


# The Watershed

## Station 7

Marc Seifert

Time Frame:	Standards:
30-45 Minutes based on age and development level.	The educators implementing this activity will determine appropriate standards based on age and student activity. References to the Idaho standards are included as an example. <a href="http://www.sde.idaho.gov/site/content_standards/">http://www.sde.idaho.gov/site/content_standards/</a>
Objectives:	
<p><b>Learn to how river and stream habitats are part of a watershed and that the watershed is part of a large interactive system from mountains to the ocean or inland seas?</b></p> <p>Looking at river/stream habitat, students can:</p> <ul style="list-style-type: none"> <li>• Define components of a river or stream habitats</li> <li>• Understand how the local river/stream habitat fits into it's watershed</li> <li>• Analyze how habitat components serve local organism needs</li> <li>• Define watersheds and how the riparian habitat fits into the larger system</li> </ul>	
Background Information:	
<p>Everyone lives in a watershed, and we are a small part of a large watershed community. The animals, birds and fish are, too! The Department of Agriculture summarized that people influence what happens in watersheds, good or bad, by how they treat their natural resources – the soil, water, air, plants, and animals. Further, what happens in the small local watershed affects the larger watersheds downstream clear to the ocean.</p>	
<p>The quantity and quality of water draining from a watershed are dependent upon the climate, vegetation, soils, geology, and development of that watershed. Watersheds are also directly tied to the cycles of water; precipitation, evaporation, condensation, and runoff.</p>	
<p>Activities that change the vegetation and surface characteristics of some</p> <p style="text-align: center;"><i>Produced by Lane Council of Governments</i></p>	



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watersheds will affect the quantity and quality of water contributed to a stream. For example, a greater volume of water, perhaps of poorer quality, will flow from a parking lot than from a forest or pasture. This volume of water from a parking lot may result in increased flooding in a watershed because the greater volume exceeds the natural ability of the stream to transport the water. What happens in small watersheds, such as pollution, also affects the larger watersheds downstream as it is transported downstream.

A watershed is an area of land that drains into a water body – such as a river, lake, or bay. Watershed boundaries are defined by a ridge or line of highest elevation and rainwater and melting snow flow downhill to streams and rivers and on to the lakes and oceans. Watersheds vary in shapes and sizes and when too much water comes at once, such as during spring melt and hurricanes, flooding can impact local habitat. Watersheds cross county, state, and national boundaries.

Water is valuable, and knowing where it comes from and how to protect, conserve and use water effectively has positive impacts on all habitats, reduces pollution, and reduces shortages.

### Materials:

- Guest Speaker: Such as a County Agent, Ground and Water Conservation District, Land Management Specialists, IDWR, BLM Land Management Officer, or other local expert
- Paper (thick or stiff printer paper works better than regular paper)
- Science journal
- Watershed handout (attached)
- County, state, or other local topography map
- Water
- Water-based Markers
- Pencil
- Colored pencils and crayons

