Great SHIPS on the Great LAKES

Welcome to the Great Ships on the Great Lakes Teacher's Guide and Student Materials DVD. This format will allow you to browse the guide by chapter. See the following sections for each chapter's activities.

Basic Guidelines

Activities

Copyright

Additional Resources

Basic Guidelines

The activities in this teacher's guide reinforce the content that students encounter in *Great Ships on the Great Lakes* by allowing them to participate as active learners rather than as passive recipients of information. Integrative by intent, the activities teach and enhance skills in language arts, geography, mathematics, art, social studies, and science. Students of diverse learning styles will thus be able to handle the content of the chapters more effectively. Typically students will be working cooperatively in groups as they use a variety of problem-solving and inquiry-based techniques, behaviors used regularly by working historians.

You should read *Great Ships on the Great Lakes* before reviewing the accompanying activities. Although a few of the activities may be useful as an introduction to a particular chapter, most will serve as active learning supplements. Please feel free to adapt any of the suggested procedures to suit the needs and interests of your students. You may not want to use every activity, but as you make your selections, please understand that some build on skills acquired in activities relating to earlier chapters. As we attempt to anticipate various teaching and learning styles, the activities in this guide appear in several different modes to accommodate as many styles as possible. Although information has been formatted loosely with variations and extensions to enhance the lesson, you can quickly review the entire activity before making the adjustments necessary to fit your curricular design and the needs of your students.

Teacher background material appears in chapters 6 and 8. The purpose of the background material is to give teachers some basic context for topics with which they may not be familiar, as well as provide whatever specific factual information the activity requires. Often a significant amount of information appears directly in the reader, and as mentioned above, we encourage teachers to read the classroom book thoroughly for context information before using the activities.

Activity sheets for students to complete are included in the form of PDFs. As indicated in the activities themselves, some historical maps and illustrations are suitable for photocopying, reproducing as transparencies, or using on a SMART Board. For the most part, activities require minimal preparation, and all materials are included or easily available.

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TEACHER'S GUIDE AND STUDENT MATERIALS

Bobbie Malone

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wisconsinhistory.org

CD cover and splash page: The schooner *John J. Audubon* lies 170 feet deep in Lake Huron. Photo by Doug Kesling, NOAA Thunder Bay National Marine Sanctuary

CD inside cover: Photo of diver investigating the *McCool* off the coast of Bayfield, Wisconsin, by Tamara Thomsen, Wisconsin Historical Society; painting of the *Cornelia B. Windiate* by Robert McGreevey, NOAA, Thunder Bay National Marine Sanctuary; Photo of Thunder Bay Lighthouse, Thunder Bay Sanctuary Research Collection

All maps are by the University of Wisconsin Cartography Laboratory unless otherwise noted.

Designed by Composure Graphics

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Activities

What Is Maritime History?

1

Activity 1.1: Defining the Great Lakes Region

Goal

To familiarize students with the basic geography of the Great Lakes region

Objectives

The student will:

- Label each of the Great Lakes
- Label each state and marked city
- Create a puzzle map

Overview

Students will create a puzzle that, when complete, makes up the Great Lakes region.

Skills and Strategies

Knowledge, comprehension, analysis, synthesis

Materials

- Map of the Great Lakes (one for each student)
- Scissors and markers
- Answer Key: Map of the Great Lakes

Procedures

1. Give each student a copy of the map.
   a. Discuss briefly what makes the Great Lakes region special.
   b. Find your own location on the map and discuss it in relation to the nearest Great Lake.
   c. Name and label each of the Great Lakes.
   d. Name and label each of the states and marked cities.
   e. Discuss briefly the importance of the highlighted cities.
2. Using their scissors, students can cut their map, turning it into a puzzle. The puzzle doesn't need to follow state or lake lines.

Closure

Have students get into groups of two. Have them trade puzzles and see if they can put their partner's puzzle back together. Then, students should name off the states and the Great Lakes.

Extension

Students can go online to look up interesting facts about the Great Lakes region, play Great Lakes games, or put together Great Lakes regional puzzles. See the Additional Resources section for helpful websites.

Name _____ Date _____

Map of the Great Lakes

University of Wisconsin Cartography Laboratory

Answer Key: Map of the Great Lakes

University of Wisconsin Cartography Laboratory

Lakes, Rivers, and Ice

2

Activity 2.1: How Is Water Used?

Goal

To build appreciation for the extent and consequences of personal water use

Objectives

The student will:

- Record daily water use in their Water Use Diary
- Express their data in bar graph form
- Compare and contrast water use data from class results
- Draw conclusions regarding necessary and unnecessary water use

Overview

Water is part of everything we do. In order for students to more fully appreciate the importance and omnipresence of water, this two-day activity will explore many uses of water and its impact on our daily lives. You may choose to do this activity before students read the second chapter.

Skills and Strategies

Recording, graphing, analyzing, evaluating

Materials

- Amounts of Water Used in Common Daily Activities (one for each student)
- Water Use Diary (one for each student)
- Water Use Bar Graph (one for each student)
- Crayons, markers, or colored pencils

Teacher Prep

The day before working through the activity with students, maintain your own Water Use Diary so that you can use it as a model.

Procedures

1. Discuss the many uses of water, starting with those listed at the beginning of Chapter 2. Have students brainstorm other examples.
2. Hand out an Amounts of Water Used in Common Daily Activities sheet and a Water Use Diary activity sheet to each student. Explain that students will keep track of their water use for one twenty-four hour day. Tell them to use the activity sheet to help them record all their water use, using the Amounts of Water sheet as a guide. Remind them to write down every time they use water. Model this exercise for students, with examples from your own diary.
3. After students have spent one day recording their water use, discuss the uses of water with the class. Record each type of water use on the board or overhead projector. Include each use only once. Next to each example, tally the number of people who recorded that particular water use. Keep this data for student bar graphs.
4. Model the construction of a bar graph to plot water uses versus number of people. Number of People will be on the Y axis, and Types of Uses will be on the X axis. Hand out Water Use Bar Graph copies to help students get started. Explain that assessment will be based on (a) neat and accurate recording of data and (b) the thoughtfulness of the discussion questions that students pose.
5. Have each student complete and color his or her own bar graph. If students are new to bar graphs, they may work in pairs.

Closure

Discuss completed bar graphs, having students respond to the following questions:

Which water uses were the most popular? Why?

How could we conserve (save) water?

Which water uses do you think seem necessary? Which could we do without?

Finish this activity by guiding students in generating questions of their own. Have students turn in bar graphs for assessment.

Extension

Compute how much water each person consumed, based on the amounts given. Figure out how much water the class used as a whole. Based on this information, how much water would the class use in a week? In a month? In a year? For more information on water use, see the Additional Resources section.

Amounts Of Water Used In Common Daily Activities

Activity	Gallons of water used
Brushing teeth (water running)	2
Drinking water	1/4 (1 quart for each 50 pounds of body weight)
Flushing toilet	5–7
Dishwasher	10
Leaky faucet (per day)	25–30
Washing dishes by hand (water running)	30
Bath	35
10-minute shower (without water-saving head)	25–50
Washing machine (large load)	60
Watering lawn (10 minutes)	75
Washing car (hose running)	180

From *Project WET Curriculum & Activity Guide*. The Watercourse and the Council for the Environment Montana, 1995.

Name _____ Date _____

How Is Water Used? Water Use Diary

For one full day record all your water use. Every time you use water (for brushing your teeth, taking a bath, flushing the toilet, drinking, cooking, or other uses) write down the time of day and the use.

Time of Day	Water Use	Estimated Time Used
7:00 a.m.	brushing teeth	2 minutes

Statistics from *Project WET Curriculum & Activity Guide*. The Watercourse and the Council for Environmental Education, 1995, p. 385.

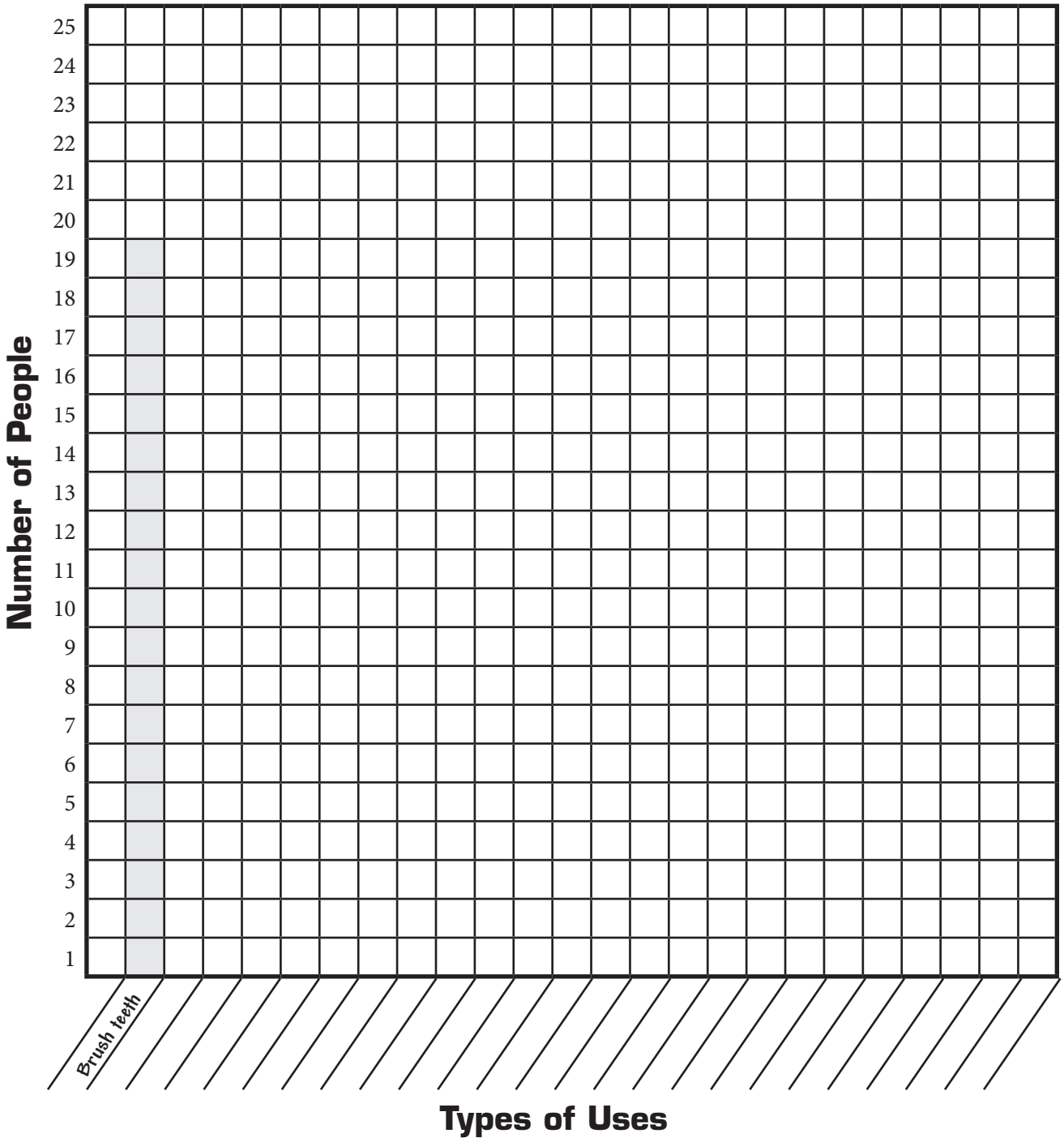
Something to Think About

Q: How much water does the average person use at home per day?

A: Estimates vary, but each person uses about eighty to one hundred gallons of water per day. Are you surprised that the largest use of household water is to flush the toilet, and after that, to take showers and baths? To help us conserve water, many local governments now have laws to make certain that water faucets, toilets, and showers only allow a certain amount of water to flow per minute.

Name _____ Date _____

Water Use Bar Graph



Activity 2.2: River Systems of the Great Lakes Region

Goal

To demonstrate understanding of six major river systems and watersheds in the Great Lakes region

Objectives

The student will:

- Locate and identify six major rivers, their tributaries, and their watersheds in the Great Lakes region
- Indicate the flow of river systems and chart their directional movement

Overview

The Great Lakes region has many smaller rivers that drain into its lakes. This lesson focuses on six of the major river systems. They drain into Lake Huron, the Mississippi River, Lake Michigan, and Green Bay. Students will learn that river systems are rivers and streams that connect or flow into each other and ultimately into a larger body of water. Therefore a river system may include many rivers. A river system stays within the boundaries of its specific watershed. In this activity, groups of students will become "experts" on one of the major river systems by discovering its location, flow pattern, and the larger body of water into which it flows. Student groups will take turns identifying watersheds on the class map and then filling in their own study maps with the same information.

Skills and Strategies

Labeling, identifying, interpreting, predicting, teaching, correlating

Materials

- Major Waterways of Wisconsin (digital overhead)
- Major Waterways of Michigan (digital overhead)
- Six major watershed pages for each group (one per student per group)
  - Rock River Watershed (also use as digital overhead)
  - Wisconsin River Watershed
  - Chippewa-Flambeau River Watershed
  - Saginaw River Watershed (also use as digital overhead)
  - Grand River Watershed
  - Menominee River Watershed

- Transparency markers in five to six colors
- Where Do Our Rivers Flow? (transparency and student page)
- Answer Key: Where Do Our Rivers Flow?

Procedures

1. Systematically review students' knowledge of the basic elements of maps, including colors, orientation, compass, etc.
2. Show students an overhead of the Major Waterways map for Michigan or Wisconsin. Explain that its purpose is to show river systems.
3. To be sure the students understand the concept, have them look up and read the definitions of *watershed* and *tributary* in a student dictionary. Also, share with the students the definition of *river systems*.
4. Explain to students that they will use the watershed maps provided to do the following: locate and trace the entire river system in a specified color; identify the large body of water into which their river system flows; and predict in which direction the river flows.
5. Model the process of discovery first using the Rock River watershed in Wisconsin or the Saginaw River watershed in Michigan.
6. Using the map transparency, locate and color the river system. Indicate some of the tributaries as you trace the river system to the Mississippi River or Lake Huron. Explain to the students that their river systems will not extend beyond the Great Lakes region.
7. Using a specific color, trace the Rock River or Saginaw watershed on the Major Waterways digital overhead.
8. Have students predict the direction of the water flow. Using the transparency "Where Do Our Rivers Flow?" check off Mississippi River for the Rock River system or Lake Huron for the Saginaw River system.
9. Group students into three to five groups, depending on how many river systems you'd like to cover, and deliver watershed maps to each student. Assign each group a different watershed to investigate.
10. Allow time as needed and circulate to assist students. Remind students to prepare for their group presentations by first sharing in their small groups what they have discovered. One student from each group will trace the watershed on the class map.

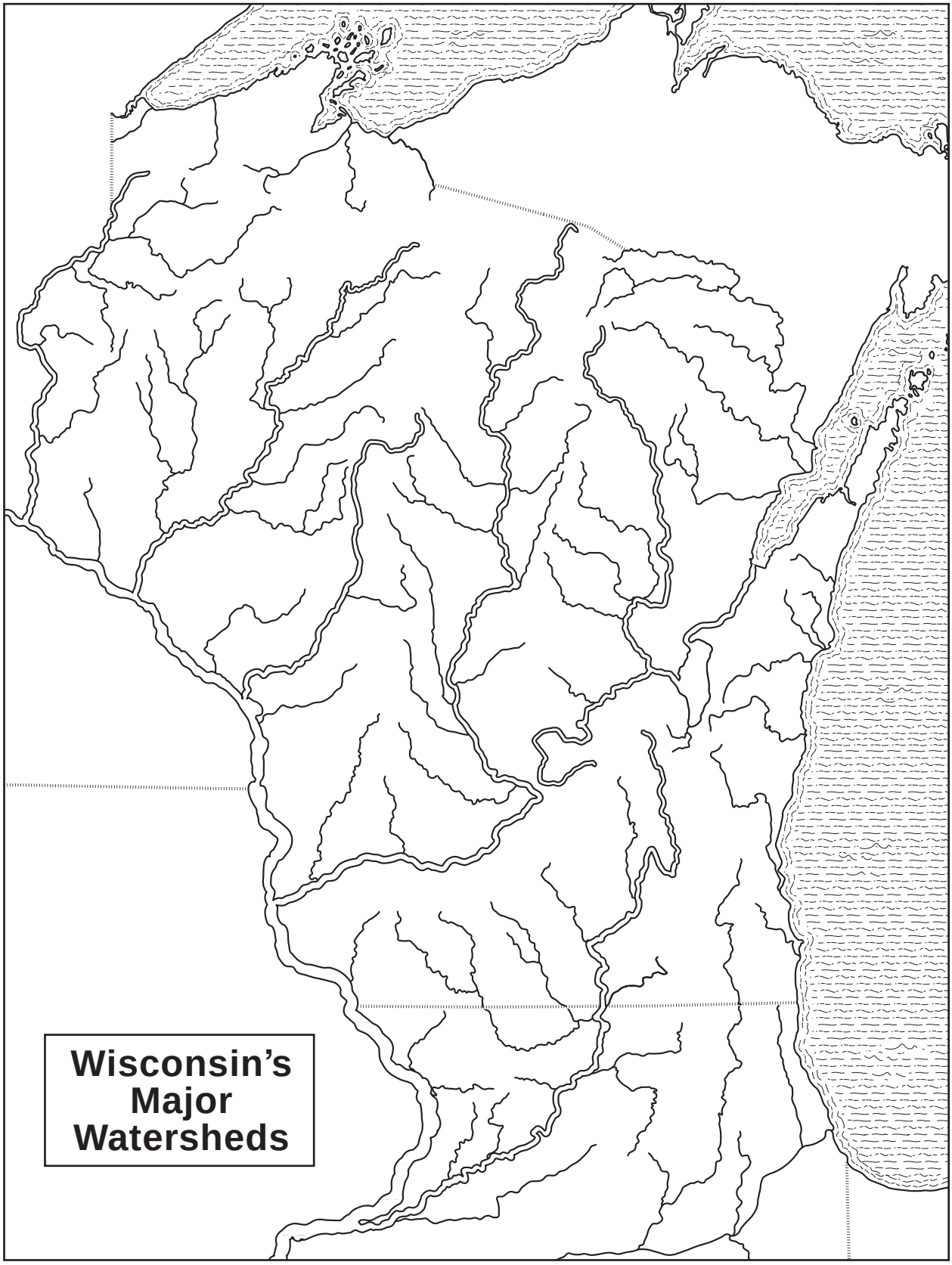
Closure

While using individual maps, have the students demonstrate the flow pattern of each river system.

