



Educators' Guide: Water Journeys

Water moves, and people move with it. These lessons build upon the *Water/Ways* and *We Are Water MN* exhibits. Components of the exhibit focus on water quantity and quality and Minnesota's unique position as the source of three major U.S. watersheds. These lessons can also be used as stand-alone activities for learning about cultural connections to water, watersheds, and impacts of land and water use on water quality.

The activities in these lessons will introduce and/or demonstrate the concept of water and water locations as sacred places, cultural relationships with water, water travel in Minnesota and the region, watershed education (including creating watershed models), reading topographic maps to determine watersheds, and creating a visual interpretation of water lessons as a "message in a bottle."

Objectives:

Students will be able to:

1. Gain an appreciation of other cultures' relationships with water and reflect on those relationships to find personal connections
2. Interpret a topographic map and locate a watershed
3. Identify factors of a healthy watershed
4. Apply their understanding of a watershed and create a model of a watershed
5. Use their knowledge of watersheds and water relationships to inform others

Subjects: Language Arts, Reading, Writing, Science, History

Time Required: 45 minutes for individual activities – multiple class periods

Grade Level: Upper elementary through middle school; younger and older with modest modifications

Materials: Map of Minnesota and topographic maps, markers or colored pencils, glue or twine, natural materials for small boat making (students can collect these themselves), cookie sheet, access to water, instant drink mix, craft materials for watershed models (students develop their materials list), empty bottles

Background: For centuries people have lived and traveled on rivers. Boats have been constructed from the natural resources available. In Minnesota, it was first the Dakota that lived on and traveled the lakes, rivers, and streams. They were joined by the Ojibwe and then European settlers. Today, Minnesota is still home to the Dakota, the Ojibwe, and people of many different cultures from across the world.

Different cultures have different ways of relating to water. While some view it as a resource to be used, others consider it a relative. Water also has spiritual and cultural significance to many, including the Dakota people.



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Bdote is a Dakota word that translates as, “where two waters come together.” Ask students what they think that means. The most significant bdote to the Dakota people of Minnesota is where the Wakpa Tanka (translated as big river), also known as the Mississippi River, and the Mnisota Wakpa, also known as the Minnesota River, join together. For many Dakota, this particular bdote is the center of the earth and where their people began. It is a part of their creation story.

As more people moved into the state, water use changed. People changed how rivers and water flowed, increased how much was used, and land use affected how water flowed across land. People are still changing our watersheds and our waterways today.

A watershed is an area of land that drains all the water to a common place or outlet. In a watershed, some water from rain and precipitation filters into the ground. But, water that cannot be absorbed by the soil flows downhill towards rivers, lakes, reservoirs, wetlands, and other bodies of water.

When conducting research, encourage students to use “close to the source” resources whenever possible (for example, utilize Dakota sources to research Dakota topics). These sources can be found online, through libraries and historical centers, and through the tribes themselves.

"When drinking water, remember its source."
— Chinese proverb

Procedures:

Where We Gather: Bdote

Show your students a map of Minnesota. Ask students to look for cities and communities and notice that many are along rivers or near large bodies of water. This is not something that is new to our present-day cultures. Allow students to brainstorm reasons why people of all cultures would choose to live along rivers. This list might include ease of transportation and travel, supplies water and food, religious reasons, and irrigation for farming.

It is also common for communities to be built at locations where rivers come together. In addition to logistical benefits of these locations, the Dakota people are connected to these places because of their spiritual and cultural importance.

Introduce students to the word, “bdote.” This is a Dakota word that translates as, “where two waters come together.” Ask students what they think that means and to discuss some different situations where waters join (at rivers, river into lake or ocean, etc). The most significant bdote to the Dakota people of Minnesota is in the area that has become the Twin Cities. Where the Wakpa Tanka (translated as big river), also known as the Mississippi River, and the Mnisota Wakpa, also known as the Minnesota River, join together is a place of spiritual, cultural, and historical importance. For many Dakota, this particular bdote is the center of the earth and where their people began. It is a part of a creation story.

