Watersheds Watersheds Everywhere

A lesson on watershed concepts

Teachers Guide

Note: This lesson is designed specifically for use in the seven districts in and around the Bryant Creek watershed. If you teach outside our area, and adapt this lesson for use, please share it with us!

Grade Levels: 4-9
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, and those watersheds in which students at their school live.
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 homes and school.
4. Students will be able to name their 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 and analysis.
Social Studies 8: the use of tools of social science inquiry such as maps.

Materials and equipment:
Note: These directions assume that the lesson will be carried out in an ordinary classroom with one or two computers and standard AV equipment. If you have a Smartboard to use with a classroom computer, or other digital projection equipment, you can skip the use of the overhead projector.

1. **Internet access** to the Bryant Watershed Atlas http://www.watersheds.org for teacher and students to do background reading, and print copies of the necessary Atlas articles and maps.
2. Copies of the **Bryant Watershed map** for each student, and a poster map for teacher use. The maps are available from the Project. E-mail your request to schoolsupport@watersheds.org; allow three weeks for delivery.

3. Highlighting **pens or markers** for each student.

4. **Overhead projector** and transparency pens.

Preparation

1. Print copies of the Local Watersheds map and the White River Basin map,

2. Assemble a variety of local maps: Missouri highway maps, county maps, and the Department of Conservation's Outdoors maps, for example. A great atlas of topographical maps of Missouri can be purchased at WalMart for under $15.

3. Prepare the following color transparencies for overhead projection:
Mississippi River Basin map
http://www.watersheds.org/teacher/mrbasin.htm
Water Resources Regions map
http://www.watersheds.org/teacher/regions.htm
White River Basin map
http://www.watersheds.org/teacher/wrbasin.htm
Local Watersheds map
http://www.watersheds.org/places/7sheds1.htm

4. Familiarize yourself with all the maps.
Locate the Ozark Divide on the Mississippi map and the Local Watersheds map. It is the upper edge of the Bryant Watershed. This is part of the boundary between the White River Basin and the Missouri River Basin. Locations in the Gasconade Watershed are in the Missouri River Basin; all others are in the White River Basin.

5.The Local Watersheds map is a map of six watersheds that adjoin the Bryant Creek watershed.

To locate your district's watersheds, go to Schools and Communities http://www.watersheds.org/communities/ and click on the name of your community to find links to your local watersheds.
6. Review the following the Atlas sections, 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://www.watersheds.org/places/shed.htm
The Ozark Divide
http://www.watersheds.org/places/divide.htm
Bryant Watershed Introduction
http://www.watersheds.org/places/bryant.htm
Byrant Creek Tributaries
http://www.watersheds.org/places/tributaries.htm

Lesson Session 1

Procedure:

1. **Ask for a definition of "watershed"** and write the definition on the board. (*Watershed: The land area that water moves across or under while flowing to a stream, spring, pond, lake or river.*) Explain that watersheds are named after the main river or creek that drains the water.

Place the Mississippi River Basin map on your overhead. 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*)

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 we live 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?

Now place the Water Resource Regions 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?…the Ozark Divide? Where are we?
• Trace the White River for the students.

2. **Explain that you are going to focus on the White River Basin** as you hand out the White River Basin map and a highlighter to each student.

Place the transparency of this map on your overhead projector.
• What states are in the White River Basin?
• What do the different colored areas show?
• What are some other rivers in this watershed?

Locate the Ozark Divide.
• What big watershed lies to the north?(*Missouri River*)
• Which one is located to the south? (*White River*)
• Point out that Mansfield, Norwood or Mountain Grove are in the Missouri River Basin. This basin is on the north side of the Ozark Divide. Some students from these districts live in the Missouri River Basin and some live in the White River Basin.
• Locate the North Fork Watershed. Bryant Creek is a part of the North Fork Watershed. It's the creek shown on the left, by the word "north". The North Fork River is on the right and is the North Fork of the White River.
• Have students locate the boundary of the North Fork Watershed and trace it with their highlighter.

3. **Hand out the Bryant Creek Watershed map to the students**. Using the poster map of the Bryant Watershed, read the title and orient students to this map.

• 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.