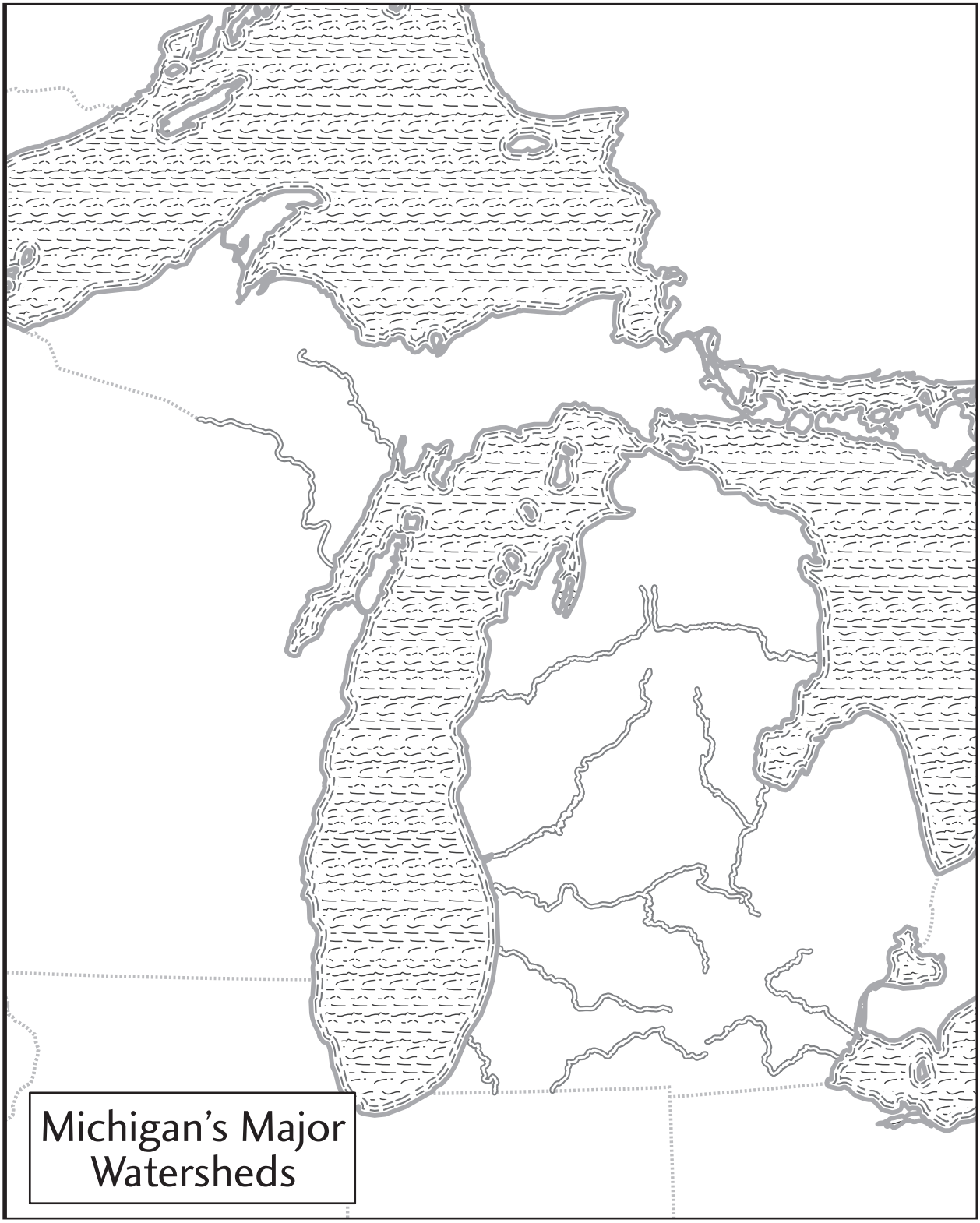
Extension

Using a classroom atlas or an online map, have students determine the major cities on their waterway and write to each city's chamber of commerce. When the packets from each city arrive, the students should extract any river use information and compile it to share with their classmates. Label all of the rivers in their designated watershed.

Wisconsin's Major Watersheds



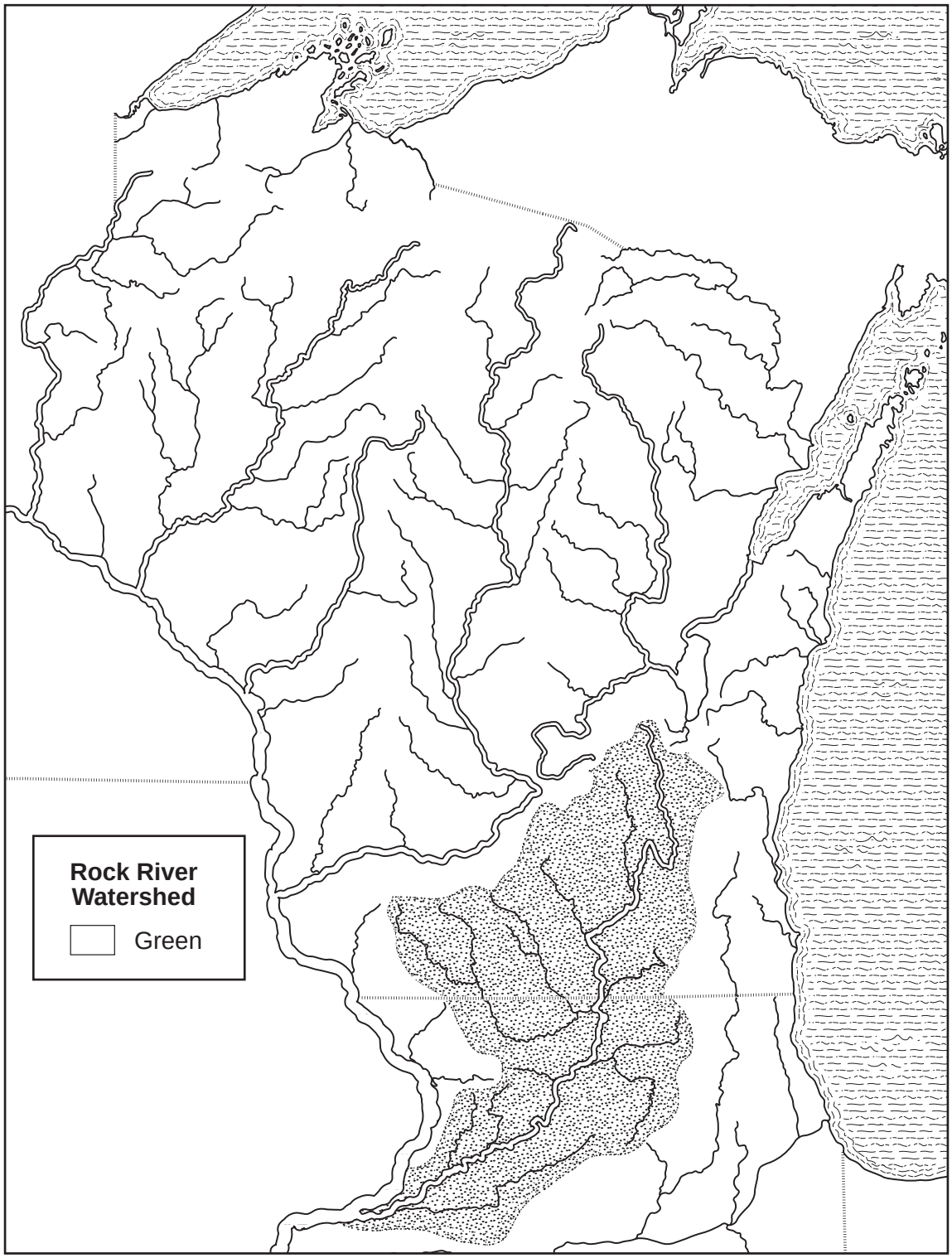
Michigan's Major Watersheds



University of Wisconsin Cartography Laboratory

Name _____ Date _____

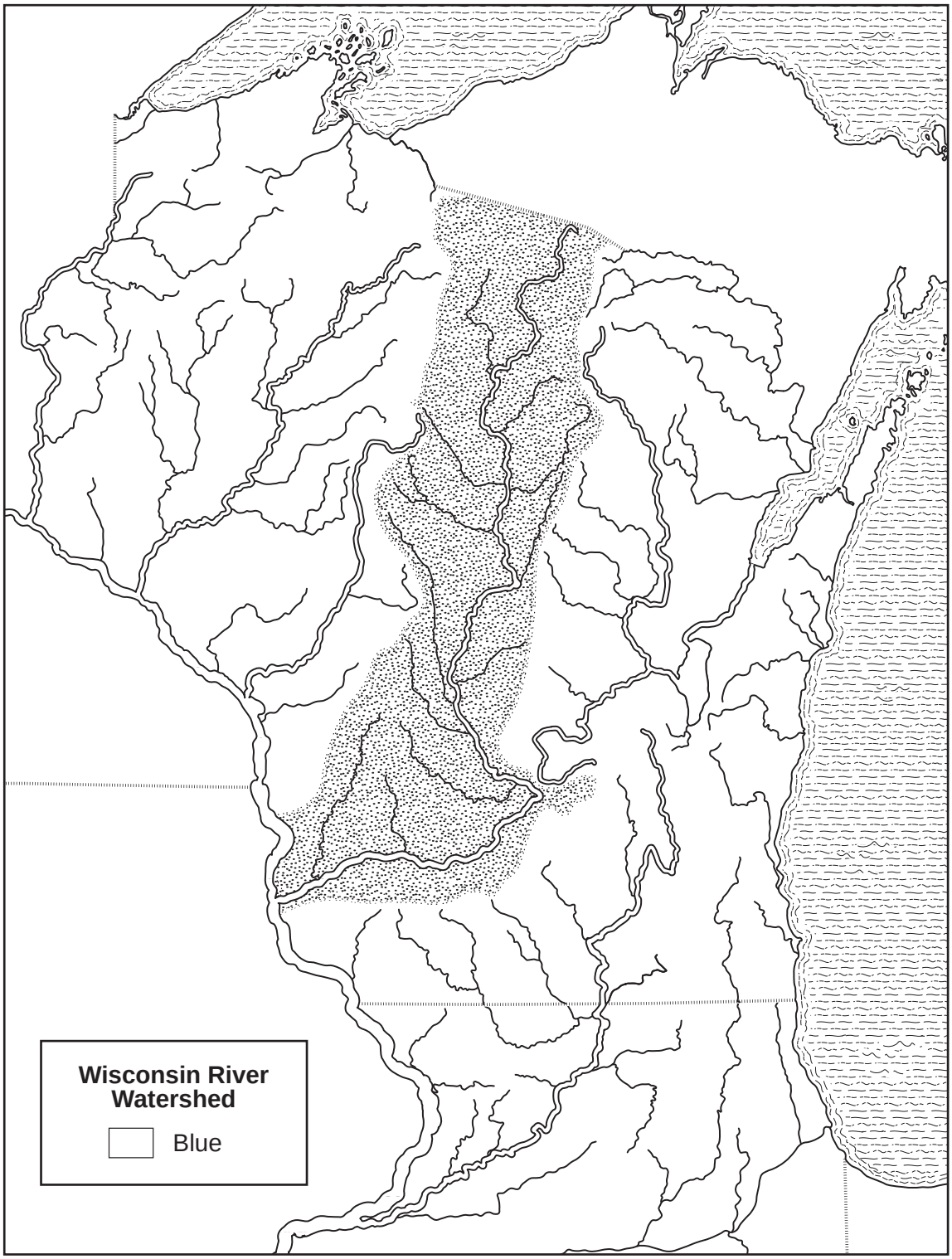
Rock River Watershed



Amelia Janes/Mike Gallagher, Midwest Educational Graphics

Name _____ Date _____

Wisconsin River Watershed



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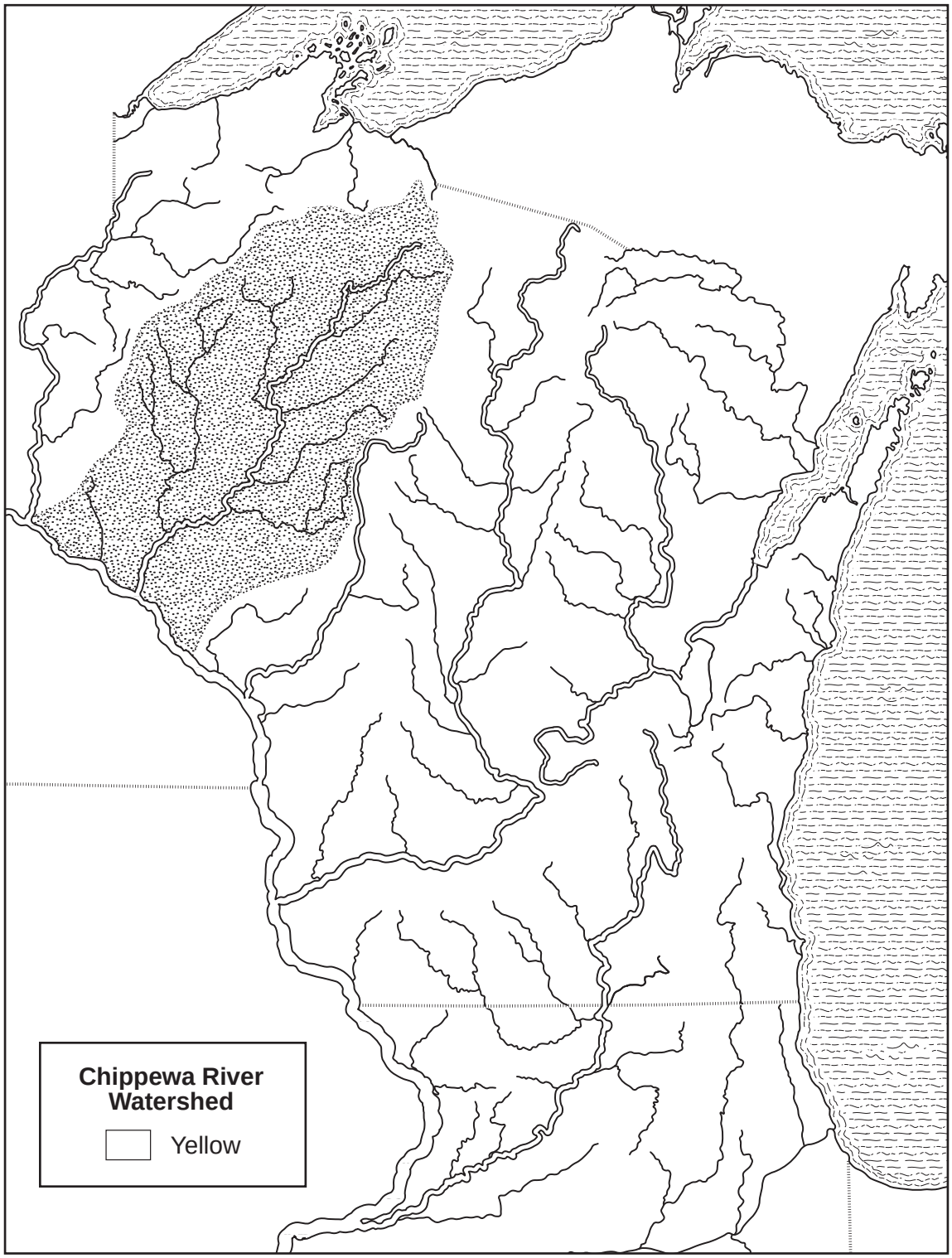
Name _____ Date _____