Allow students to hear Waziyatawin share her creation story. The video is two and half minutes.

http://www.humanitieslearning.org/apps/video/upload/wazcreationfinal_2.mp4

Have students visit the Bdote Memory Map at <http://bdotememorymap.org>. Allow students to explore this site to hear water stories and learn more about the Dakota people’s relationship to water and Minnesota. Once students are familiar with the concept of bdote and have had the opportunity to listen to the stories on the Bdote Memory Map, lead a discussion about the importance of special places and water.

- What did they learn about Bdote?
- How do they think Bdote affects the lives and choices of modern Dakota?
- Do they have a water place that is significant in their life? How is it similar to Bdote? How is it different?

All in the Family: A Way of Viewing Water

Water has always been important in the lives of Minnesotans. Agriculture, industry, and recreation have had success in the “Land of 10,000 Lakes.” Some cultures treat water as a thing to be used and controlled.

While specific traditions vary between tribes, a common view of many Native American cultures takes a familial approach to water. The Dakota and many other native cultures view water and other living things as a relative and thus deserving respect. Like a brother or sister, water can provide us with care and things we need but can also cause harm. Similarly, we can take care of water or we can hurt it.

Have students create a list of ways that water can be compared to a family member. Ask students to write a short paragraph that compares water in some form (rain, river, waves) to a family member. Encourage students to use figures of speech to demonstrate these ideas.

Example:

The lake was as calm as my older sister. And together, the lake and my sister served a dinner of fish that fed the entire family!

All the World

Share with students that the United States and Minnesota have seen many changes from immigration over the past 400 years. Ask students to consider their own heritage and create a classroom list. Allow students to share any of their cultural connections to water they may know.

Add to the list to ensure that many of Minnesota and the world’s cultures are represented. Have students research the culture and perceptions of water of a different culture. Does water have significance in this culture? What is the cultural relationship to water, if any? How did water scarcity or abundance affect this group’s relationship with water? What other factors affect this? How has this culture’s relationship with water impacted our state’s relationship with water?

Life on the Water: Boats

Take students outside on the school grounds, local park, or natural area. Remind students of the Minnesota map that they have reviewed in earlier lessons, and that the Dakota, Ojibwe, and other tribes of Minnesota maneuvered the waterways of the region. Depending on location and purpose of work, they used birchbark and dugout canoes, bullboats (a bowl-shaped wooden frame covered in animal hide), and rice boats and rafts. They fished, harvested wild rice, and travelled the state’s waters. These traditions continue today, although use of traditional boats is not common.

The Ojibwe are most commonly associated with birchbark canoes as it is a type of boat that was originally used by tribes in the northeast region of what is now the United States. However, they also used rice boats, flat bottom boats, for harvesting wild rice, rafts, and other boats depending on circumstances.

The Dakota are commonly associated with bullboats. Bullboats were used to transport materials and goods, small children, and those requiring assistance across streams or rivers. They weren’t used for long trips on water. Bullboats were used by the tribes that lived along the Missouri River and in the upper Midwest region of what is now the United States.

Instruct students to collect natural materials that they will use to create their own small boat. Using only natural materials (and glue or twine), have students work in small groups to create their own boat.

Once their boats are made, have students create an overview of their boat: what materials were used to create it; what kinds of water could it go on (lakes, rivers, small streams); if they could make it full-sized, how many people could it hold; what purpose would it serve; etc.

Have each group make a short presentation of its boat before having the opportunity to put it on water. (Use a washbin or other tub if an outdoor water feature is not available.)

Extension:

Assign small groups a specific, traditional boat to research. Have them prepare a report on that type of boat and construct a small model. Remind students not to strip live trees of their bark to create their boats.

When conducting research, it's a good idea to use "close to the source" resources whenever possible. Encourage students to use Ojibwe sources to research Ojibwe topics, Dakota sources to research Dakota topics, etc., whenever possible. These sources can be found online, through libraries and historical centers, and through the tribes themselves.