### Procedure:

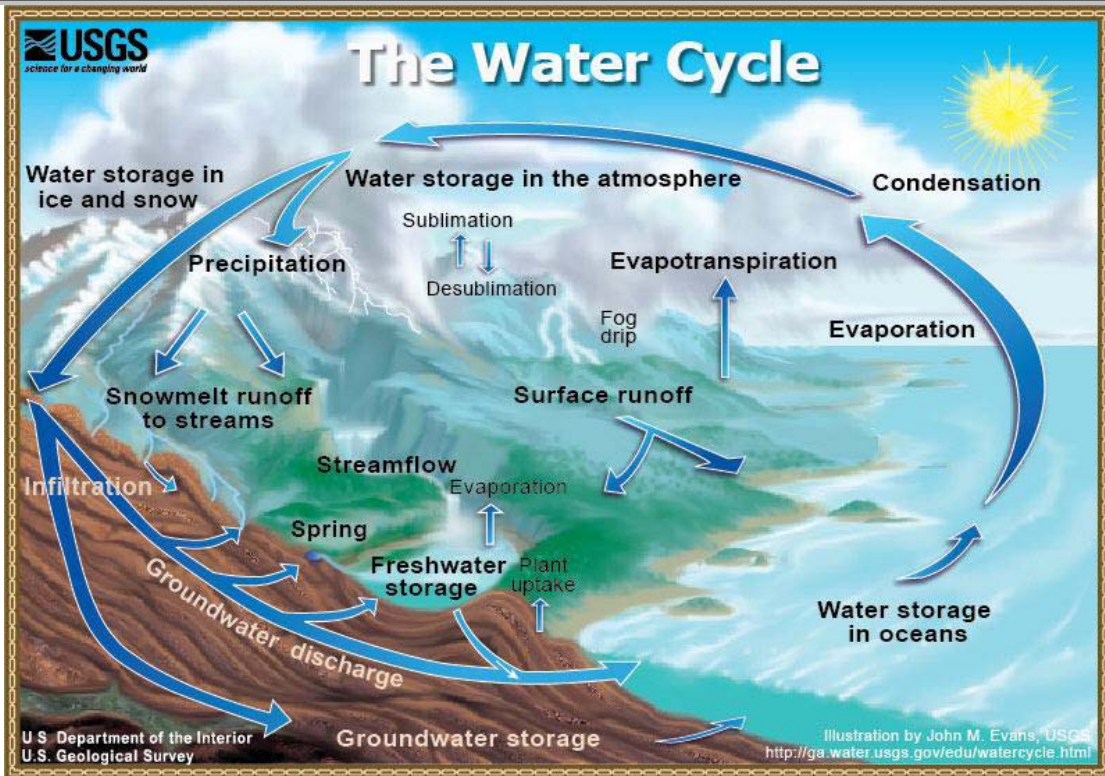
The guest speaker will talk to the students and discuss the basic elements of watersheds, such as associated water cycles, watershed impacts on river habitats, and the integration of local water habitat systems. Examples of subjects that can lead to student discovery may include:

- Discussions with students about what they already know about watersheds and how their local river habitat fits into the larger habitat.
- Discuss the attached Water Cycle Poster and all of the cycles.

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### Water Cycle Activity:

In this lesson plan, the cycle of water (precipitation, evaporation, condensation, and runoff) and the cycle of water absorption will be discussed and analyzed.

- Ask students to list 10 ways that they use water in their journal, then;
  - Each student will share their ideas with a different student partner and list the common ways which they both use water
  - Students will switch to a new partner and share ideas after 1 minute, once again writing down commonalities
  - Repeat the process at least 4-5 times
  - Gather as a group and share and discuss common uses of water
  - Discuss where water that the student's use comes from
  - Discuss the attached "Water Shed Handout" as an alternate discovery and learning mechanism

### Watershed Demonstration:

Separate students into small groups of 3-7 students and make their own watershed demonstration models. This watershed demonstration project demonstrates a watershed



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and how water cycles interact with the watershed.

- Crumple a piece of paper into a loose ball.
- Partially open the paper, and place it on a table. The paper should still be crumpled enough to have portions that resemble mountain ridges and valleys. Be sure there is a paper towel or other water barrier under the crumpled paper.
- Using a blue water-based marker, have students mark “creeks” or rivers on their papers in the bottoms of the creases, and also have them mark where they think the water will collect as it runs downhill (this could represent a lake).
- Using a black water-based marker, have learners outline the ridges that separate one creek or river from another.
- Using green crayons mark the areas that could represent grass and trees.
- Using brown water-based markers, have learners draw exposed soil that could erode or wash away into the lake as the water flows through the watershed.
- Using red water-based markers, have learners draw in some pollutants that may be found in their watershed, such as soap from washing cars, oil from leaking cars, pesticides from lawns, and animal waste from a nearby farm.
- Keeping the model on the table or ground (and still on top of the towel), have students spray (or the teacher can go around with a sprayer) a very light mist of water over it until it starts to collect and run down the surfaces to the low points.
- Observe where water runs down and collects.
- Students should write the observations, notes, responses to the following questions, and draw a picture with notes to document the project lessons in their journals.
- Discuss the following questions with the students:
  - What do you suppose the crinkled paper shape represents?
  - What does the mist/spray represent?
  - What does the water that runs down into the creases represent?
  - Why does water flow down into the creases?
  - What does the water flowing in the creases represent?
  - Why didn't the green crayon flow with the water?
  - What does the water that “pools up” represent?
  - What happened to the ink from the markers as the water flowed?
  - Where will the ink eventually end up (the highest or lowest place in the



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watershed)?