Chippewa-Flambeau River Watershed



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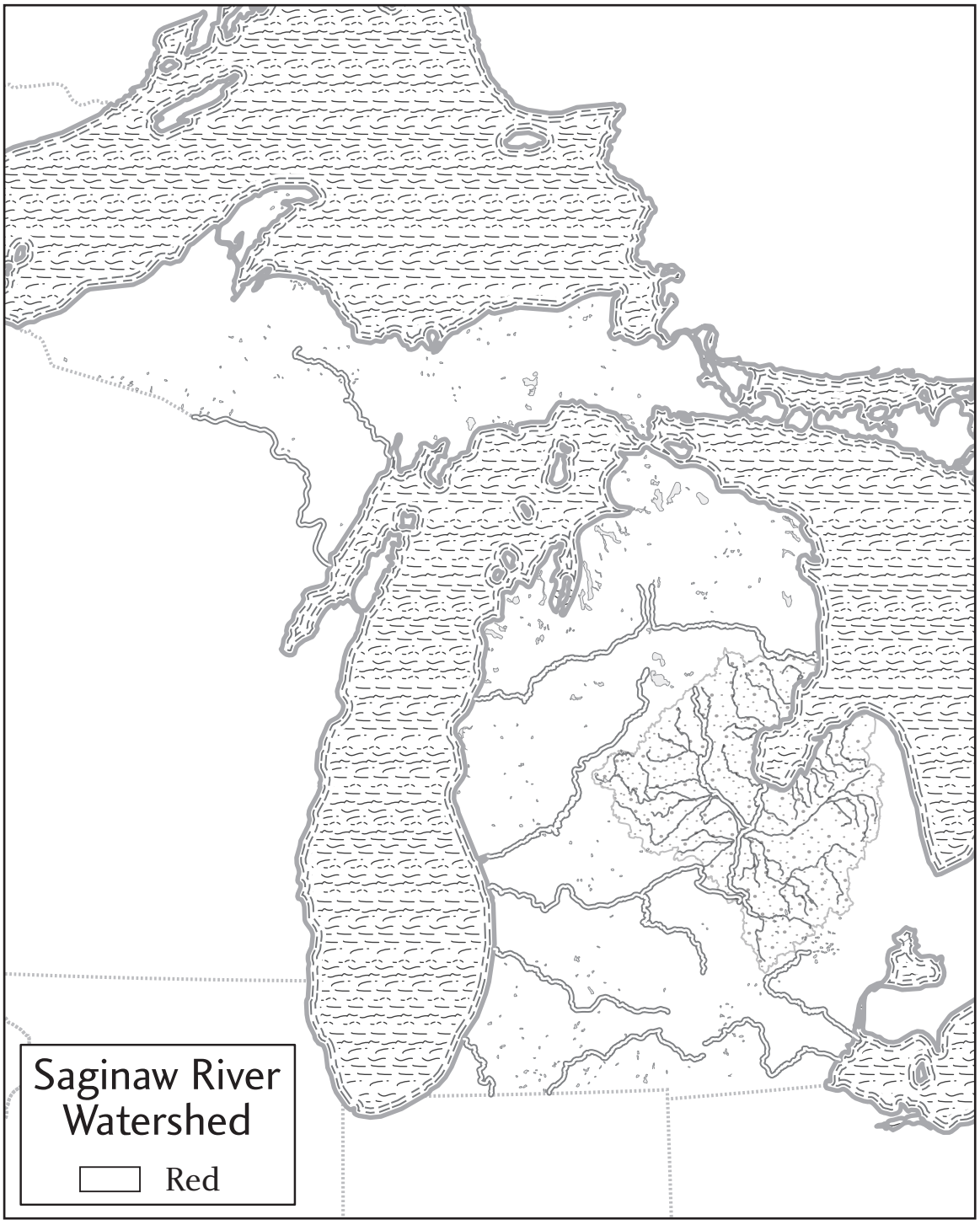
Name _____ Date _____

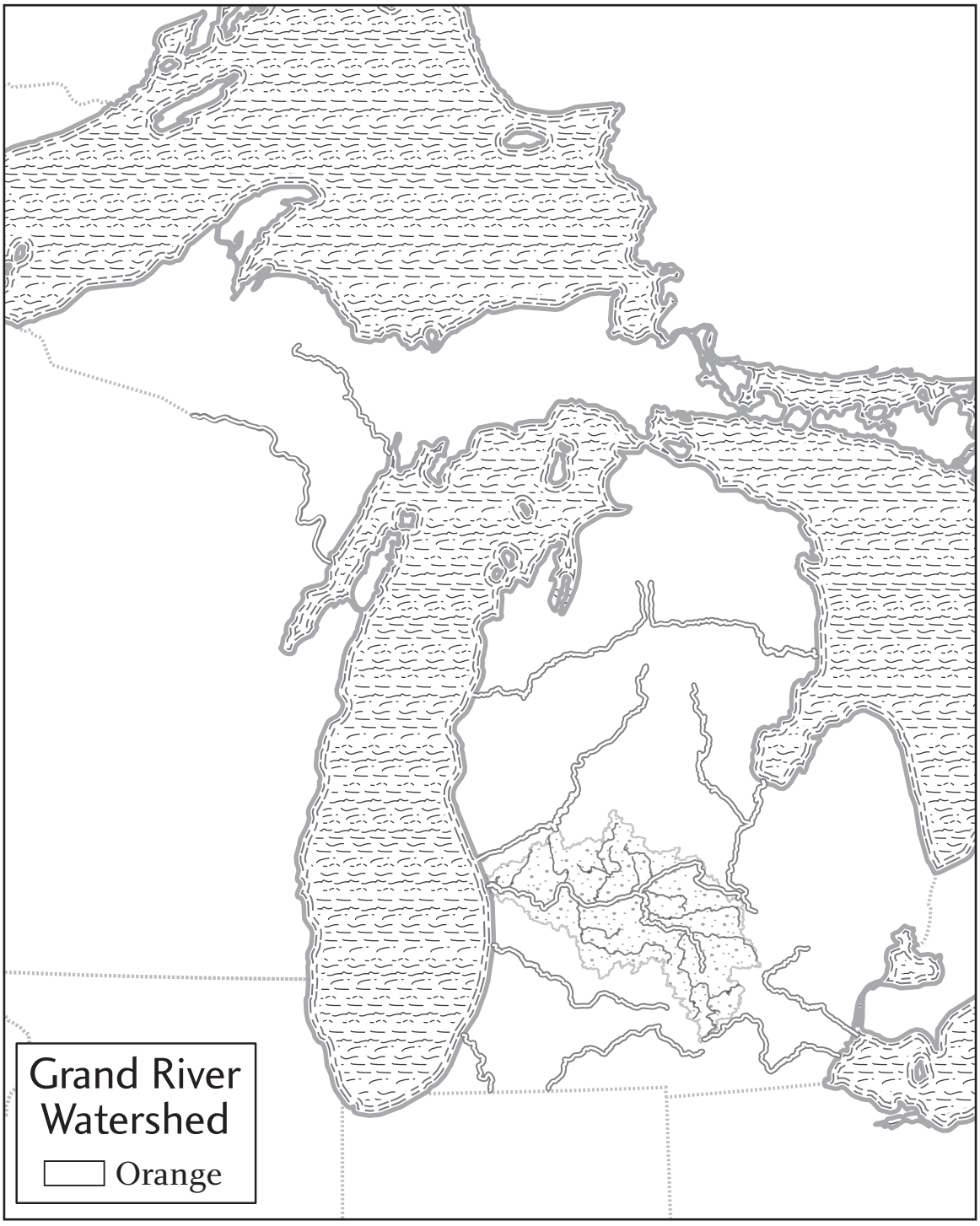
Saginaw River Watershed



University of Wisconsin Cartography Laboratory

Name _____ Date _____

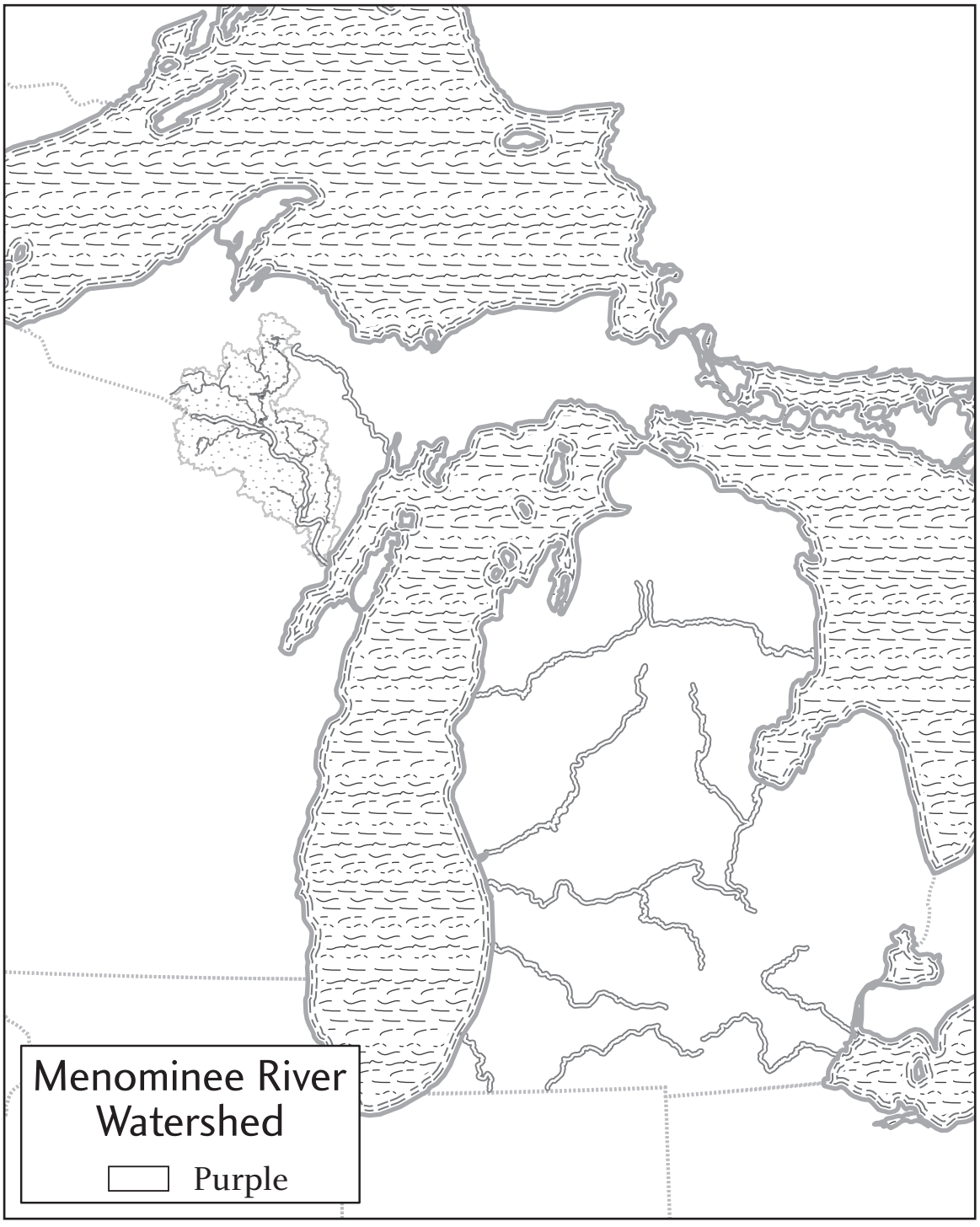
Grand River Watershed



University of Wisconsin Cartography Laboratory

Name _____ Date _____

Menominee River Watershed



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Name _____ Date _____

Where Do Our Rivers Flow?

River System	Lake Huron	Mississippi River	Lake Michigan	Green Bay
Rock River				
Wisconsin River				
Chippewa-Flambeau River				
Saginaw River				
Grand River				
Menominee River				

Where Do Our Rivers Flow?

Answer Key

River System	Lake Huron	Mississippi River	Lake Michigan	Green Bay
Rock River		×		
Wisconsin River		×		
Chippewa-Flambeau River		×		
Saginaw River	×			
Grand River			×	
Menominee River				×

Activity 2.3: Miniature Glaciers

Goal

To understand how glaciers shaped the landscape of the Great Lakes region

Objectives

The student will:

- Construct a model of a glacier
- Observe and record the sorting of drift material through modeling
- Compare and contrast the size and placement of the drift materials in the glacial melt outwash plain

Overview

Melting glaciers created areas of glacial outwash (debris carried by water). This sorting affected the region's natural topography, with boulders and larger rocks remaining on higher ground while the sand washed to the central plains. In this activity, students will create a miniature glacier and observe the "sorting" of drift material from the melting glacier.

Skills and Strategies

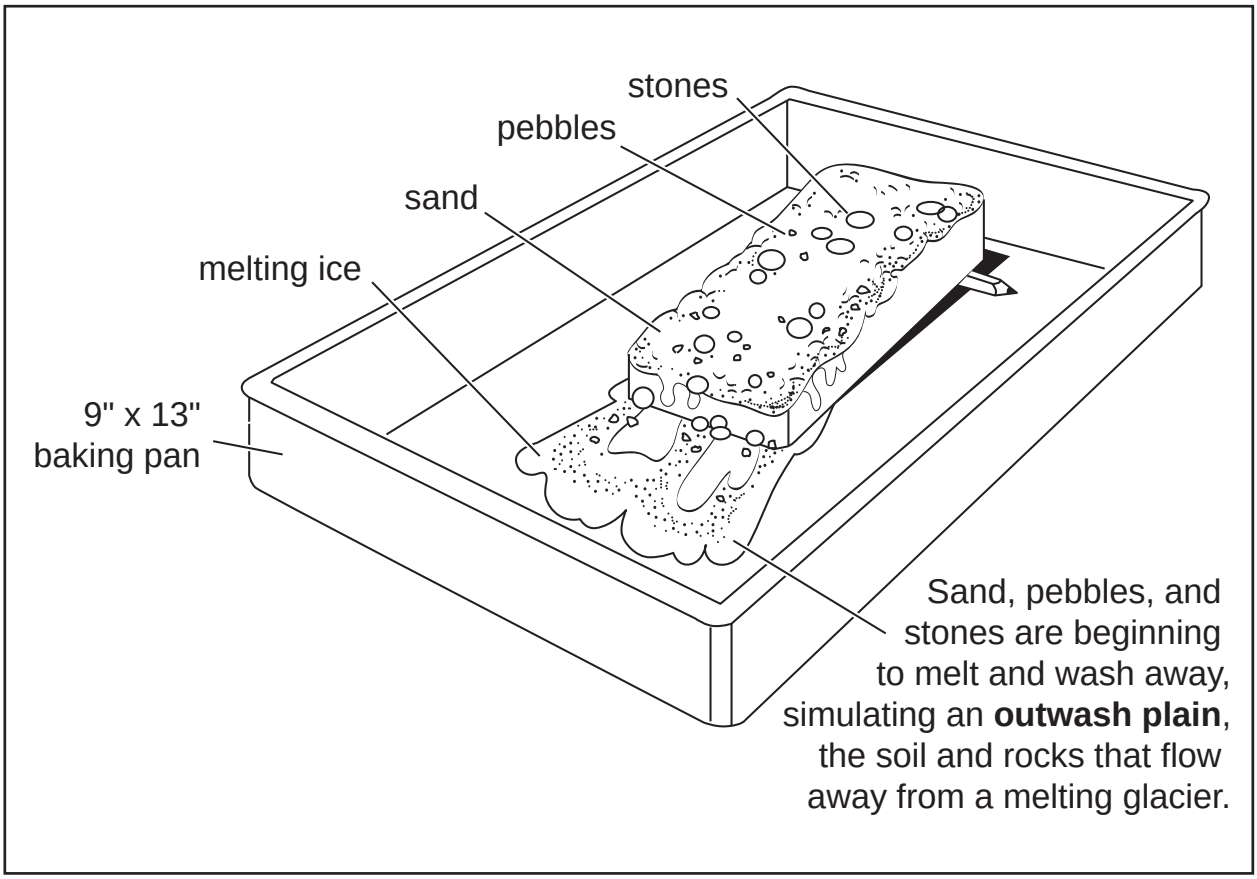
Observing, recording, analyzing, collaborating, constructing

Materials

- One set for each "miniature glacier":
  - Bread pan or metal ice tray
  - 1 tablespoon sand
  - 1 tablespoon small pebbles (pea size or smaller)
  - 1 tablespoon gravel
  - 1 cup water
  - Cookie sheet with sides or 9" x 13" x 3" pan
- Measuring tools (tablespoons and measuring cup)
- Freezer
- Miniature Glacier Observation sheet
- Pencils, markers, colored pencils, or crayons

Procedures

1. Depending on class size and resources, make one "miniature glacier" for the entire class, or divide the class into small groups and have each group make a glacier.
2. Discuss appropriate behavior around water and dirt. Review measurement skills.
3. Have one student pour one cup water into the bread pan. Then have additional students pour in the sand, small pebbles, and gravel.
4. Hand out the Miniature Glacier Observation sheet; have students make an initial written observation with an accompanying sketch.
5. Freeze the bread pan overnight.
6. When ready to begin student observations, remove the bread pan from the freezer. (Note: The most remarkable observations will occur after the bread pan has been at room temperature for one to three hours.)
7. Remove the miniature glacier (that is, the entire block of ice) from the bread pan and place, smooth side down, on the cookie sheet.
8. Have students fill out the observation sheet at regular intervals, recording the time, noting any changes, and sketching what they see. As the glacier melts, use a book to elevate one end of the cookie sheet slightly. The larger stones should remain in place, while the smaller pebbles and sand should run outward. This movement represents the "sorting" of drift materials from melting glaciers. Make sure students recognize that the larger materials remain at the higher elevations, while the smaller materials move farther away.



Closure

After the glacier melts and the drift is obvious, discuss the final observations with the class:

What happened to the glacier?

What did you see and record?

What happened to the sand? The pebbles?

What do you think occurred?

Allow students time to write a brief paragraph on the observation sheet about the conclusion of the experiment. Use completed activity sheets for assessment.