Consider inviting a traditional builder into the class to share their knowledge with the students. The Minnesota Humanities Center, the Minnesota Indian Affairs Council, and most historical societies and nature centers will have names of traditional builders that they can share.

Life in the Watershed

Hold a cookie sheet at a slight angle with the bottom end on another cookie sheet or towel (something to catch water). Tell the students that you are going to pour a cup of water in the middle of the cookie sheet and ask them which way the water will flow: down. Share with students that just like the water that flowed down the cookie sheet, when water flows on land, it flows from high areas to low areas. Ask students to think about where water flows? Into rivers, streams, lakes, oceans – but sometimes even something as small as puddles!

Discuss what students may already know about watersheds. If this is a term that they are familiar with, have them share their definition. If this is a new term, share the definition.

A watershed is an area of land that drains all the water to a common place or outlet. In a watershed, some water from rain and precipitation filters into the ground. But, water that cannot be absorbed by the soil flows downhill towards rivers, lakes, reservoirs, wetlands, and other bodies of water.

Conduct the demonstration a second time, but sprinkle instant drink mix (like Kool-Aid) and some dried herbs on the cookie sheet before pouring the water. Explain to the students that as water flows across watersheds, it picks up pollutants from the surface and deposits the pollution in the waterbodies in the watershed. Even something that isn't always considered a pollutant, like soil, can be considered pollution if it enters the bodies of water in enough quantity. Pour water along the top of the cookie sheet

Watersheds are important because they hold water from rain and precipitation, store groundwater, and provide habitats for animals, plants, and humans. Humans modify watersheds and waterways for a variety of reasons. Flood control, land use, and human water use needs are some of the significant reasons that watersheds have been and continue to be changed.

Riverways were commonly straightened so boats could navigate. Construction of homes, farms, cities, and parking lots continue to change how water flows across the lands' surface and what is carried into waterways. While humans still modify watersheds and waterways, a greater effort is taken in most areas to reduce negative impacts. Educational efforts attempt to inform the public of water issues. Watershed restoration is the term for projects that work to improve watersheds and re-introduce natural elements.

Watersheds are like a set of measuring cups. Smaller watersheds make up medium watersheds, and medium watersheds make up larger watersheds. A watershed can be as small as a portion of your yard that drains to a low area and as large as the Mississippi River Watershed.

More on the Mississippi River Watershed:

The Mississippi River Watershed is truly amazing. It covers all or part of 31 states and two provinces in Canada! It covers about 1.2 million square miles. Looking at a map, about 40% of the continental United States is a part of the Mississippi River watershed. (The Mississippi River watershed is actually identified as the fourth largest watershed in the world.)

On the Map

Provide each student with a copy of a topographic map and share that these maps show features of the landscape. The contour lines on a topographic map show changes in elevation. Remind students that water flows from high areas to low areas. Inform students that they will use their topographic maps to identify a watershed.

Instruct students to select a large stream or river on their topographic map. They will find the watershed of this river. Choose a location downstream and mark an “X” at the location with a colored pencil or marker. This will be the color of their watershed. With the same color, mark all of the stream above the downstream “X” location. Do the same thing to all the tributaries flowing into the main river that the student has selected. (Students may need to be reminded that a tributary is a river that flows into a larger river.)

Have students study their topographic map and use a different color pencil or marker to mark any streams or rivers in the area of their river system, but that are **not** connected. These rivers and streams are in a different watershed. Remind students that since water flows from high points to low, their next step is to find the high points that will separate the watersheds.

Instruct students to find the high points on the land surrounding their stream system and put an “X” at those points. Connect those points (like a dot-to-dot) to create the watershed boundary. The beginning and ending point will be the original sample location downstream. The watershed boundary should include the entire stream system that was marked in the first color. Streams in the second color are outside of this watershed, but of course, in a watershed.

Reiterate that anything that is exposed to the land within a watershed will flow to the watershed’s lowest point, where they put their x on the map.