4. **Next direct them to Cedar Gap Conservation Area** and explain that this is the **headwaters** area of Bryant Creek. Point out the small **tributaries** that are the beginning of the Bryant. Have students highlight from the headwaters to Bryant Spring and on down the entire length of the creek.

• Where does the creek end? (*Tecumseh, near Norfork Lake*)

Direct students to find the beginning of the stream that is near Mountain Grove.
• What is the name of this river? (*North Fork*)
• Is it in the Bryant Creek Watershed? (*No*)

Have them place a finger from one hand on the beginning of the North Fork and a finger from the other hand on Cedar Gap. Trace the two streams at the same time.
• Where do you end up? (*at their confluence just above Tecumseh and Norfork Lake*)
• 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 Bryant Watershed with their highlighter.
• Where is the school located? Is your school in the Bryant Watershed? 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 Bryant 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*)

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 the Bryant, a small watershed right here in the Ozarks. In the next session, they will use more maps and learn a special kind of address called a watershed address. Everybody has one, and they will find them out in the next session.

Lesson Session 2 and Extensions

Session 2
Warm up: Have students identify key locations on the series of maps from the previous lesson.

• Does everyone live in the Mississippi River Basin? Write Mississippi River Basin at one side of the board.
• Does everyone live in the White River Watershed? Do some live in the Missouri River Watershed? Write these on the Board.

Procedure:

1. Hand out the **Local Watersheds** map and put that map on your overhead. Find the North Fork and Bryant Creek. Follow them down to where they come together.

• What stream is labeled between them? (*Fox Creek*) Find Fox Creek on your Bryant Creek watershed map, too.
• Where is the Ozark Divide? Where are the highest ridges in these watersheds? And the lowest areas?
• Highlight the school's location on the overhead map. Have the students mark their copies.
• What watershed is it in?
• Is that in the White River Basin or the Missouri River Basin?
• What do each of these watersheds share with the Bryant Creek Watershed? (*point out the common ridgelines*)

2. Ask students which of these small watersheds they think are in your school district. Write the correct watersheds on the board. Have the students highlight those watershed boundaries on their maps.

3. Ask the students to locate their homes on the collection of paper maps in the classroom. Help students relate the maps to the Local Watersheds map to find their home watersheds.

• Which watersheds do they live in? Count the representatives of each watershed and have them note those population numbers on their maps as well as on the board.
• Which watershed has the most students? Why? Which has the fewest? What might be some reasons for that?

4. Record all those found on both the overhead maps and individual student maps, even if they are approximate locations.

5. Have the students write their complete watershed address on their maps, starting with the smallest watershed they can identify. For example: Hunter Creek, Bryant Creek, North Fork River, White River, Mississippi River. You may use the **Watersheds Worksheet** for this, which has a watershed address form included in it.

6. Ask students who finish first from each watershed represented to think of some important features and landmarks in their home watershed. Where are the bridges? Recreation accesses to the river or creeks? What are the main roads and towns? Ask them to tell the class a little about their home watershed.

Wrap up: Ask a few students to give their complete watershed address out loud. Compare the watershed addresses to mailing addresses. Could you find some one's home by their watershed address? What kind of map would you need?

Evaluation
Each student should be able to identify their own watershed address, and to locate those watersheds on a map.

Extensions
A. Have students read the introductions to the watersheds from the Atlas, either online or in print. Have each student write up and/or illustrate a short descriptive essay about some feature of his/her watershed.
Bryant Watershed Introduction
http://www.watersheds.org/places/bryant.htm
Bryant Creek Tributaries have their own articles. Go to: http://www.watersheds.org/places/tributaries.htm and follow the links.

B. Use a portion of a state map to create a poster or bulletin board, with the watersheds drawn in and students' homes located.

C. Compile the watershed address data for the class on charts or graphs, by hand or using a database program like Excel. See samples of this activity: http://www.watersheds.org/education/agraphs.htm

---

The development of content for this lesson plan was funded through the Missouri Department of Natural Resources. U.S. Environmental Protection Agency Region VII, through the Missouri Department of Natural Resources, has provided partial funding for this project under Section 319 of the Clean Water Act.