Name _____ Date _____

Miniature Glacier Observation Sheet

Time	Observations	Draw what you see

Conclusion _____

Paddles and Pelts

Activity 3.1: Making a Birchbark Canoe

3

Goal

To understand the shape and design of a canoe

Objectives

The student will:

- Construct a model of a birchbark canoe
- Examine the many uses of a canoe
- Discuss desirable properties of a canoe
- Compare and contrast dugout and birchbark canoes

Overview

Before the first half of the nineteenth century, birchbark canoes were the predominant form of water transportation in Wisconsin and Michigan. In this activity, students will use the information they learned in Chapter 3 to compare the canoes used by the Native peoples (dugout and birchbark) and later the voyageurs (birchbark). Students will also make a model of a birchbark canoe in order to have a tactile sense of its shape and structure.

Skills and Strategies

Observing, distinguishing, evaluating, constructing

Materials

- Birchbark Canoe Directions activity sheet (one for each student)
- Birchbark Canoe Cut-out activity sheet (one for each student)
- Colored pencils or crayons
- Scissors
- Glue
- Vegetable oil (optional)
- Tubs of water (optional)

Teacher Prep

Make a sample canoe ahead of time to show students what it will look like. Then make another one in class, modeling each step before students try that particular procedure.

Procedures

1. After reading Chapter 3, compare and contrast dugout canoes and birchbark canoes. Have the class develop the following T-chart on the board or using an overhead:

Dugout Canoes	Birchbark Canoes

Use leading questions to help students come up with characteristics:

What did Native peoples/Early Europeans use canoes for?

What natural resources did Native peoples/Early Europeans use to make canoes?

How did Native peoples/Early Europeans make their canoes?

2. Tell students they will be making a model of a birchbark canoe. Explain that they will be making a simplified paper model in the same shape as a birchbark canoe.
3. Pass out the Birchbark Canoe Directions activity sheet. Read through the directions with the class and model the first step in the construction of the canoe.
4. Pass out the Birchbark Canoe Cut-out activity sheet, crayons or colored pencils, scissors, and glue. Have students follow your modeling in constructing their canoes, giving assistance when necessary. Remind them to follow the directions and to proceed one step at a time, as this project can be difficult for students who rush.

Closure

Discuss the completed canoes, pointing out the shape and design.

Discuss the desirable properties of a birchbark canoe that students encountered in the reader, such as being easily portaged, having materials readily available, and mending easily. What makes them good for shallow rivers?

Extension

When coated with vegetable oil for waterproofing, these birchbark canoe models will float in water. Have students coat the outside of the canoes in vegetable oil using paint brushes or their fingers. Allow to dry. Fill tubs with water and have students try to float the canoes.

Adapted from Robert Livesy and A. G. Smith, *The Fur Traders,* Discovering Canada Series (Toronto: Stoddart Kids, 1989).

Birchbark Canoe Directions

1. **Color** the canoe pieces:

   Interior (*inside*) of the canoe hull: Brown

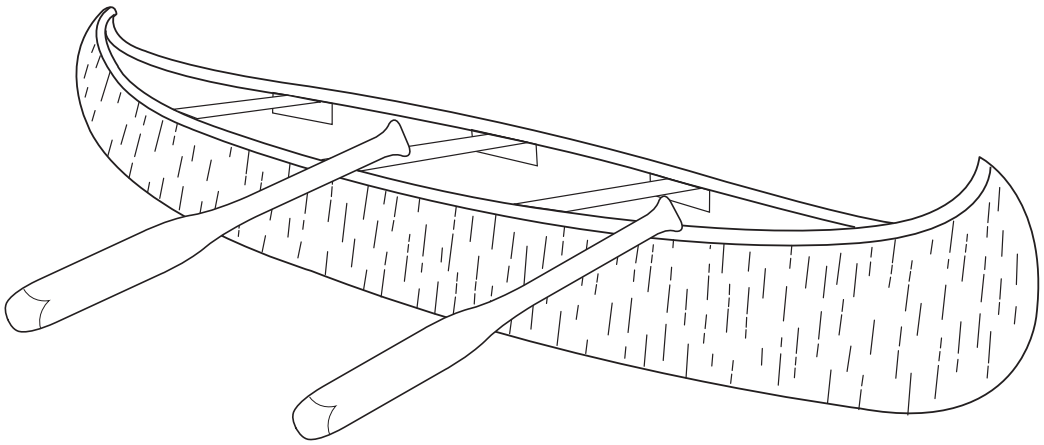
   Cross braces (*thwarts*): Brown

   Paddles: Brown with red or yellow tips

   Exterior (*outside*) of canoe hull: White

2. **Cut out** the hull. Put a thin line of glue on the edge of the bow (front) and press the ends together. Do the same thing with the stern (back) of the hull. It should start to look like a canoe.
3. **Cut out** the middle cross brace (the longest one) and put a tiny drop of glue on each dot.
4. **Fold** the tab on the dotted line and press to the inside middle of the hull.
5. **Cut out** the two end cross braces and put a drop of glue on each dot. Place one brace near the bow and place one near the stern.
6. **Fold** each paddle over on the dotted line and glue the paper together.
7. When the glue has dried, **cut out** the paddle shapes. **Glue** paddles to the outside of the canoe or place them inside the canoe.

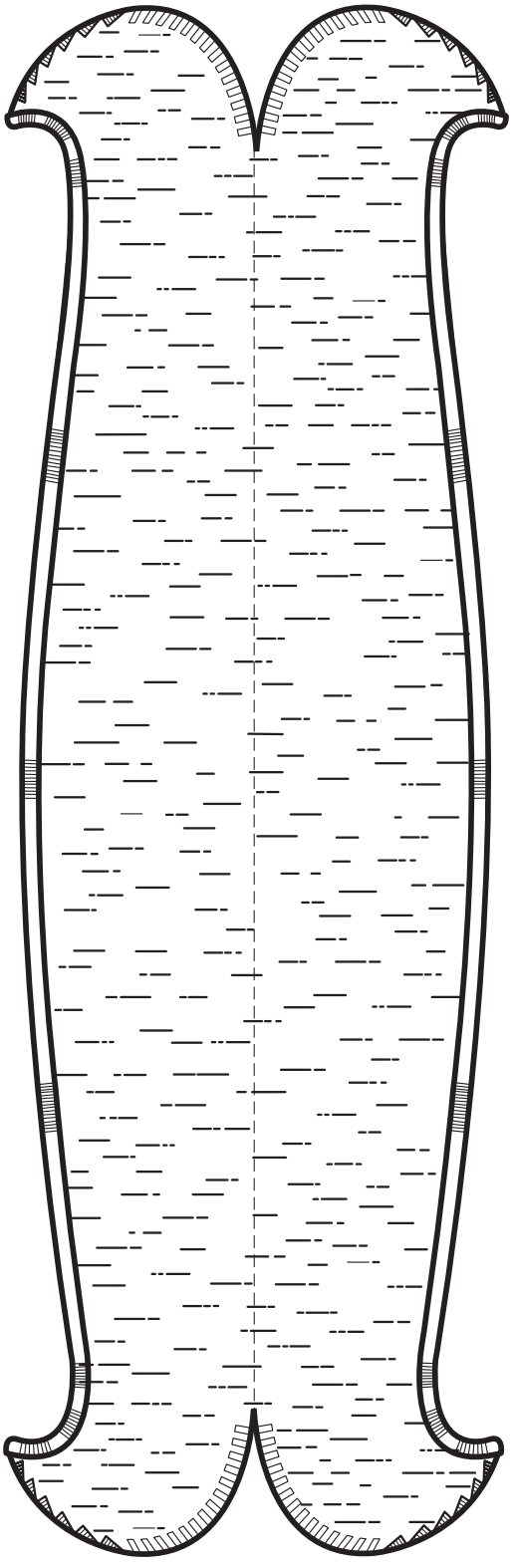
This is what your finished birchbark canoe will look like!



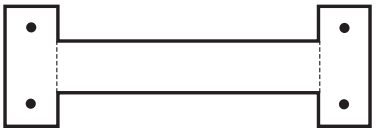
Birchbark Canoe Cut-out Activity Sheet

Cut out all pieces of the canoe. Fold on all dotted lines.

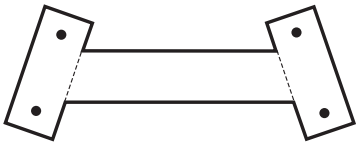
Bow

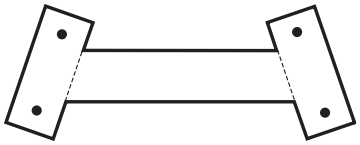


Middle cross brace

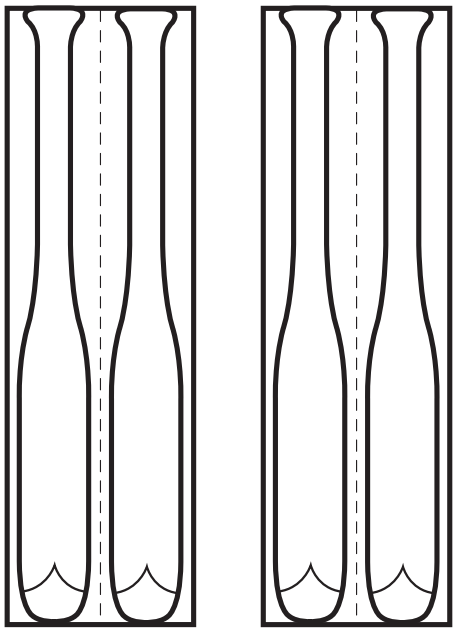


End cross braces





Paddles



Stern

Activity 3.2: Michigan Travel Then and Now

Goal

To recognize the importance of river travel in the past

Objectives

The student will:

- Practice mapping skills
- Compare and contrast river and highway travel in Michigan
- Explain why river travel was preferred in the past

Overview

Throughout history, people have sought the most efficient and inexpensive means to travel and move goods from one place to another. Although water transportation today remains significant for shipping and recreation, most of our everyday travel is land based. To highlight changes in transportation in Michigan, students will compare historic river travel and contemporary highway travel in this activity.

Skills and Strategies

Applying, analyzing, evaluating

Materials

- Michigan Rivers map (one transparency; one copy of map per pair of students)
- Michigan Travel: Then and Now activity sheet (one for each student pair)
- Answer Key: Michigan Portages
- Michigan Highways map with scale (one transparency; one copy of map per pair of students)
- Standard Michigan highway map for small groups of students (optional)
- String (optional)
- Computer with Internet access (optional)

Procedures

1. Begin the activity by reviewing the basic map skills that will be needed to complete the activity, including the parts of a map (compass rose, scale, key) and cardinal directions (N, S, E, W, SW, NE, etc.).
2. Have students work in pairs for this activity. Hand out the Michigan Rivers map to each pair of students and display it as a transparency. Review and discuss the features of the map.
3. Discuss early river travel as described in chapter. Ask why river travel was important to early Michigan

people and why people didn't travel on highways like we do now. Explain that historically, Michigan people used the rivers and waterways to travel and that they traveled from one river to another by short overland trails called portages. Have students identify the portages on the rivers map.

4. Tell students to imagine they are early French fur traders in Michigan. They are at the trading post in Bay City (have each pair find Bay City on the map) and need to travel to the trading post in Grand Rapids (have students find this town on the map) for a rendezvous.
5. Give students time to discuss the travel routes with their partners. Then hand out the Michigan Travel: Then and Now activity sheet. Have students work in pairs to complete the river route of the activity sheet. Guide students as they give directions for travel, making sure they include the rivers they take, the direction they are traveling (north, south, southeast, etc.), and any portages. Have them mark portages on the Michigan Rivers map.
6. Repeat the mapping activity using the Michigan Highways map. Hand out the Michigan Highways map and display the transparency.
7. Have students identify the cities of Bay City and Grand Rapids. Instead of traveling via waterways, modern travelers will travel by the roads and highways.
8. Have students trace the new route between the two cities and complete the second portion of the activity sheet. Guide students as they give directions for travel. Be sure they include the highways they will be taking and the direction of travel. NOTE: As an optional activity, have students calculate the approximate distance traveled, using string and a map scale.

Closure

Compare and contrast the two routes and discuss as a class. Have students complete the third portion of the activity sheet with their partners to hand in for assessment. Stress that although land travel is fast today, it was very difficult and time-consuming in the past. In order to move heavy goods and furs, traders had to use water routes.

Extensions

1. Have students compare the speed of river travel versus road travel, assuming a canoe travels about five miles per hour and a car travels about sixty miles per hour. What does this tell us about travel then and now?
2. Interested students can find out how to get from their hometown to Sault Sainte Marie or to Detroit. Have them plan their route on a highway map, finding information on the Internet about the cities through which they pass. They can then compile a list of helpful websites and turn it in with their marked maps.
3. Use some of the fantastic lessons from the United States Geological Survey to teach more about maps and map skills. For contact information, see the Additional Resources section.

Michigan Rivers Map

University of Wisconsin Cartography Laboratory

Name _____ Date _____

Michigan Travel: Then and Now

Then: Michigan Rivers

What river route will you take from Bay City to Grand Rapids? Give directions for travel and trace the route on your map. Name the waterways that will help you reach Grand Rapids, and circle the places that you have to portage your canoe.

_____

_____

_____

_____

Now: Michigan Highways

What route will you take from Bay City to Grand Rapids? Give directions for travel and trace the route on your map. Name the highways over which you need to travel, and name some of the main cities that you will drive through to reach Grand Rapids.

_____

_____

_____

_____

Then and Now

In what ways are the river route and highway route the same?

_____

_____

_____

_____

In what ways are the river route and highway route different?

Compare and contrast how we use the rivers today with how our ancestors used the rivers hundreds of years ago.

Challenge Question: How many miles is the highway route from Bay City to Grand Rapids? _____

Answer Key: Michigan Portages

University of Wisconsin Cartography Laboratory

Michigan Highways Map

University of Wisconsin Cartography Laboratory

Activity 3.3: Wisconsin Travel Then and Now

Goal

To recognize the importance of river travel in the past

Objectives

The student will:

- Practice mapping skills
- Compare and contrast river and highway travel in Michigan
- Explain why river travel was preferred in the past

Overview

Throughout history, people have sought the most efficient and inexpensive means to travel and move goods from one place to another. Although water transportation today remains significant for shipping and recreation, most of our everyday travel is land based. To highlight changes in transportation in Wisconsin, students will compare historic river travel and contemporary highway travel in this activity.

Skills and Strategies

Applying, analyzing, evaluating

Materials

- Wisconsin Rivers map (one transparency; one copy of map per pair of students)
- Wisconsin Travel: Then and Now activity sheet (one for each pair of students)
- Answer Key: Wisconsin Portages
- Wisconsin Highways map with scale (one transparency; one copy of map per pair of students)
- Standard Wisconsin highway map for small groups of students (optional)
- Computer with Internet access (optional)

Procedures

1. Begin the activity by reviewing the basic map skills that will be needed to complete the activity, including the parts of a map (compass rose, scale, key) and cardinal directions (N, S, E, W, SW, NE, etc.).
2. Have students work in pairs for this activity. Hand out the Wisconsin Rivers map to each pair of students and display it as a transparency. Review and discuss the features of the map.

3. Discuss early river travel as described in chapter. Ask why river travel was important to early Wisconsin people and why people didn't travel on highways like we do now. Explain that historically, Wisconsin people used the rivers and waterways to travel and that they traveled from one river to another by short overland trails called portages. Have students identify the portages on the rivers map.
4. Tell students to imagine they are early French fur traders in Wisconsin. They are at the trading post in Green Bay (have each pair find Green Bay on the map) and need to travel to the trading post in Prairie du Chien (have students find this town on the map) for a rendezvous.
5. Give students time to discuss the travel routes with their partners. Then hand out the Wisconsin Travel: Then and Now activity sheet. Have students work in pairs to complete the river route of the activity sheet. Guide students as they give directions for travel, making sure they include the rivers they take, the direction they are traveling (north, south, southeast, etc.), and any portages. Have them mark portages on the Wisconsin Rivers map.
6. Repeat the mapping activity using the Wisconsin Highways map. Hand out the Wisconsin Highways map and display the transparency.
7. Have students identify the cities of Green Bay and Prairie du Chien. Instead of traveling via waterways, modern travelers will travel by the roads and highways.
8. Have students trace the new route between the two cities and complete the second portion of the activity sheet. Guide students as they give directions for travel. Be sure they include the highways they will be taking and the direction of travel. NOTE: As an optional activity, have students calculate the approximate distance traveled, using string and a map scale.