Extension:

The MCPA studies the water in Minnesota by dividing into 81 large watersheds. What larger watershed is your little watershed a part of? What are some of the characteristics of the larger watershed (this a paragraph on the watershed page)? Are they similar or different to what you found in your little watershed?

<https://www.pca.state.mn.us/watersheds>

Research opportunity

Have students research their local watershed individually or in small groups. Students should consider the following questions:

- What is their watershed’s history?
- Who has called this watershed home?
- How has the watershed changed over time?
- What communities and cities are in the watershed?
- When were these communities started and by whom?

- What were early industries and current industries?
 - What is the potential impact on the watershed?
- What are potential sources of pollution from the different land uses in the watershed? (The *We Are Water MN* exhibit has information on common Minnesota pollutants and their sources.)
- What role does water have in the history and cultures and ecosystems of this watershed?

Healthy Watersheds: Make Your Own Models

In small groups, have students research watersheds and create their own watershed models. This could be a model of an imaginary watershed or an actual watershed.

First, allow students to research watersheds and document their observations of what they have learned. In addition to the information from the introduction to watersheds discussion in this lesson, encourage students to research factors that make a healthy watershed (natural waterways and winding rivers, wetlands, plants and greenspaces, etc.).

Second, have students plan their watershed model. After discussing, students should sketch out the plans for their watershed model. They will need to determine what materials they will need and have available. Consider providing students with a list of supplies and materials available to them or allow them to create their own list. Ask students to have their plan approved before allowing them to move on to creating their model.

Students will need to determine what will hold or form their watershed, how they will create high and low (topographic) features, how their watershed will hold water, where their watershed will drain (a river, wetland, lake, ocean, etc.), and what features they will have in their watershed.

Groups needing assistance can be provided with the following suggestions:

- Will their watershed have a straightened river, a natural river, or no river at all?
- Will there be a wetland? If yes, what could they use as a wetland? (sponges can be used as wetlands)
- Will they include a city, farm, or other land use?
- How will they have vegetation?
- Suggestions for watershed models include creating a watershed in a 9x13 pan, a paint pan, or a yard model.

Finally, students create their models. Once the models are created, have students make presentations on their models. Share what they included to make sure that their watershed was healthy. Have students reflect upon the Dakota and Ojibwe approach to water as a member of their family that can help or hurt. Have students share how they are taking care of their watershed and how their watershed will take care of them.

Message in a Bottle

Encourage students to think about what they have learned about water and what they want people in the future to know.

Ask students if they have ever heard of a message in a bottle. A message is written on paper and put in a sealed container and released into a body of water (usually an ocean or sea). The bottles float downstream or on currents. Sometimes scientists even used a message in a bottle to study ocean currents.

Have students create their own message in a bottle. Consider what they have learned from the past and what lessons they hope people in the future could learn from them.

What are other ways that waterways convey information (seasonal changes, plants and animals that are found in an area or have disappeared, water levels, speed of current)?

Variation: Have students imagine that they have found a message in a bottle in a Minnesota waterway. Have students research a person (or people), community, body of water, or event to create a letter from the past. What does the writer of the message want the person finding the bottle to know?

Select a stream or river in your community. If you placed a message in a bottle, where would it go? Think about what you know about watersheds to answer this.

Make It Seen

Create a visual exhibit of the Message in a Bottle project. Have students bring in bottles or jars (glass or plastic). Make a copy of each student's letter to the future. Place one copy of the letter in the student's bottle.

Line the bottles up along a wall, ledge, or table in the classroom, office, hallway, library, or other public area. Hang the second copy of the letter to the future behind the bottle containing the letter. Invite parents, students, and others to view the exhibit.

Litter and trash in our waterways is a problem. Consider having your students participate in a litter clean up. The bottles that are collected can be used in the Message in a Bottle project.

Get Outside

Many communities have nature centers and other organizations that assist in getting students and other groups "on the water." Contact one of the *Water/Ways* host sites or other community resources to plan a daylong (or partial day) canoe trip.