and the Water Cycle” interactive animation. As they watch the animation, students take notes on their worksheet. They should pay close attention to how water moves through the cycle and what form it takes in each stage of the cycle.
4. After they watch the animation, have students create their own colored pencil diagrams of the water cycle on drawing paper or their worksheet. Students should label the important parts of the cycle and write a short description of each stage. If necessary, teachers can draw a simple diagram on the board to assist students with this activity. Replay and pause the animation as necessary.
If you are taking a bath, remember to plug the tub before adjusting the temperature. If you adjust the water temperature as the tub is filling instead of letting the water run down the drain, you avoid wasting a lot of water!

**ACTIVITY 2: A DIGITAL STORY ABOUT WATER**

**Time:** 60+ minutes  
**Materials:**  
- Computers with Internet access  
- Video cameras or still cameras  
- Digital storytelling software (options include, but are not limited to, iMovie or Windows Movie Maker)  
- Writing paper and pencils

**Procedure:**  
1. Have students imagine that they are drops of water moving through the water cycle. Where did they come from? What stage of the water cycle will they go through next? How do they change as they move through the water cycle? What do they encounter as they move through each stage of the cycle?  
2. Divide students into pairs to create a digital story about the water cycle. Digital stories are stories told through computer-based tools. Give students time to storyboard (create a step-by-step outline of) their digital stories, write their scripts, and find or shoot images/videos they would like to use in their stories. Then have students put their stories with their narration. Their digital stories should:  
   - Be both creative and factual  
   - Address all stages of the water cycle  
   - Include important terms associated with each stage (transpiration, evaporation, etc.)

3. Share the finished stories with the entire class. Invite other classes to view the stories as well.  
4. Variation: If it is not possible to create digital stories, have students turn their storyboards into water cycle comics or water cycle performance skits.

**GLOBAL IMPACT**

**Extension Questions/Activities**  
- How do humans impact the water cycle? Make a list of human activities that may impact or affect the water cycle.  
ABOUT THE AUTHOR

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KQED Education Network engages with community and educational organizations to broaden and deepen the impact of KQED media to effect positive change.

www.kqed.org/education

SUPPORT

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ASSESSMENT IDEAS

- Students create a water cycle dictionary with their own definitions for the important stages of the water cycle (use the attached Student Worksheet for recording definitions).
- Students play Water Cycle Jeopardy. Divide students into groups to write questions and answers. Write the game on the board or computer.

ADDITIONAL RESOURCES

Climate and the Water Cycle, National Center for Atmospheric Research
http://www.ncar.ucar.edu/research/earth_system/watercycle.php
This website explores the relationship between climate and the water cycle and gives examples of some of the complexities and challenges scientists are currently examining in their research of Earth’s water.

Fog Chamber, Exploratorium (adaptable for grades 4–12)
http://www.exploratorium.edu/snacks/fog_chamber/
In this activity, students learn about water vapor by creating a cloud in a bottle. (Note: This activity uses lit matches and therefore requires adult supervision.)

The Water Cycle, Planet H₂O (grades 4–7)
http://www.thirteen.org/h2o/educators_lesson2.html
In this lesson, students build their own water cycle models and investigate what happens to water as it goes through the water cycle.

The Water Cycle: Now You See It, Now You Don’t, National Aeronautics and Space Administration Aquarius Mission (grades 3–6)
http://aquarius.nasa.gov/water_cycle.html
Students explore evaporation and condensation in this lesson on the changing states of water.

Water Cycle Animation, U.S. Environmental Protection Agency (EPA)
http://epa.gov/climatechange/kids/water_cycle_version2.html
As part of the EPA Climate Change Kids Site, this animated movie has six scenes that teach students about the water cycle and how climate change affects it. After watching the movie, students can test their knowledge by taking the Water Cycle Quiz.

http://ga.water.usgs.gov/edu/watercycle.html
The USGS Water Cycle website provides students with in-depth information about what happens to water as it goes through each stage of the water cycle.
# The Water Cycle

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<thead>
<tr>
<th>Parts of the Water Cycle</th>
<th>Notes/Definitions</th>
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<tbody>
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<td>Evaporation</td>
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<td>Condensation</td>
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*Draw your own water cycle diagram here.*