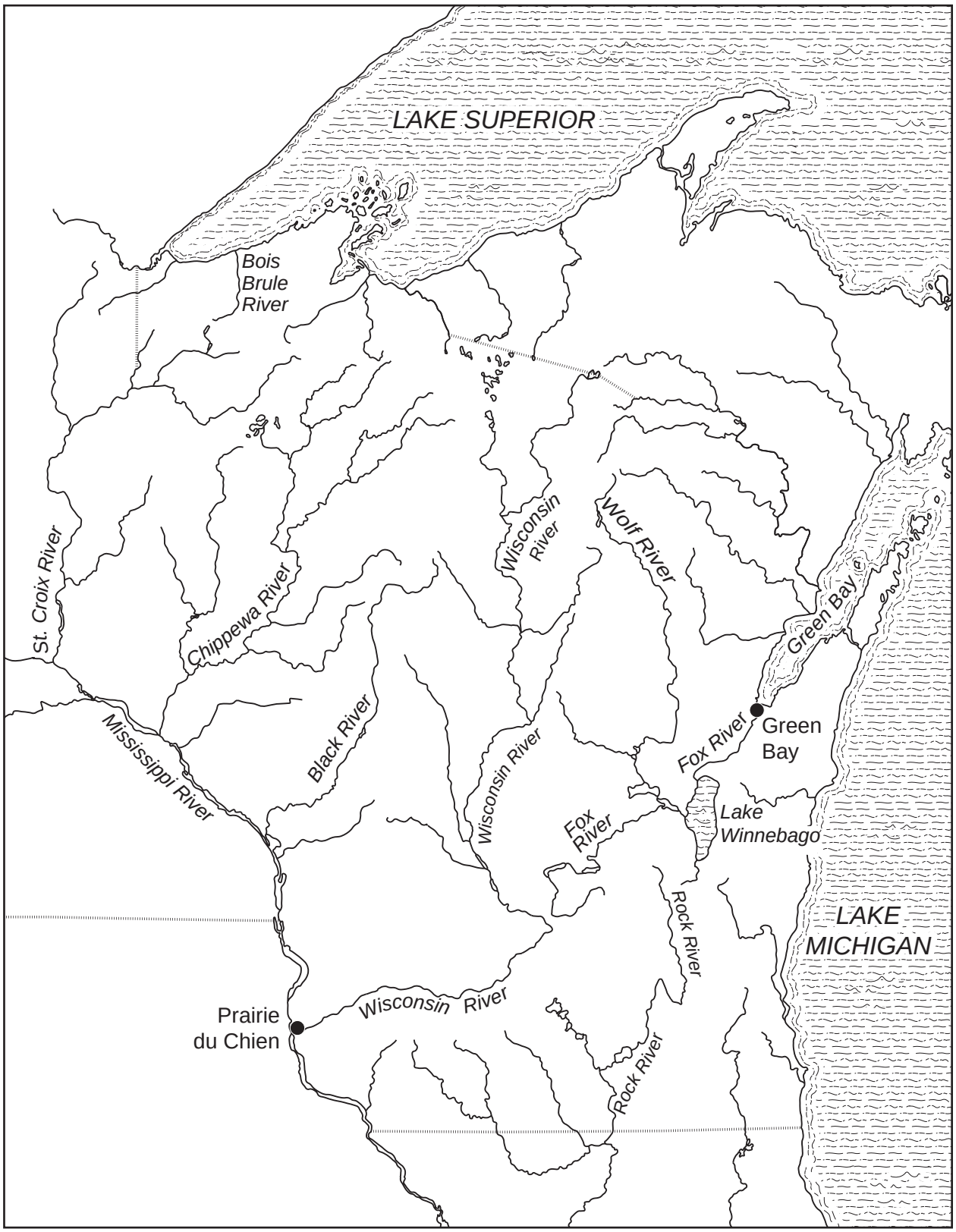
Closure

Compare and contrast the two routes and discuss as a class. Have students complete the third portion of the activity sheet with their partners to hand in for assessment. Stress that although land travel is fast today, it was very difficult and time-consuming in the past. In order to move heavy goods and furs, traders had to use water routes.

Extensions

1. Have students compare the speed of river travel versus road travel, assuming a canoe travels about five miles per hour and a car travels about sixty miles per hour. What does this tell us about travel then and now?
2. Interested students can find out how to get from their hometown to Madison or to Milwaukee. Have them plan their route on a highway map, finding information on the Internet about the cities through which they pass. They can then compile a list of helpful websites and turn it in with their marked maps.
3. Use some of the fantastic lessons from the United States Geological Survey to teach more about maps and map skills. For contact information, see the Additional Resources section.

Wisconsin Rivers Map



Amelia Janes/Mike Gallagher, Midwest Educational Graphics

Name _____ Date _____

Wisconsin Travel: Then and Now

Then: Wisconsin Rivers

What river route will you take from Green Bay to Prairie du Chien? Give directions for travel and trace the route on your map. Name the waterways that will help you reach Prairie du Chien, and circle the places that you have to portage your canoe.

Now: Wisconsin Highways

What route will you take from Green Bay to Prairie du Chien? Give directions for travel and trace the route on your map. Name the highways over which you need to travel, and name some of the main cities that you will drive through to reach Prairie du Chien.

Then and Now

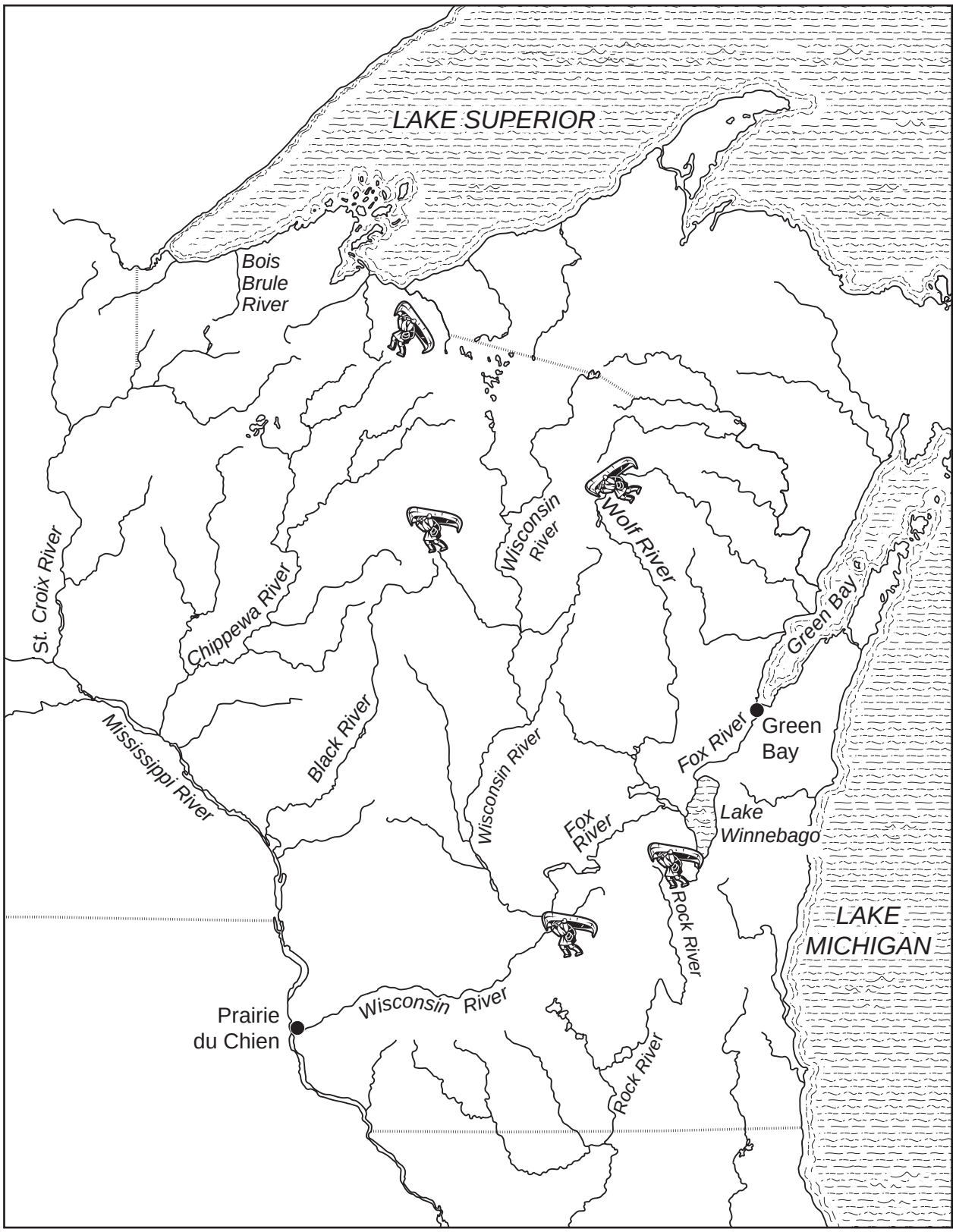
In what ways are the river route and highway route the same?

In what ways are the river route and highway route different?

Compare and contrast how we use the rivers today with how our ancestors used the rivers hundreds of years ago.

Challenge Question: How many miles is the highway route from Green Bay to Prairie du Chien? _____

Answer Key: Wisconsin Portages



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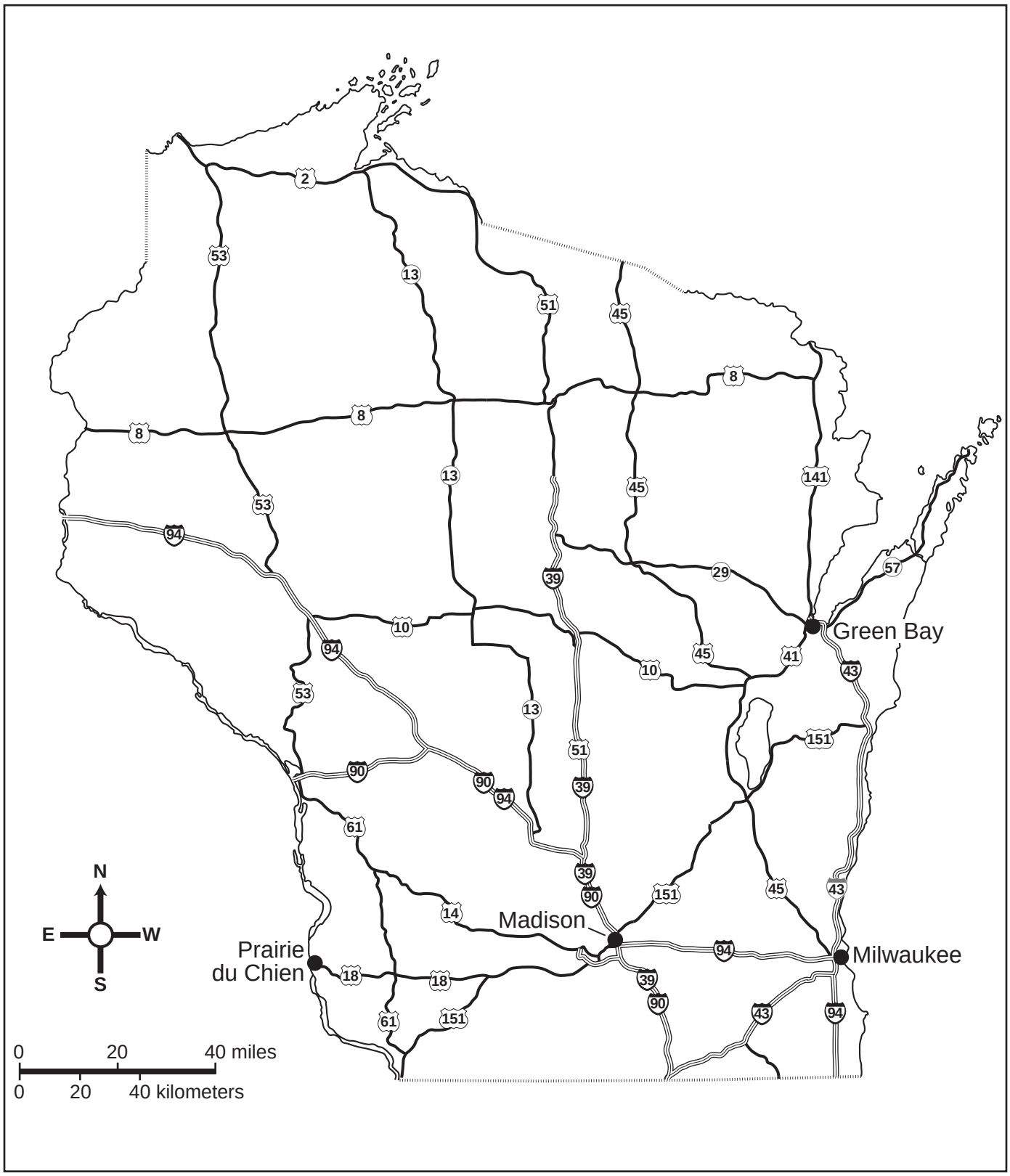
Wisconsin Highways



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Fighting for the Inland Seas 4

Activity 4.1: Taking Sides

Goal

To understand the chronology of events in the Great Lakes region through the War of 1812

Objectives

The student will:

- Create a timeline of events from 1600–1813
- Evaluate the relative importance of each event to their home state

Overview

Students will gain insight into the events that transpired in the Great Lakes region between 1600 and 1813 by creating a timeline of events.

Skills and Strategies

Listing, ordering, evaluating

Materials

- Rulers
- Plain paper
- *Great Ships on the Great Lakes* reader
- Computer with Internet access (optional)

Teacher Prep

Read Chapter 4 in *Great Ships on the Great Lakes* with the class.

Procedures

1. Give each student a ruler, a piece of unlined paper, and a copy of *Great Ships on the Great Lakes*.
2. Tell students they will be working with events from 1600–1813. Have students draw a horizontal line with a hash mark at the beginning (marked 1600) and a hash mark at the end (marked 1813).

3. Give students the following list of events—don't give them the dates, and do not let them refer to the time line at the end of *Great Ships on the Great Lakes*:
   - French and British move into the Great Lakes region (1600s to 1700s)
   - Americans gain control of the Great Lakes (1813)
   - The British take over French land in the Great Lakes region (1760)
   - The British and Americans decide on a border between the United States and Canada (1783)
   - Pontiac's Rebellion (1762)
   - The first British ship, the *Oswego*, sails on the Great Lakes (1755)
   - The War of 1812 (1812)
4. Have students use Chapter 4 to determine where on the timeline the events should be.

Closure

Place a timeline, similar to the one the students created, on the board or on an overhead. Ask students which of the events they feel was the most important in the history of their state. Have them articulate why the event was important.

Extension

Have students research one of the events on their timeline in more detail, using Internet or print resources. Have them draft a page-long report on "This Day in History" explaining what happened, who the key players were, and the significance of the event.

Connecting With Canals

Activity 5.1: The Erie Canal

5

Goal

To understand the importance of music as a source of historic information

Objectives

The student will:

- Compare and contrast historic content within informational text and song lyrics
- Analyze the meaning of song lyrics
- Generalize what life was like along the Erie Canal in the past
- Speculate on why songs are still sung about the canal

Overview

Canals play a significant role in American maritime history, and the Erie Canal, completed in 1825, was one of the most important. Building the canal accelerated the settlement of the Upper Midwest; it was the most common way mid-nineteenth century Yankees and European immigrants got to Wisconsin and Michigan. Many people who grew up in twentieth-century America learned the song "The Erie Canal" in elementary school. Although the lyrics convey a sense of travel and life on the canal, as well as the style and spirit of a "traditional" American folk song, the song actually was composed in 1905 in Tin Pan Alley (a songwriting district in Manhattan in the early twentieth century) by Thomas S. Allen. In this activity, students will learn the song and come to understand the significance of its lyrics in communicating an important aspect of the transportation history of our country—and by extension, the Erie Canal's impact on Wisconsin.

Skills and Strategies

Analyzing, evaluating, synthesizing

Materials

- Copy of Peter Spier's picture book *The Erie Canal* (optional)
- "The Erie Canal" song sheet (one copy for each student)
- "The Erie Canal" Informational Text (one copy for each student)
- "The Erie Canal" question sheet (one copy for each student)

- Recording of "Low Bridge" ("The Erie Canal" song) (optional)
- CD player (optional)
- Computer with Internet access (optional)

Procedures

1. To introduce the activity, read or sing "The Erie Canal" aloud, or show students the pictures in Peter Spier's *The Erie Canal* while singing or reading the song aloud.
2. Pass out "The Erie Canal" song sheet to each student.
3. Allow time for each student to read through the song lyrics once silently.
4. Do a choral reading of the song lyrics with the class. If you are familiar with the tune, lead students through singing the song.
5. Distribute "The Erie Canal" question sheet.
6. Have each student answer the questions on the sheet. Tell students to do their best, but do not help them.
7. Pass out "The Erie Canal" Informational Text. Have students read it aloud.
8. Have students go back to "The Erie Canal" question sheet and see if they can better answer the questions.
9. Discuss their responses with questions such as the following:

   How could you figure out the answers from the lyrics?

   How could you figure out the answers from the informational text?

   Which was easier to work from?

   What do you think life was like for people along the canal?

   How does this song help us understand life on the Erie Canal?

   How do you think people used the lumber, coal, and hay?

   Why do you think people still sing a song about the canal?

Closure

Have students hand in "The Erie Canal" question sheets for assessment.

Extensions

1. Have students listen to the recording of the song "The Erie Canal" and sing along. You can find recordings of this traditional song in many collections of American music or American folk music, available in a school media center or public library, online, or for purchase from bookstores and music stores.
2. Have students search the Internet for sources of Erie Canal information (there are many, and several have been put up by elementary classrooms; see Additional Resources). Have students find more about the Erie Canal and other canals in traditional sources in the library, including picture books like Spier's that indicate how a canal works.