- How would this be a problem in a river habitat if the inks represent pollutants?
- What does pollution in a small habitat mean to the larger habitat as the rivers run to the lakes and ocean.

Have the Students from all of the groups come together and share their observations and responses to the questions.

Additional questions the educator could ask the students;

- Can they identify where the rain, snow, etc. in their area drains to? Ask them to name local rivers, lakes, or bays, etc?
- Can the students use the county or state map and identify the names of the rivers and streams flowing through their watershed?
- Can the students identify the lowest point in the watershed (the point to which all water flows) and can they trace the path they believe the water would flow to get there?
- What would happen if pollution was getting into the watershed?

An option is to suggest that they may start by marking their town with a red dot, and then find the river nearest to their school or town and draw a blue line from there to the lowest point in the watershed and make sure they include arrows showing the direction the water flows.

Discuss their understanding of what a watershed is after they have participated in the lessons and learned about the water cycle, watersheds, and their local river habitat.

The students in this station will prepare to share their new knowledge with the other teams of students later when they all assemble as part of the Jig-Saw learning process.

### **Assessment:**

Students will be able to share their knowledge of how the local habitat is part of a larger area watershed; demonstrating their knowledge of the habitat and larger scale interaction.

Students shall share their journal entries, discussing how water enters the watershed, how water moves through the watershed, how pollutions and water gets from their house, school, or community and in general how does the water move through to the lowest points and on to lakes and oceans.

Students will complete their Journal entries in preparation to sharing with the other students using a Jig Saw or other equivalent shared learning process.



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### Additional Content:

Define a watershed: Body of land that supports water draining into a river, lake, or other body of water. (Teacher Note: Boundaries are high points of land that slope downward towards the body of water).

Educators could discuss additional information showing that all water in the local area is part of a common watershed, and that the Earth is covered by numerous watersheds, some containing more of the Earth's (fresh) water than others. Alternately, the watershed can be made from clay in the shape of the local habitat to illustrate water impacts on familiar territory.

An alternate version of the watershed project can be found on <http://learningtogive.org/lessons/unit374/lesson2.html>

### Water Conservation Activity:

Discuss water conservation and usage to energize involvement, increase student background knowledge and illustrate how simple changes can have great impact.

**Water Usage Information**

Water Usage	Estimate Gallons Used	Average Gallons Used
Flush a toilet		5
Full bath in tub		36-50
Wash hands (with water running)		2
Brush teeth (with water running)		2-10
Dishwasher		60
Wash clothes		50
Drinking water		2-12
Cooking		10
Washing the car		100

Note - On the average in the U.S., a person uses 100 gallons of water a day, a dairy cow must drink 3 gallons of water to produce 1 gallon of milk, an ear of corn needs 26 gallons of water to grow, and a meal at a fast food restaurant can take 1,400 gallons of water to make (burger, fries and drink).

*This exercise was obtained from the Saginaw Bay Watershed Middle School Curriculum Guide Lesson "Some Ways We Use Water."*

**For the educator** - Print out the chart shown above for the students. Fold it so the gallons used answers are hidden. Ask the students to estimate what they think it might be. Have them discuss the differences between what they estimated and their answer. Ask the students to talk about how they might save water? Ask them to discuss the impact water use has on limited water sources and the habitats. Have the students document their findings in their journals and participate in group discussions.



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## References:

State Fish and Game Office

<http://sfr.psu.edu/youth/sftrc/lesson-plans/water/k-5/watershed>

[http://www.deq.state.ms.us/mdeq.nsf/pdf/NPS\\_WatershedLP/\\$File/WatershedLessonPlans.pdf?OpenElement](http://www.deq.state.ms.us/mdeq.nsf/pdf/NPS_WatershedLP/$File/WatershedLessonPlans.pdf?OpenElement)

<http://www.watersheds.tv/intheflow/rivers.asp>

[http://www.ndhealth.gov/wq/sw/z1\\_nps/D\\_Watersheds3.htm](http://www.ndhealth.gov/wq/sw/z1_nps/D_Watersheds3.htm)

The Watercourse 2000, 2002, and 2004. The Watercourse U.S.A. Bozeman Mt.

<http://projectwet.org/>

Project Wet, Bozeman Mt. <http://projectwet.org/>

<http://www.need.org/needpdf/Wonders%20of%20Water%20Student.pdf>