Watersheds Everywhere

A lesson on the concept of watersheds

Grade Levels: 4-8
Subject Areas: Earth Science, Geography, Social Studies
Duration: Two 50 minute sessions. A preliminary session may be needed to introduce the subject and assign background reading.

Objectives:
1. Students will be able to identify the watershed in which their school is located.
2. Students will be able to define the term watershed, and name the characteristics of a watershed.
3. Students will use a variety of maps to locate their school.
4. Students will be able to name their school's complete watershed address.

Show-Me Standards:
Process: Goal 1.4: Use of technological and other resources to locate and organize information.
Content: Science 5: Knowledge of processes and interactions of the Earth's biosphere and hydrosphere.
Social Studies 5: Knowledge of elements of geography study and analysis.
Social Studies 8: the use of tools of social science inquiry such as maps.

Grade Level Expectations:
SC5,2,E,5a Describe and trace the path of water as it cycles through the hydrosphere, geosphere and atmosphere (i.e. ..surface runoff/ground water flow)
SC5,2,A,4b Identify the major landforms on Earth (i.e.…mountains, plains, oceans, river valleys, coastlines, canyons)
SC5,3,A, 4a Identify the ways humans affect the erosion and deposition of Earth's materials (e.g.…clearing of land, planting vegetation, paving land, construction of new bridges)
SC5,3,A,5a Explain how major bodies of water are important natural resources for human activity (e.g.….food recreation, habitat, irrigation, solvent, transportation)
SC5,2,E,7a Explain and trace possible paths of water through hydrosphere, geosphere, and atmosphere (i.e.…the water cycle, evaporation, condensation, precipitation, surface runoff/groundwater flow)
SS,EGSA,5,1,A,4 Construct and interpret maps
SS,EGSA,5,1,B,4 Locate cities of Kansas City, Springfield, St. Louis, Jefferson City, Columbia, St. Joseph.
SS,EGSA,5,7,G,4 Use geography to interpret the past and predict future consequences.
SS,TSSI,7,2,B,4 Create maps, timelines, diagrams and cartoons to enhance studies in civics, history, economics, and geography.
SS, EGSA,5,A,5-8 Use geographical research sources to acquire information and answer questions.
SS, EGSA,5,B,5-8 Locate cities of MO and the U.S., Locate states and major topographic features of the U.S., Locate and describe real places using absolute and relative location.

SS, EGSA,5,C,5 Identify physical characteristics such as climate, topography relationship to water and ecosystems.
SS,TSSI,7,A,5-8 Using primary and secondary sources.
SS,TSSI,7,B,5-8 Using maps, graphs, statistics, timelines, charts, and diagrams.
SS,TSSI,7,C,5-8 Creating maps and graphics.
SS,TSSI,7,D,5-8 Using technological tools.

Anticipatory Set: Ask the class, how many of you think that they live in a watershed? Everyone lives in a watershed. In fact, you have a watershed address, just like you have a street address. Ask the class to define "watershed". (*Watershed the land area from which surface runoff drains into a stream channel, lake, reservoir, or other body of water; also called a drainage basin*

Instructional Input:

Materials/Technology:
1. **Internet access** to www.watersheds.org for teacher and students to do background reading and print copies of the necessary articles and maps.
2. Copies of a **watershed map** for each student printed from www.watersheds.org (go to Watersheds > What is your Watershed Address?).
3. Highlighting **pens or markers** for each student.
4. Overhead projector or Smart Board
5. Print copies of a local watershed map and the appropriate river basin map.
6. Assemble a variety of local maps: Missouri highway maps, county maps, and the Department of Conservation's Outdoors maps to give students actual map reading experience.

7a. Download the following maps (PDF files) to print on transparency film if you need to make **overheads**:
Mississippi River Basin
http://watersheds.org/places/extension/MissBasin.pdf

River Basins in Missouri (outline of the state over Mississippi Basin)
http://watersheds.org/places/extension/Mo_Basins.pdf

Rivers and Watersheds in Missouri
http://watersheds.org/places/extension/MoWatersheds.pdf (note: must be printed in landscape orientation to fit the paper or film)

White River Basin
http://watersheds.org/places/extension/WhiteRiver.pdf

South Central Missouri Watersheds
http://watersheds.org/places/extension/images/Regional_Watersheds.pdf

OR

7b. If you are using a **SmartBoard** with an Internet connection, bookmark the following web pages:

Mississippi River Basin
http://watersheds.org/places/extension/mississippi.htm

River Basins in Missouri (outline of the state over Mississippi Basin)
http://watersheds.org/places/extension/missouristate.htm

Rivers and Watersheds in Missouri
http://watersheds.org/places/extension/missouririvers.htm

White River Basin
http://watersheds.org/places/extension/whiteriver.htm

South Central Missouri Watersheds
http://watersheds.org/places/extension/mosheds.htm

8. Review the following sections or search the website for other articles relevant to your watershed, and select those you will want to assign as background or follow up reading, depending on your class and area of study. Print as needed for reading assignments.
What is a Watershed?
http://watersheds.org/places/shed.htm
The Ozark Divide
http://watersheds.org/places/divide.htm

9. Vocabulary / Definitions
Watershed - *the land area from which surface runoff drains into a stream channel, lake, reservoir, or other body of water; also called a drainage basin (Project Wet,* www.projectwet@montana.edu)
Headwaters - *the source and upper part of a stream*
River basin – *also called a watershed or drainage basin, often used to identify the rivers of major river systems*
Tributary - *a stream that flows into a larger stream or other body of water*.