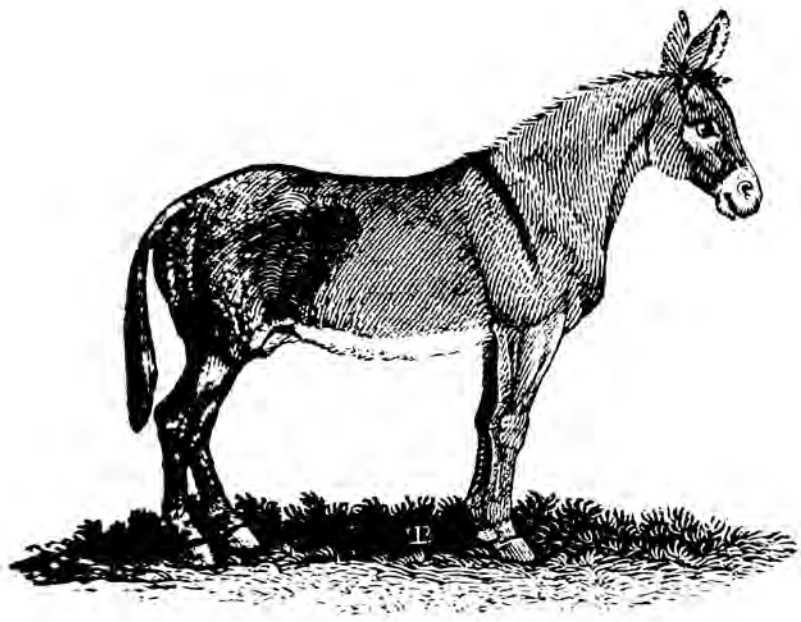
"The Erie Canal" Songsheet

I've got an old mule and her name is Sal,
Fifteen miles on the Erie Canal;
She's a good old worker and a good old pal,
Fifteen miles on the Erie Canal.

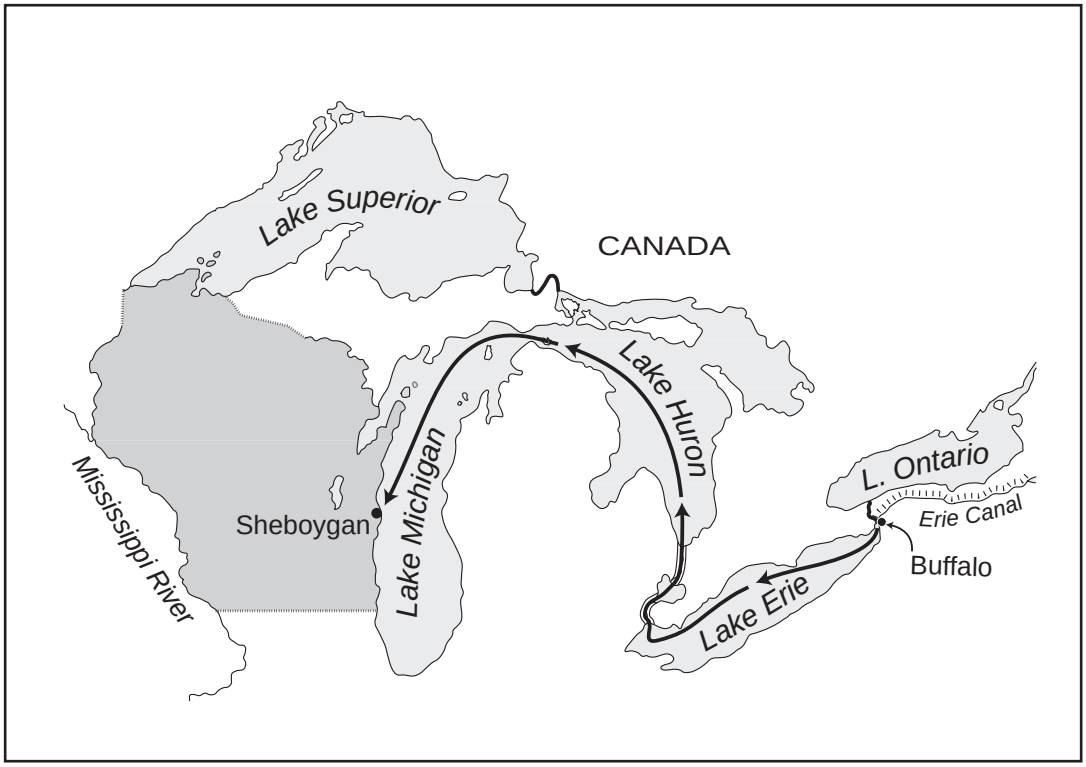
We've hauled some barges in our day,
Filled with lumber, coal, and hay,
And every inch of the way we know,
From Albany to Buffalo.

Chorus:

Low bridge, everybody down!
Low bridge for we're coming to a town.
And you'll always know your neighbor,
And you'll always know your pal,
If you've ever navigated on
The Erie Canal.



The Erie Canal



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John O. Kroehnke (**kron** kee) and his wife were among those who traveled through the Erie Canal. They left their home in Germany in March 1848 to immigrate to Wisconsin. They sailed across the Atlantic Ocean and then up the Hudson River to Albany. Kroehnke kept a travel journal that describes their trip through the Erie Canal on a canal boat pulled by two mules. He complained that one day the boat covered very little distance because of the amount of traffic on the canal. Every time a boat approached traveling in the other direction, the Kroehnkes' boat had to stop and wait until there was enough space to pass and continue.

Since the weather was pleasant, passengers spent time on deck enjoying the passing sights. Whenever they reached a bridge, someone would shout. "High bridge" warned passengers on deck to "bend down a little." If travelers heard "low bridge," they knew they had to lie down on the deck.

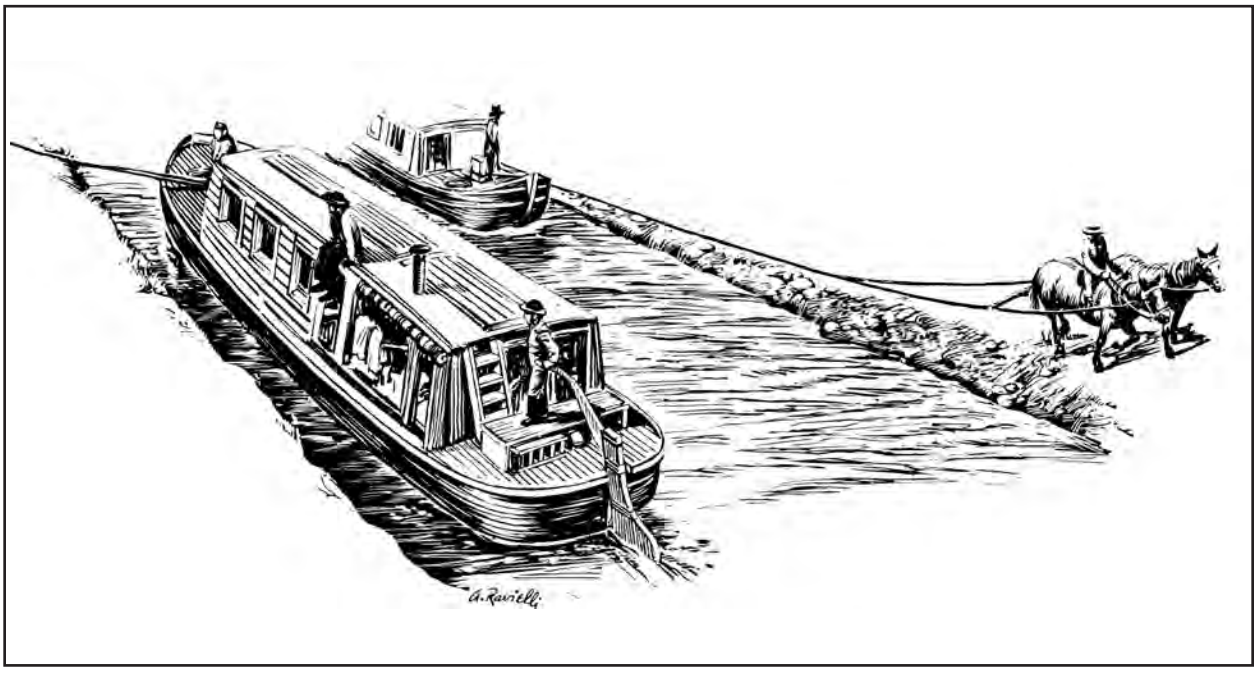
When the boat moved really slowly, some passengers got off and walked on the path alongside the canal. The canal boat journey took about four days. When the boat reached Albany, the Kroehnkes boarded a steamboat to cross the Great Lakes. They arrived in Sheboygan in late May, almost two months after leaving home. From there they traveled a short distance overland to New Holstein in Calumet County to start farming. It was a long journey to a new life.

Name _____ Date _____

The Erie Canal" Question Sheet

Read the song and try your best to answer these questions:

1. Why does the singer have a mule? _____
2. What is the canal used for? _____
3. What kind of cargo do the barges on the canal haul? _____
4. What do the words "low bridge" mean? _____
5. What does "You always know your neighbor" mean? _____



Anthony Ravielli

Erie Canal and towpath

Activity 5.2: How a Lock Works

Goal

To understand how a lock works

Objectives

The student will:

- Define the various parts of a lock
- Match captions with appropriate illustrations
- Assemble the Lock Puzzle activity

Overview

Locks are designed to allow vessels to pass from one water level to another in a canal or river. Locks are a critical part of the Great Lakes region. In this activity, students will gain a better understanding of the workings of a lock.

Skills and Strategies

Identifying, assembling, sequencing

Materials

- Parts of a Lock diagram (one transparency; one handout per student)
- Lock Puzzle activity sheet (one per student)
- Answer Key: Lock Puzzle
- Scissors
- Glue
- Large pieces of construction paper

Procedures

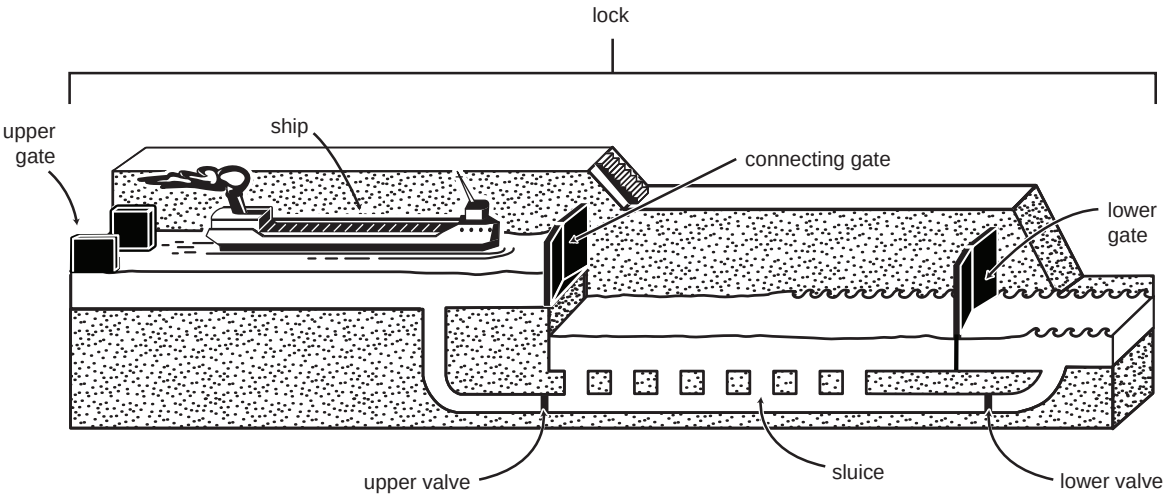
1. Based on student reading of Chapter 5, discuss some of the advantages of locks and canals, using the Erie Canal as an example.
2. Hand out or show the transparency of the Parts of a Lock diagram. Discuss the vocabulary—*lock, sluice, valve, gates*—and the parts of a lock.
3. Hand out the Lock Puzzle activity sheet to each student.

4. Have students volunteer to read aloud the label text or caption that corresponds to each picture. Give students time to match the caption to the right text. Be sure students understand each diagram.
5. Read the directions on the lock puzzle aloud to the class.
6. Hand out scissors, glue, and paper. Allow students time to complete the activity and give help as needed.

Closure

Go over the lock diagram and lock puzzle. Have students share their completed puzzles with the class. Have students hand in completed activities for assessment. For more information on locks, see the Additional Resources section.

Parts of a Lock



Vocabulary

Lock: A walled section of a canal or river that can be opened or closed by gates at each end. The water level in the lock can be raised or lowered to allow vessels to pass from one water level to another.

Sluice: A tunnel under a lock through which water moves in or out of the closed lock.

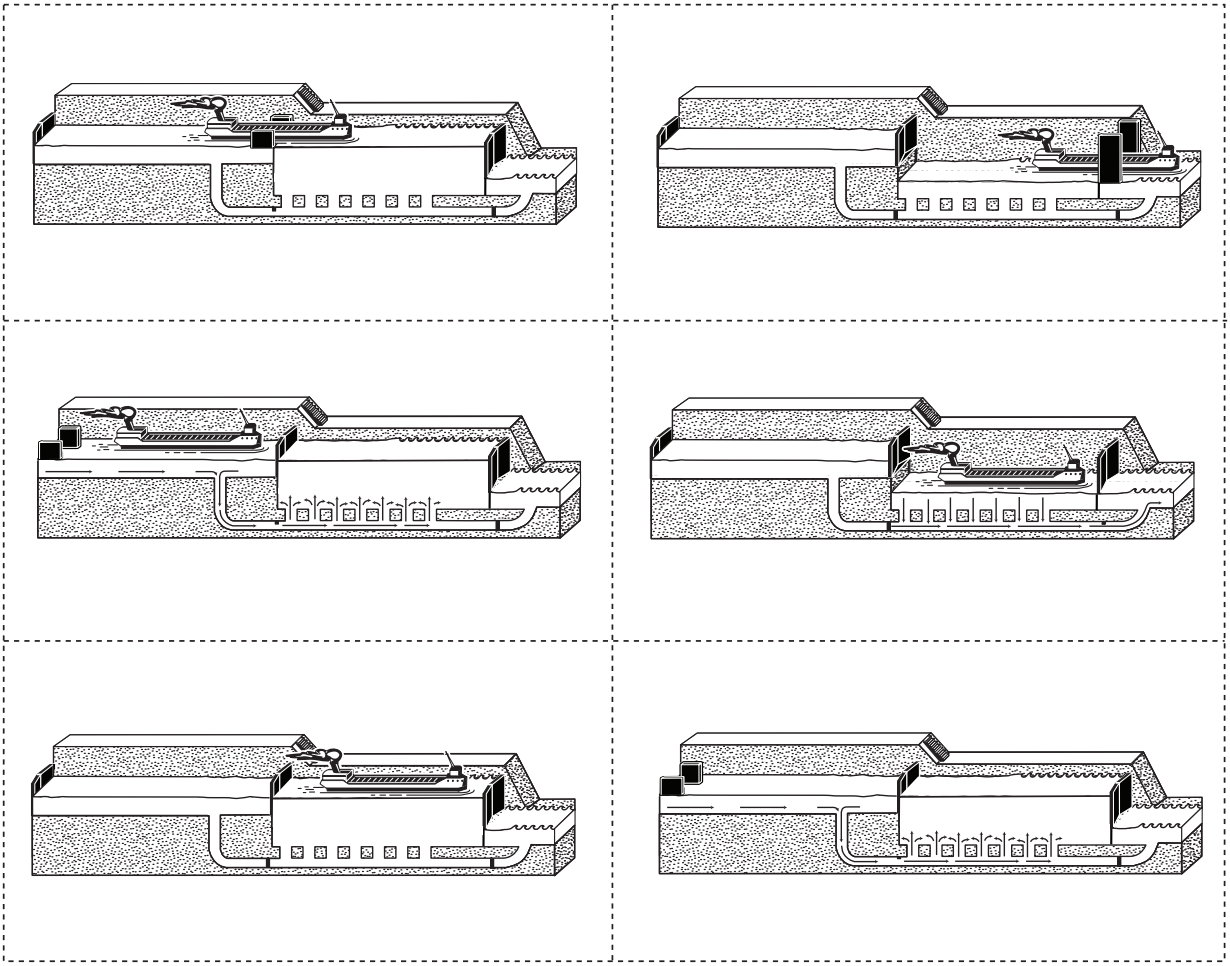
Gate: A door at either end of a lock that allows a vessel to enter or exit the lock.

Valve: A control device that can be opened or closed to allow water to flow into or out of an area. For example, a sluice valve allows water in or out of the sluice.

Lock Puzzle Activity Sheet

Directions: These pictures are out of order. It's your job to arrange them in the correct order for a vessel to pass through the lock. To do so, follow these steps:

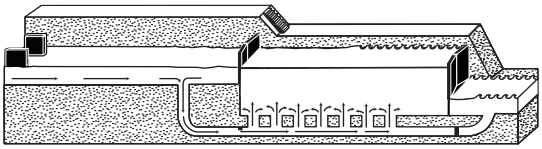
1. Cut out each picture and each caption.
2. Match each caption to the correct picture.
3. Arrange the pictures and captions in the correct order to allow a vessel to pass through the locks.
4. Glue the pictures and captions, in order, to a piece of construction paper, and label them in order from 1 to 6.



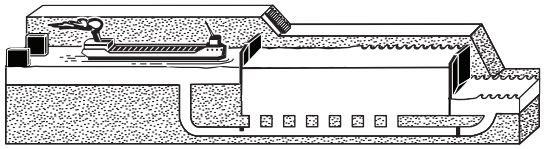
Captions for Lock Puzzle Activity Sheet

The upper gates and lower gates are closed. Both valves are closed. The ship is in the second lock.	To get ready for a ship to sail from a higher to a lower water level, the upper gate and the upper valve open. The second lock is closed. The sluices allow the water to fill the second lock.
The upper and lower gates are closed, and the connecting gate is open. The boat passes into the second lock.	The upper gates and upper sluice valve are closed. The lower sluice valve and lower gates are open. The water level drops.
The ship enters the first lock.	The boat passes through the open lower gates and out of the lock.

