

Incredible Journey- Water Cycle

4th Grade MWEE driving question: How can I, along with my family and community, positively affect our watershed?

Investigative Question for this activity: What are some ways that water travels in the Chesapeake Bay watershed?

End-of-activity reflection question (SOL big idea reflection): What did I learn about the Chesapeake Bay as a natural resource for Virginia? (ties into the central idea for Science 4.8; see below)

Goal: Students simulate the movement of water within the water cycle, focusing on our region and ecology.

Objectives:

Knowledge: Students identify the interaction of water within our watershed (the land), bodies of water, and organisms in the watershed system (land and water).

Skills: Students use evidence to explain the statement "We all live downstream".

Value: Students gain an appreciation for the importance of water in both biotic and abiotic portions of a watershed system.

Grade(s): 4th

Special Safety: The day prior to setting up, check the outdoor area for tripping hazards and holes. If necessary, move your location or remove the hazards.

VA Standards addressed:

Science (2018): 4.1 (SEP), 4.8 (NOTE: Sci 3.7 focuses on specifics of water cycle. Consider the use of water cycle terms as a review!)

 = Science and Engineering Practices (SEP)

4.8 The student will investigate and understand that Virginia has important natural resources. Key resources include

- a) **watersheds and water;**
- b) **plants and animals;**
- c) **minerals, rocks, and ores; and**
- d) **forests, soil, and land.**

4.8 Big Idea (central idea): Virginia has many natural resources including watersheds, minerals, rocks, ores, soil, land & forests.



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The water cycle journey highlights resources of our Chesapeake Bay watershed and how water moves through these resources: the land, water bodies, plants & animals, rocks, and the air.

This activity helps develop skill in SEP 4.1d constructing and critiquing conclusions and explanations: use evidence (i.e., measurements, observations, patterns) to construct or support explanations and to make inferences. **The essential knowledge and practices are highlighted yellow.**



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Enduring Understandings	Essential Knowledge and Practices
<p>Natural resources are necessary or useful to humans. Many natural resources are distributed unevenly around the planet.</p> <ul style="list-style-type: none"> Virginia has many natural resources. <p>Some examples of Virginia’s natural resources include minerals, plants, animals, water, soil, and land (4.8 a, b, c, d).</p> <ul style="list-style-type: none"> A watershed is an area of land over which surface water flows to a single collection place. The materials from the watershed, including pollutants, add to the water flow and impact organisms that may serve as a natural resource for humans. <p>The Chesapeake Bay watershed covers approximately half of Virginia’s land area. The other two major watershed systems in Virginia are the Gulf of Mexico and the North Carolina sounds (4.8 a). <i>Students do not need to identify all the major watersheds in Virginia; however, they should be able to identify the watershed in which they live.</i></p> <ul style="list-style-type: none"> Virginia’s water resources include lakes, rivers, bays, and the Atlantic Ocean (4.8 a). Virginia has a great variety of plant and animal resources. Plants hold soil in place to reduce erosion, which aids in improving water quality (4.8 b). 	<p>In order to meet this standard, it is expected that students will</p> <ul style="list-style-type: none"> describe characteristics of Virginia’s waterways (including rivers, bays, lakes, and the Atlantic Ocean), name an example of each, and discuss the importance of the waterways to Virginia (4.8 a) create and interpret a model of a watershed (4.8 a) use evidence to explain the statement, “We all live downstream.” (4.8 a)

Time: 40 minutes

Materials:



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- 8 water cycle location signs with supports
- dice- one per student
- 8 different colors of stickers
- [Map of our local watershed](#) with water sources labeled (Chesapeake Bay, Opequon River, Potomac River, Atlantic Ocean) and Valley and Ridge
- Link to River Runner web site: <https://river-runner.samlearner.com/>
- Student data sheets/1 per student

GLOSSARY

WATER VAPOR- Water in its gas phase

EVAPORATION- when liquid water is heated and changed to a gas (water vapor)

TRANSPIRE- Plant leaves giving off water vapor

CONDENSATION- When water vapor is cooled and changed back to a liquid

Set Up

- Set up the 8 water cycle location signs in a rough circle. At each location, put a container of stickers on the ground.

Commented [1]: potential wind challenge to consider

Instructional Strategy:

- Introduction: Review the term watershed (A watershed is an area of land over which surface water flows to a single collection place).
 - Review impacts of pollutants on the Chesapeake Bay watershed. (Pollutants add to the water flow and impact organisms that may serve as a natural resource for aquatic animals and humans). The Chesapeake Bay watershed covers approximately half of Virginia's land area.
- Instruct students to locate the water cycle data sheet in their journal. Review the data sheet and what will be recorded. Review states of matter as needed (they will record Solid, Liquid or Gas phases of matter.) Give each student a die. Students are to act as water, moving through the water cycle while considering the statement, "We all live downstream". As students move through the activity, on their data sheet they will place a sticker and record the location, state of matter, and what happened to their water.
- Each time they **roll a die** at a location, students will add one sticker from that location to their data sheet.
- Provide directions for how the water cycle journey works. (At each location, get one sticker, roll your die, read and record what happened, and then move to the next location as instructed.)
 - At each location: students affix a sticker and then roll the die.
 - Record the location name, what state of matter they are in (*solid, liquid, or gas*), and what happened to the water at this location.
 - Before moving to another location, students should ask themselves: "Did I go downstream?" Refer to the map for clarification.
 - Next, they move to the location written in all CAPITALS on the sign. For example, if starting at the VALLEY AND RIDGE location, students get a sticker, then they might roll, "You are absorbed by a red maple and help it make food. Go to TREES." They write "valley and ridge", record the state of matter (solid, liquid, gas) and what happened. Then they move to the TREES location and repeat the process. If the die says STAY then they record another turn at that location on the sheet, so they will add another sticker at that location and roll again.
- Divide students evenly among the eight locations (Clouds, Animals, Chesapeake Bay, Opequon Creek, Potomac River, Valley and Ridge, Groundwater, and Trees).



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- Engage! Students need to complete 12 rounds (until the data-sheet is filled in.) Remind students- Not all students will go to every location- it is chance where they end up, based on the roll of the die (probability!).
- Wrap up. Ask students to share their water cycle journey with the rest of the group. Did everyone have the same cycle? Did each student go to each location? In which state of matter did they spend the most time? What did this journey show you about the water cycle?
 - Discuss. How did you apply the statement, "We all live downstream" to this activity?

Possible Extensions: (optional)

- After the students have finished, students can draw their own water cycle showing the cycle as they went through it.
- Probability extension: Use the River Runner web site to track how a drop of water flows from a specific location to the Chesapeake Bay: Link to River Runner web site: <https://river-runner.samlearner.com/>



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