Discover the Missouri River Watershed

Overview

Students will...

- Define the boundaries of a single watershed within a map of many watersheds
- Identify the main stem, tributaries, drainage divide and headwaters of the Missouri River Watershed.

Background

A watershed is the area of land that drains into a particular stream, river or lake (fig. 1). We all live in a watershed. Smaller watersheds often join together to form larger watersheds. By looking at a map, you can see that every river or stream is part of a larger watershed. For example, the James River, which joins the Missouri River near Yankton, South Dakota, has its own watershed. The James River watershed is part of the larger Missouri River Watershed, which is also part of the still larger Mississippi River Watershed.

Watersheds are separated by a drainage divide (figures 1 and 2). Drainage divides are typically high points, such as a hill or a mountain, that divide water flowing in one direction towards a stream from water flowing another direction into a different stream and therefore a separate watershed. In the United States, the Continental Divide separates water that flows west towards the Pacific Ocean and water flowing south and east towards the Gulf of Mexico and the Atlantic Ocean.

Vocabulary

Mainstem: the principal watercourse of a river, excluding any tributaries.

Headwaters: the source area of a stream or river.

Mouth: the point of discharge of a stream into another stream, a lake, or the sea.

Tributary: a stream that contributes its water to another stream or body of water.

Drainage divide: The line of highest elevation separating two or more drainage basins, thus distinguishing water flows into each basin.
**Figure 1.** The image above illustrates the definition of a watershed. The red line represents the watershed boundary, or drainage divide. Water outside of the drainage divide will flow into a separate watershed.

**Figure 2.** The image above shows a drainage divide between two watersheds.
**Pre-activity Discussion**

1. Ask if anyone knows the name of the watershed they live in.
2. See if they can identify prominent features of their watershed, such as states and cities, mountains, forests and parks.
3. Show students a map of the United States. A map showing rivers and terrain will be helpful, this can be created here: [http://nationalatlas.gov/mapmaker](http://nationalatlas.gov/mapmaker). Ask them to predict the boundaries of the Missouri River Watershed based on the shape of the rivers. On the right side a variety of layers can be selected. For this question, turn on the “Streams and Waterbodies” layer, as well as a “Shaded Relief Land” layer under the “Geology” heading.
4. Ask why it might be important to know the boundary of a watershed.
5. See if students can identify where major drainage divides are in the United States.

**Materials**

- A map of the Missouri River Watershed, to be shown to students after they have outlined the watershed on their own map as detailed in the class activity below.
- A United States map featuring major rivers and tributaries, 1 per student. A map of major rivers and streams can be found and printed here: [http://nationalatlas.gov/mapmaker](http://nationalatlas.gov/mapmaker). On the right side select the “Streams and Waterbodies” under the ‘Water’ heading. You may also turn on cities and states layers.
Four different color markers, 1 set per student. Blue, red, green, and orange.

**Class Activity**

1. Instruct students to trace the Missouri River in blue, beginning from its mouth at St. Louis to the headwaters at Three Forks, Montana.
2. Have students use the orange marker to trace tributaries of the Missouri River, from its confluence with the Missouri all the way to its headwaters.
3. In this step, students will begin to define the boundaries of the Missouri River Watershed by determining the location of drainage divides at the headwaters of all tributaries flowing into the Missouri River. Students can place a green dot at the drainage divides just above the headwaters of the Missouri River and each of its tributaries.
4. Determine the watershed boundary by connecting the green dots with a red marker. Start at the confluence of the Missouri and Mississippi Rivers, connecting dots in a clockwise motion until the mouth is reached again on the opposite side of the river at the confluence.
5. Optional- have students determine watershed boundaries of other rivers using the same procedure.

**Discussion**

1. Identify the boundaries of the Missouri River Watershed as a class.
2. Revisit key terms: mainstem, tributary, headwaters, mouth and drainage divide.
3. Did watershed boundaries vary among the students? In what areas?
4. For which areas was the watershed boundary difficult to determine? Why?

**Online Resources**

Find your watershed here: [http://cfpub.epa.gov/surf/locate/index.cfm](http://cfpub.epa.gov/surf/locate/index.cfm)

Maps can be created and printed here: [http://nationalatlas.gov/mapmaker](http://nationalatlas.gov/mapmaker)