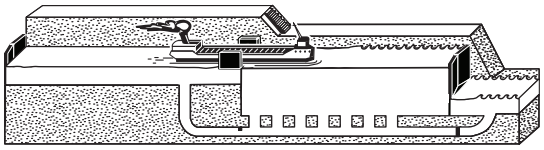
Answer Key: Lock Puzzle Activity Sheet



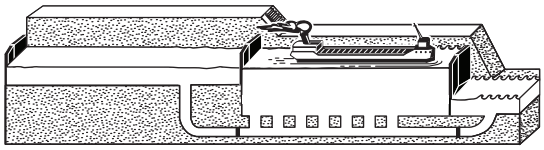
1. To get ready for a ship to sail from a higher to a lower water level, the upper gate and the upper valve open. The second lock is closed. The sluices allow the water to fill the second lock.



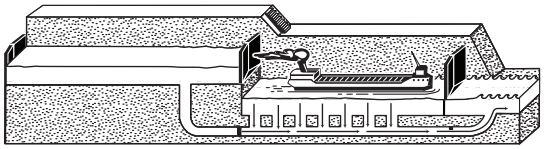
2. The ship enters the first lock.



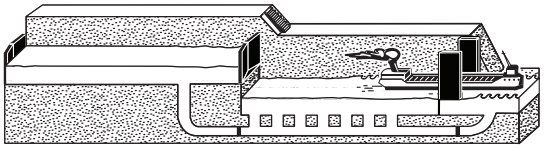
3. The upper and lower gates are closed, and the connecting gate is open. The boat passes into the second lock.



4. The upper gates and lower gates are closed. Both valves are closed. The ship is in the second lock.



5. The upper gates and upper sluice valve are closed. The lower sluice valve and lower gates are open. The water level drops.



6. The boat passes through the open lower gates and out of the lock.

Activity 5.3: Tour to the Northern Lakes

Goal

To understand the use of primary source materials in the study of the past

Objectives

The student will:

- Compare and contrast river, lake, and overland travel
- Chart the route described in *Tour of the Northern Lakes*
- Analyze and evaluate the choices the explorer made in choosing his route
- Speculate on how a completed railroad would have changed the route

Overview

In this activity, students will trace the route taken by a traveler from Albemarle, Virginia, as he made his way to Chicago via the Great Lakes in 1837.

Skills and Strategies

Mapping, analyzing, evaluating, synthesizing

Materials

- *Tour to the Northern Lakes* reading (one per student)
- Blank map of Tour to the Northern Lakes (one per student)
- Computer with Internet access or atlas
- Answer Key: Tour to the Northern Lakes
- *Life Aboard a Steamship* reading (optional)

Procedures

1. Briefly review material from Chapter 5 about travel on the Great Lakes, emphasizing the many changes that took place during the nineteenth century.
2. Put students together in groups of two or three, one group per computer. Distribute the *Tour to the Northern Lakes* reading, one for each group. To give some background, explain that it was written by an anonymous writer from Virginia who traveled to the Great Lakes in 1837. He kept a diary of his journey, which was published in a magazine later that year. It included many details about the journey itself—where he went, how he got there, and how long each part of the trip took.
3. Next, distribute a blank map of the Great Lakes to each group. Explain that they will be helping map his journey. Point out the key on the map that shows what kind of transportation was used. The students will use this key as they recreate the journey.

4. Have each group log onto the Internet and access a mapping website like www.google.com/maps or www.mapquest.com. (Note: the website will need to be searchable. If computers aren't available, a paper atlas with a comprehensive index may be used.)
5. Working in groups of two or alone, have students read the account of the traveler as he goes from Virginia to Milwaukee, tracing the route as they read by entering the place names that are in bold in the text into the map's search engine. Once they locate each place online, they should write it into their map, marking the route as they go.
6. As they map the route, students should use the symbols in the key to indicate whether the journey is by stagecoach, railroad, canal boat, or steamship.
7. Once they've mapped the entire journey, ask students the following:

   Why did the traveler take the route he did?

   Was it the shortest distance between Albemarle and Milwaukee?

   What kept him from setting out for the west on a more direct route?

   How did the Erie Canal make his voyage easier?
8. Have students list the different forms of transportation used along the route (stage, sailing ship, railroad, canal boat, steamship), and ask the following:

   Why did he have to take so many different types of transportation?

   Which of these would you want to take if you were transporting freight to the east (or west?)

   Why?

   Which would be better for a family moving to Wisconsin from New York City in the 1830s? (You can mention that railroads didn't make it to Wisconsin or Michigan until the 1850s.)
9. In the narrative, the writer says that "A rail road from Detroit to Michigan City is in progress, and will be finished in the course of this year, or the beginning of next. This will enable to traveler to pass from Detroit to Chicago in less than two days. A rail road across Ohio will give one the choice of coming by Philadelphia or New York." Using their maps, have students locate where this new railroad would be. If it had been finished by the time the diary was written, how might the route have changed? What places would the traveler have seen? What places would he have missed? Have students discuss which way they think is better, and why.

Closure

Each group should turn in their work, making sure to list each student's name at the top.

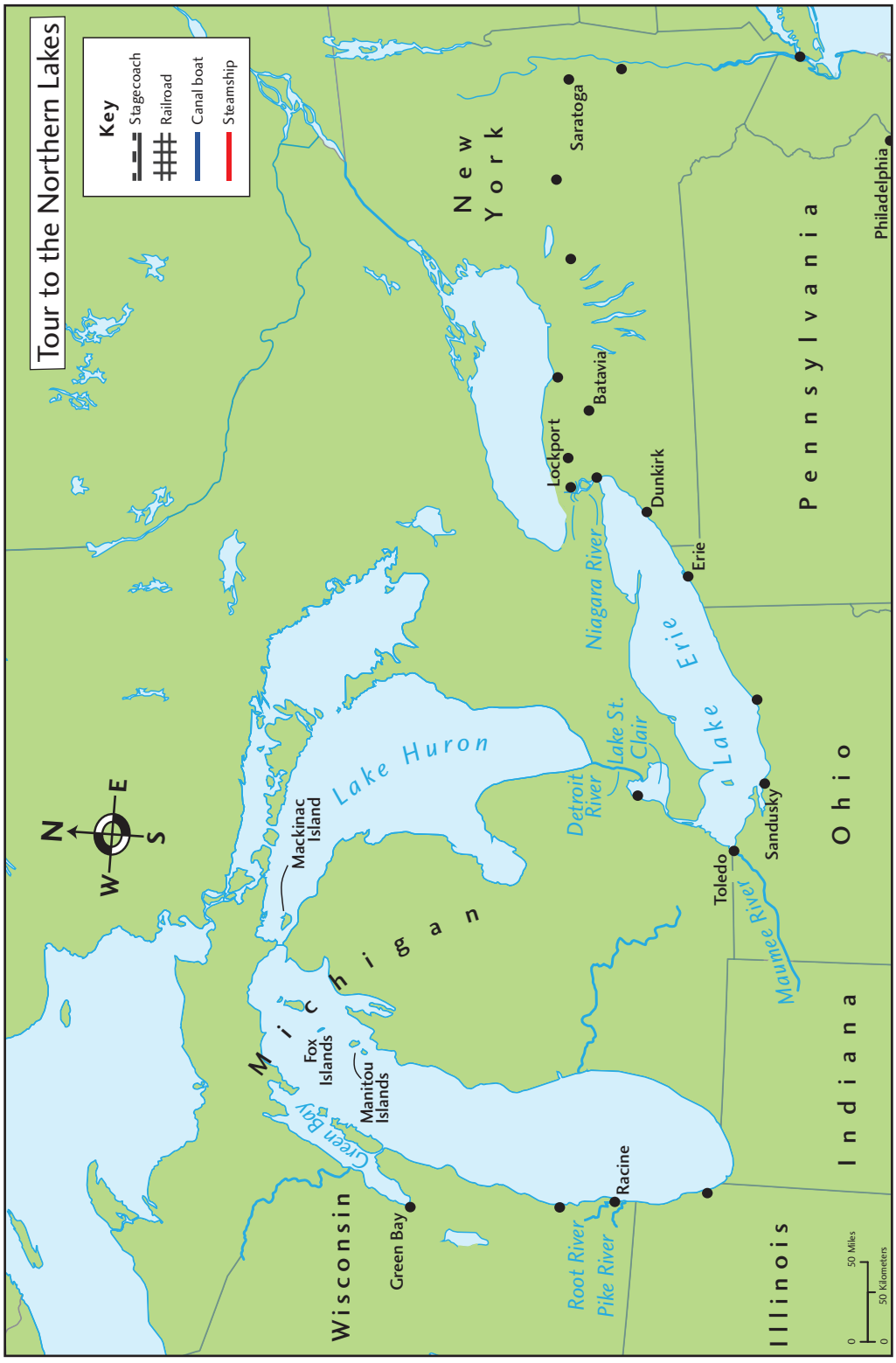
Extension

Read aloud the paragraphs from "Life Aboard a Steamship," which also come from *Tour to the Northern Lakes*. Have students choose a "role" from these paragraphs: as a passenger, immigrant, young mother, lone traveler, or Native person. Then have students write their own diary entry or tell a story about traveling on the steamship from that perspective.

Have students volunteer to share their steamboat voyage stories with the class.

Name _____ Date _____

Tour to the Northern Lakes Map



University of Wisconsin Cartography Laboratory

Tour to the Northern Lakes

This comes from *Tour to the Northern Lakes*, by A Subscriber, November 1837, in the *Southern Literary Messenger*. After traveling by railroad to **Washington, DC**, **Philadelphia**, and **New York City**, the writer heads to Albany, New York, in order to get to Buffalo and take a steamship west over the Great Lakes.

Monday, July 24. I set out Sunday evening for **Albany**, which we reached next morning at sunrise, after a run of about twelve hours; it is often made in ten. We went in the old . . . [steamship] line, but there is [another] company called the People's Line, which takes passengers for fifty cents. . . .

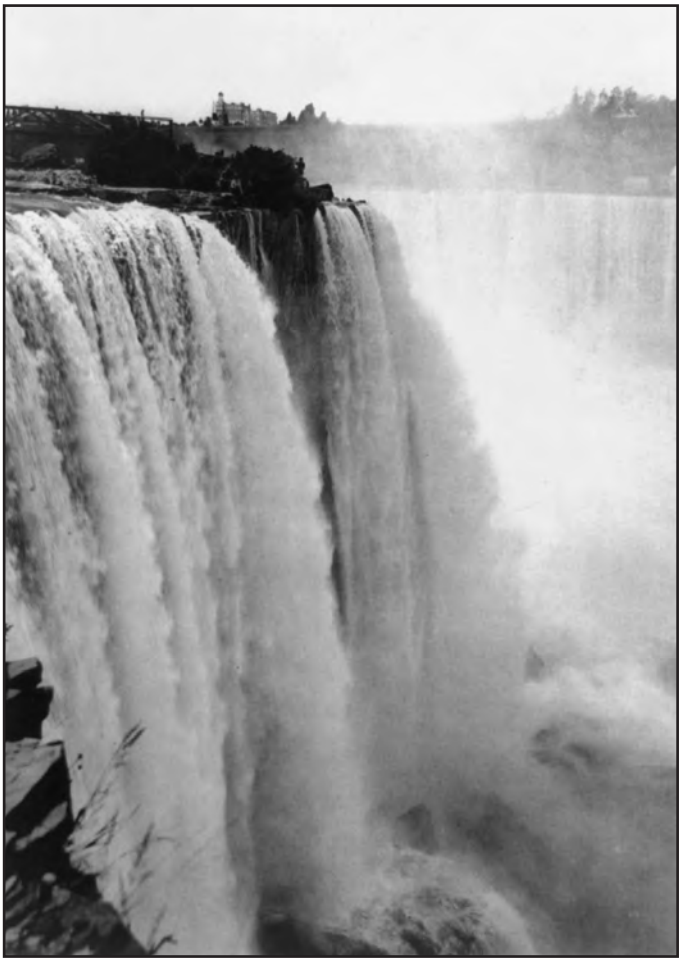
[Today] I reached **Saratoga** about one o'clock, in time to make myself comfortable. . . . At half past 3 o'clock we sat off in the [railway] cars, of which we had nine for passengers in the train, and [though there were] several stoppages for wood and water, and yet more for the refreshment of the passengers, we reached **Utica** in [a] little more than five hours—about eighty miles. . . .

When I rose [the next day], I found it was time to prepare for the canal boat. We left Utica about half past eight o'clock with seventeen passengers, and **ere** (before) ten o'clock, we were all stowed away on our **hanging shelves** (bunks or "berths")—I was between two—and whenever my lower neighbor, who was very **stout** (heavy) and thick, turned himself round in his berth, I was made **sensible** (aware) of it through the bottom of mine. I however slept quite soundly, and awoke in the morning greatly refreshed. We reached **Syracuse**, a distance of sixty-one miles by the canal, between eleven and twelve. We soon set off in the mail stage[coach]. . . . At **Rochester**, we had traveled ninety-six miles since twelve o'clock—that is, in about eighteen hours. [At **Batavia**] we took a coach to **Lockport**, thirty-two miles, which we reached in four and a half hours, in time for dinner, and the rail road cars to [**Niagara**] **Falls**. This place is remarkable for the number of its locks, and its deep cut for the canal. About sunset, we reached the famed **Niagara** [**Falls**]. [The next day,] a rail road, in the afternoon, took us in two hours to **Buffalo**. The ride is a very pleasant one, as it is almost the whole way along the Niagara [River]. . . .

On Monday the 31st of July, I **embarked** (set sail) on board the steamer *Daniel Webster* for **Detroit**. She is a new boat, of about 350 tons, and is a regular **trader** (ship that carries goods) between Buffalo and Detroit. A strong breeze directly ahead was discouraging—and the waves it raised, as well as the appearance of the lake itself to the west and north, made me feel as if I was making a sea voyage.

This lake [**Lake Erie**], like all the others, will in time have its **margin** (shores) **studded** (filled) with towns. Thus after 40 miles we came to **Dunkirk**, a town which though small at present, aspires to be one day the rival of Buffalo. We reached **Erie**, in Pennsylvania, after sunset. . . .

We next stopped at **Cleveland**, where the canal across Ohio **terminates** (ends). This is the largest town which Ohio yet has



Niagara Falls

Library of Congress, Prints & Photographs Division, Detroit Publishing Company Collection, LC-USZ62-92453

on the lake. . . . About 30 vessels, mostly **schooners** (a fast sailing ship with at least two masts), were lying in the port. . . .

We reached **Sandusky** in the evening. It is located at the head of a bay of that name. . . .

At daylight next morning, we were **roused** (woken up) from our slumbers by the bell, which announced our arrival at **Toledo**. This stands on the left bank of the Maumee River, some two or three miles from its mouth. . . .

From [Lake] Erie we passed into the strait [the **Detroit River**] which connects that lake to St. Clair [Lake], and had a delightful run of 29 miles, in a fine day, to [Detroit]. **Detroit**, at present the **metropolis** (big city) of Michigan, is pleasantly situated on the west bank of the river. . . . A rail road from Detroit to Michigan City, 197 miles [long], is in progress, and will be finished in the course of this year, or the beginning of next. This will enable the traveler to pass from Detroit to Chicago in less than two days. A rail road across Ohio will give one the choice of coming by Philadelphia or New York. . . .

Monday, August 7. At length we set off for the Upper Lakes [**Lake Huron**], in the Steamer *United States*, [with] Captain Shooks. We left the **wharf** (landing place for ships) at half past 10 o'clock, with more than 200 souls (people). . . .

We had a pleasant run along the **Detroit** [**River**] for some miles, but our course appeared to be unusually slow. . . . We stopped at the approach of **Lake St. Clair**, and were told that it was to repair a leak in the **boiler** (part of the ship's engine that heats water to make steam). After three hours or more delay, we set off again, and on approaching the end of the lake, we got **aground** (stuck)—the channel here being a narrow one, and not deep. This second mishap did not continue long. We soon regained the channel and resumed our course. . . .

At 9 o'clock on Wednesday we weighed anchor, and again entered **Lake Huron**, now **tranquil** (calm), with a deep blue surface to the eye. . . . We reached **Mackinaw** [**Island**] about 6 o'clock in the afternoon . . . [and soon entered **Lake Michigan**.]

Green Bay in 1842

WHi Image ID 3773

Thursday, August 10. We passed by the **Manitou Islands** in the night, and were **opposite** (across from) the **Fox Islands** about sunrise. We passed numerous islands this day. . . . We entered **Green Bay** at midday. This bay is about 80 miles deep from north to south, and from 30 to 40 miles from east to west. . . .

Friday, August 10. At half past 11, we left the wharf to recruise Green Bay to Lake Michigan, when we must again turn to the south, and pursue our voyage to Chicago.