10. Download the printable handout and run off copies of the watershed address sheet from:

http://www.watersheds.org/places/extension/watershed-address.htm

Procedure:

1. **Write the definition of a watershed and basin on the board.**
   Watershed: - the land area from which surface runoff drains into a stream channel, lake, reservoir, or other body of water; also called a drainage basin (ProjectWet)
   Basin: the entire geographical area drained by a major river and its intersecting streams.

2. **Have students shape their hands into a bowl.** The stream is the crevice where their two hands come together. Have them visualize rain falling on the watershed. Where would the rain go? It would move across your hands and flow into the crevice or stream. (For younger students, use a spray bottle with water tinted with just a bit of blue food coloring to illustrate their watershed.

3. **Explain that watersheds are named after the main river or creek that drains the water.** Everyone has a watershed address. We are going to figure out our schools watershed address.

4. **What is the address here at school?** If they don't know, ask what street the school is located on.

5. **Go through the rest of the school's address**, including city, county, state, and country, continent, and planet. Record this on the board.

6. **Next tell students they are going to figure out their school watershed address**. Have them think of what creeks or rivers are nearby.

7. **A street is part of something bigger…a city.** Watersheds are part of bigger watersheds. Where does water from Missouri drain?

8. **Place the Mississippi River Basin map on your overhead**. *(Basin: the entire tract of country drained by a river, or sloping towards a sea or lake.)*
   Orient students to the map with questions such as:
   What is this a map of? (*Continental US*)
   What does the multi-colored area show? (*the Mississippi River Basin or watershed)*

9. **Identify and trace the basin boundary.**

- The Rocky Mountains form the basin's western boundary and the Appalachian Mountains form the eastern boundary.

- What does each differently colored area show? (*name each watershed*)

- Is the land high or low where they touch?

- Where is Missouri?

- How many of the watersheds extend into Missouri? Have students locate southern Missouri.
- What is the name of the part of the Mississippi River Basin that southern Missouri is in? (*Arkansas-Red-White or Missouri*)
- What does the name refer to? (rivers)
- How do these two regions differ? (*Arkansas-Red-White is smaller but combines three rivers' watersheds; Missouri is much larger but only one river*).
- What other states are included in the regions?

10. Now place the Rivers and Watersheds in Missouri map on your overhead.

- How is it like the Mississippi River Basin map? How is it different?
- Identify the six watersheds in the Mississippi River Basin. You may need to return to the Mississippi River Basin map to do this.
- Where is the state of Missouri? Locate the Ozark Divide.
- What big watershed lies to the north? (*Missouri River*) Which one is located to the south? (*White River*)
- Trace the White River or Missouri River for the students.

11. Decide which River Basin your school is in; pass out the appropriate River Basin Map and a highlighter to each student.

- What states are in the River Basin you live in?
- What do the different colored areas show?
- What are some other rivers in this watershed?
- Begin by having students find the town where their school is located, that is, where they are on the map right now.
- Have students locate the watershed boundary and trace it with their finger, identifying the towns that are on and near the boundary.
- Have students locate the headwaters and small tributaries of streams near their school.
- Have students highlight from the headwaters, the entire length of the stream.
- Where does the creek end? Have them follow [younger students can finger trace] the roads in the watershed from point-to-point, and tell which roads they have traveled. Have students share familiar places they see named on the map. Now trace the boundary of the Watershed with their highlighter.

- Where is the school located? Is it in the White River Basin or the Missouri River Basin?
- Where is the Ozark Divide?
- Where are the very highest ridges in the Watershed? (*forming the boundaries*)
- Have students name some of the roads that follow the ridges.
- Where are the very lowest areas? (*along the creek*)
- What natural force brings the water to the lowest areas? (*gravity*)

12. **Assignment:** Each student should complete his or her watershed address on the worksheet from: http://www.watersheds.org/places/extension/watershed-address.htm
13. **Wrap up**: Briefly review the maps used in this session. They are all about watersheds, from the Mississippi, the biggest watershed in the United States, to their smaller watershed. Everybody has a watershed address. Ask a student to share their complete watershed address out loud. Compare it to mailing addresses. Ask if they could find someone's home by their watershed address? Ask what kind of map they would need?

Modeling: The teacher will model when asking students to use maps. The teacher will model tracing basin boundaries as well as finding headwaters and tributaries in their particular watershed. The teacher will model the beginning of the writing of a watershed address.

Comprehension Check: The teachers will check for understanding using the questions provided in the procedure section of the lesson plan and the completed watershed address worksheet.

Assignments:

Guided Practice: The teacher will model often during the course of the lesson and check to see if students understand the activity and what they are supposed to do.
Independent Practice: Students will write their watershed address and turn it in to the teacher for grading.

Closure/Summary: During the wrap-up part of the activity, students will review what they have done in this lesson and review what should be included in their watershed address.

Application: This lesson will help students better understand their environment and help them to see that they are part of a very large watershed and a local watershed both very important to each other.

Modifications: Students with eye-hand coordination problems may need help tracing their watershed. Student may need to work in pairs to help with map reading and completing the watershed address worksheet.

Partial funding for this lesson plan and resource materials came through the Missouri Dept. of Natural Resources in the form of an EPA 319 Grant to the Missouri Watershed Information Network (MoWIN), an MU Extension water quality project.