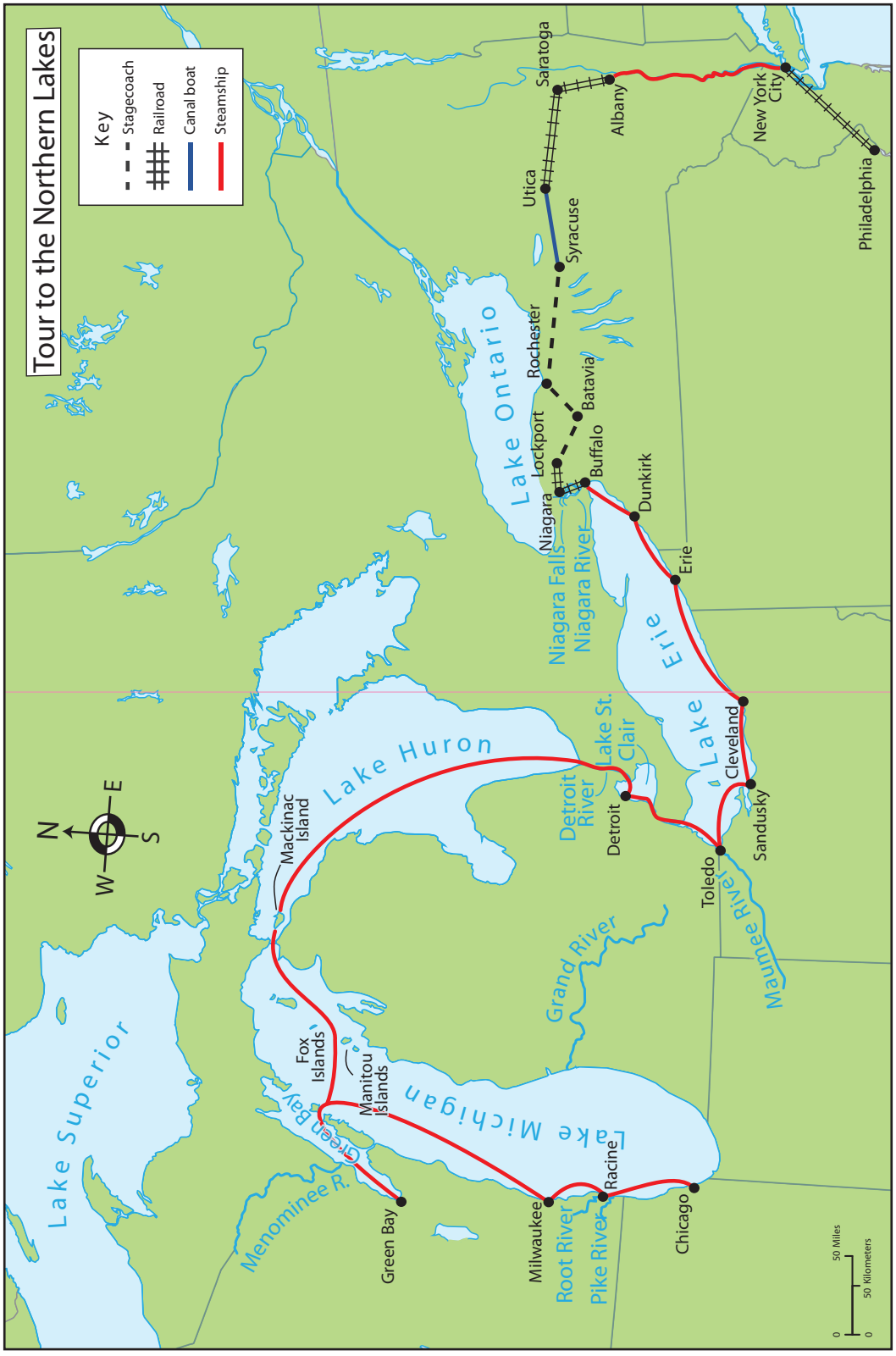
Saturday, August 12th. . . . The western coast of Lake Michigan, along which we course at the distance of six or eight miles, presents the same low dark green line of forest that we have already seen; but occasionally we can see a line of sandy beach, and sometimes of low hills of sand. No sign of human habitation or of human labor can be seen. . . .

Sunday, 13th. We reached **Milwaukee**, about 5 o'clock in the morning. . . . It lies on the west, or Wisconsin side of Lake Michigan, about 90 miles above Chicago, and is handsomely situated in the bottom of a bay of a **semicircle** (half-circle), about three and a half miles from one **extremity** (side) to the other, and near two miles deep. . . . On either side of the Menominee River is the town, consisting I should think of some 100 or 120 houses, which make a good show in the distance, as some of them are placed on **heights** (hills) about the river. . . .

We left Milwaukee about 10 o'clock, having stopped to take in wood, and not half past 12, came to the town of **Racine***, so called . . . because its site is at the mouth of the **Root River**. Here were about 15 or 20 houses. . . . We passed Pike River, soon afterwards, where no doubt there will soon be, or is already, another town laid off; and soon after sunset we reached the town of **Chicago**, whose highest buildings and lighthouse, we had seen sometime before.

* Racine (pronounced "ruh **seen**") is a French word that means root

Answer Key: Tour to the Northern Lakes



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Description of Life Aboard a Steamer

From *Tour to the Northern Lakes*, by A Subscriber, November 1837, *Southern Literary Messenger*.

A lake steamboat, like ours, bound to the west, presents a most **motley** (mixed), as well as crowded scene. Heaps of packages, furniture, and household items, indicate the nature of the country the owners are going to, and the humble character of the **accommodations** (living spaces) they are contented with. In the **forecastle** (also called foc'sle, front of the ship below the main deck) one sees children, dogs, women, sailors and blacks, lounging, or gazing, or chatting in careless ease—on the upper deck, Indian women, wrapped up in their blankets, their husbands sitting by them, or strutting about in their **gay** (brightly colored) and fantastic attire—Americans, variously grouped. Here, a young couple plan future schemes of comfort and happiness in the land of promise—there, a mother, nursing one child, and watching or keeping within her reach one or two others—here, a young gentleman playing the **gallant** (brave man) to a **comely** (good-looking) maiden—and there, two or three exploring, on a map, the route they are about to take, or the site of the lands they have purchased. Now and then someone withdrawn to a snug corner, is reading some new light work (book), and not a few are looking on with **listless indolence** (boredom). . . .

In the evening I began to experience some of the discomforts of Lake navigation. Our tea was without milk. The clouds, which had been threatening all day, at length discharged themselves in rain showers, and the roofs of most of the **state-rooms** (private cabins), including my own, leaked sadly, so that the water was half an inch deep. The Indians and deck passengers were seen seeking shelter everywhere in holes and corners; and the floors on which they slept, were all wet and dirty. To make the matter worse, the wind, which had been favorable, became . . . stronger, and we were threatened with a severe **blow** (storm). . . . Wherever the luggage of the passengers left a vacant spot, it was covered with beds, on which lay, as close as they could, children and women, so that it was with difficulty one could pass from one part of the boat to the other. Mothers might be seen providing some dry and sheltered spot for their little ones. . . . While every place was thus wet, chilly, and crowded, and the boat **pitching** (rolling from side to side) extremely, I withdrew to my wet state-room at nine o'clock; but the force with which the waves would dash against our **bark** (hull), making her **quiver** (shake) throughout her whole frame, so forcibly impressed me with thoughts of danger to the paddles or the crazy engine, that I could not sleep.

6 Sail and Steam

Teacher Background

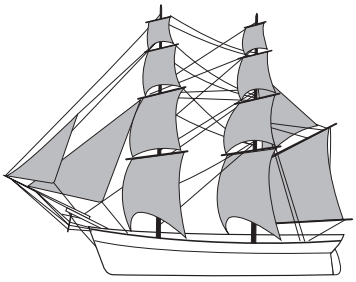
Buoyancy

Buoyancy is the force that allows things to float. According to the principle of buoyancy, a body partially or totally immersed in a fluid is acted upon by a force equal to the weight of the fluid displaced. Simply stated, a ship needs to displace the amount of water equal to its own weight to remain afloat. Some materials will always float. Wood and other materials that are less dense than water are naturally buoyant. Conversely, materials such as steel and concrete are more dense than water, so their hull shapes must be designed for buoyancy.

A key factor, then, is the boat's *shape*, not the raw materials from which it is made. This means that one object can weigh more than another but still be more buoyant because of its shape. That is why the smaller but more compact shape of a steel ball will cause it to sink, while a ship with a steel hull floats even when loaded with tons of cargo. When discussing an object's buoyancy, something that floats is positively buoyant, something that sinks is negatively buoyant, and an object that neither floats nor sinks is considered neutrally buoyant. Ships, of course, strive to be positively buoyant.

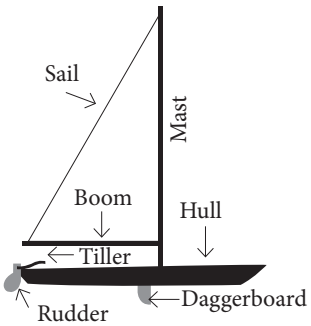
Principles of Sails

In the picture of the **square-rigged ship**, sails catch the wind from behind, which propels the boat forward. This means the wind has to be *behind* the ship to push it forward. This principle works well for ocean-going vessels in situations when the winds blow mainly from east to west or west to east.



square-rigged brig

Most sailing vessels on the Great Lakes were not square-rigged. They carried a **fore-and-aft rig**, which is a variation of the same kind of configuration that most modern sailboats use. These vessels are designated fore-and-aft rigged because, when there is no wind, the sails sit along a line that could be drawn from the forward (front) end of the boat to the aft (rear) end of the boat. The wind drives these vessels forward by a different principle. It is a little more complicated than the idea behind square-rigged ships, but the principle should be familiar. Airplanes apply the same theory in flight.

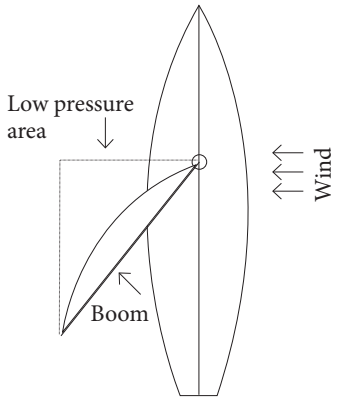


fore-and-aft rig

Fore-and-aft rigged ships are not pushed along by the wind. Instead, they are pulled forward by the wind in the same way that an airplane is lifted by the airflow over the wings. On a plane, wind flows under the flat bottom of the wing and over the curved top of the wing at different speeds. This creates lift, allowing the plane to climb into the sky. If you look at the overhead view of the sail, you can see it is shaped much like the side view of a plane wing. The wind flowing along the forward, curved side of the sail must get to the back edge of the sail at the same time as the wind moving along the shorter, flat side of the sail. This means that the air on the outside of the sail has to travel farther,

and therefore faster, than the air on the inside of the sail. This creates a difference in air pressure, which causes "lift" and pulls the boat forward.

This kind of sail configuration excelled on the Great Lakes for a number of reasons. Sailing in an enclosed body of water, Great Lakes vessels did not have the luxury of the large, regular trade winds that occur on the ocean. A fore-and-aft-rigged vessel that could maneuver in restricted waters and adapt better to the changing wind conditions of the Great Lakes could operate more efficiently. In addition, square-rigged vessels needed large crews to handle the sails. Conversely, a much smaller crew could handle fore-and-aft-rigged sails, as on Great Lakes schooners. This meant fewer sailors to pay and larger profit margins for the owners. The heyday of sail on the Great Lakes, however, would be eclipsed by steam power, which over time would prove more efficient for all kinds of cargo.



Sails work like a vertical airplane wing

Steam Engines

Before steam-powered vessels, ships were at the mercy of the wind. With the introduction of the steam engine, vessels could travel practically whenever and wherever they needed to go. Steam engines not only made traveling across water faster, they also were adapted for use in different industries in the region. But how does a steam engine work?

In Chapter 2, students learned that water can change its form easily. Liquid water can change to a solid (ice) or to a gas (steam) when its temperature is changed. Steam is formed when water is heated to its boiling point (100oC). One of the properties that makes steam so useful is that it takes up much more space (1,700 times) than the water that produced it. So, when steam is produced and contained, the pressure of the steam builds up. Conversely, when steam is cooled, it condenses. Steam engines take advantage of the power produced by this expansion and contraction.

A boiler is used to produce the steam to power a steam engine. All boilers have a furnace where fuel (wood, coal, or oil) is burned to heat the water in the boiler. The water is converted to steam. The pressure of the steam increases as more water is converted to steam and is stored in the boiler. The steam is piped to the engine and is used to move the engine's cylinder, powering the engine. By converting water to steam, inventors and industrialists set in motion an industrial revolution that led to the evolution of the engines we use today.

Bulk Cargoes on the Great Lakes

The maritime history of the Great Lakes centers on the constant search for the most efficient way to move goods. In 1825, a US Senate committee reported that a ton of cargo could be shipped from New York to London for about the cost of moving a ton of cargo thirty miles across land. Simply put, the laws of physics favor water carriage of bulk goods, since the force necessary to move a floating body through the water is appreciably less than that needed to push it through any other medium. The use of canals further validated this idea. A team of horses on a towpath pulling a canal barge with a hundred-ton load would make better time over long distances than a team pulling a single ton in a wagon on the finest roads. Even in the early twentieth century, it cost over twice as much to ship grain via railroad from Milwaukee to Buffalo than to ship it over water.

The bulky nature of many goods produced in the Great Lakes region fueled a push for larger vessels. In the nineteenth century, grain, timber, and iron ore comprised much of Wisconsin's contribution to the world market. Per pound, these goods were relatively inexpensive (and cargoes were heavy), so transportation needed to be very efficient to turn a profit. As outlined in this chapter, as new building techniques and navigational components allowed, ships were built larger and stronger, they loaded and unloaded more quickly, and they traveled faster.

Activity 6.1: Classroom Sailing Vessel

Goal

To familiarize students with the basic configuration and specialized terminology required of a sailing vessel

Objectives

The student will:

- Memorize various terms used in sailing and shipping
- Label sections of the Vessel Diagram
- Role-play the various aspects of sailing

Overview

This activity, which familiarizes students with the configuration of a sailing vessel, should be introduced before they begin reading Chapter 6. By rearranging their desks into a classroom-sized model of a sailing vessel, students will "live" with some terms and concepts inherent to sailing. This experience will heighten their appreciation of maritime history and underwater archaeology.

Skills and Strategies

Memorizing, labeling, synthesizing

Materials

- Vessel Diagram (one transparency)
- Labels for the classroom: Bow/Forward, Stern/Aft, Port, Starboard, Foc'sle, Hold/Amidships, Quarter Deck
- Starboard Side View (one transparency; one copy per student)
- Additional Vocabulary List (optional) (one for each student)

Teacher Prep

Refer to the Vessel Diagram and rearrange students' desks in the shape of the outline of a ship, with the bow (pointed end) facing forward and the stern (blunt end) toward the back of the room. With the large labels included here, place a sign on each of the four walls: **Bow/Forward** (front of room), **Stern/Aft** (back of room), **Port** (left), **Starboard** (right). Students should be facing forward, or toward the **bow**, with the **stern** at their backs, **port** on their left, and **starboard** on their right. **NOTE:** If time and space are limited, you can complete this activity without moving the desks but simply treating the whole classroom as the vessel.

Procedures

1. Have all the students sit facing the **bow** in order to learn each position.
2. With the students seated at their desks, go over each direction. Have students point to or face the stern, the bow, port side, and starboard side. Repeat until students have mastered each direction. Cover each sign and practice the directions from memory. Distribute the Starboard Side View sheet to each student to further illustrate the plan of a sailing vessel. You may want to assign a student to be the "captain" and test the crew on their knowledge. **NOTE:** On a boat, you do not walk to the "front" or "back" of a vessel, you go or face **forward** (toward the bow) and go or face **aft** (toward the stern). Use the directions "forward" and "aft" when directing students.
3. Have all the students turn around and face the **stern** (aft). Repeat the exercise in step 2. Help them to see how port and starboard stay the same even though the port side is now on their right side and starboard is now on their left.
4. Optional: If students are enthusiastic and curious for more information, use the teacher information to label the **foc'sle, hold/amidships**, and **quarterdeck** within the classroom ship, or hand out the Maritime Vocabulary List to apply more terms to the classroom ship. From the Vessel Diagram, you could also identify the **bowsprit, windlass, masts, hatches, wheel**, and **rudder**.
5. Review the information on sailors and officers in Chapter 7. Divide the class into officers and sailors. Approximately one-third of the students (the ones seated in the back of the classroom) make up the officers, who live toward the aft end of a vessel, or the **quarterdeck**. Explain that the officers needed to be close to the navigational aspects of the vessel, the wheel and charts. They earned a better rate of pay, generally ate better meals, and lived in larger, more comfortable cabins. The rest of the students comprise the ranks of the common sailors (or sailors "before the mast"), who live in the foc'sle. Explain that the foc'sle also was the most uncomfortable part of the ship. The wettest, bumpiest, and most cramped part of the vessel was reserved for the common sailors. These sailors also earned a lower wage and usually ate poorer-quality food than the officers.
6. Finally, have students identify the area known as the **hold/amidships** and place their backpacks there as cargo. Review locations in the ship in much the same way as step 2. Have students point to each location within the ship. Have students in each area stand up when their location is called. Review the directions as well. **NOTE:** If you want to continue this theme, you can divide the classroom in half (from bow to stern), calling the right half the **starboard watch** and the left side the **port watch**.
7. In order to further enforce shipboard concepts and terminology, keep the classroom in this formation for a couple of days and refer back to the terms. Each day or half-day, have students take turns in different vessel positions, assuming the roles of officers and sailors.

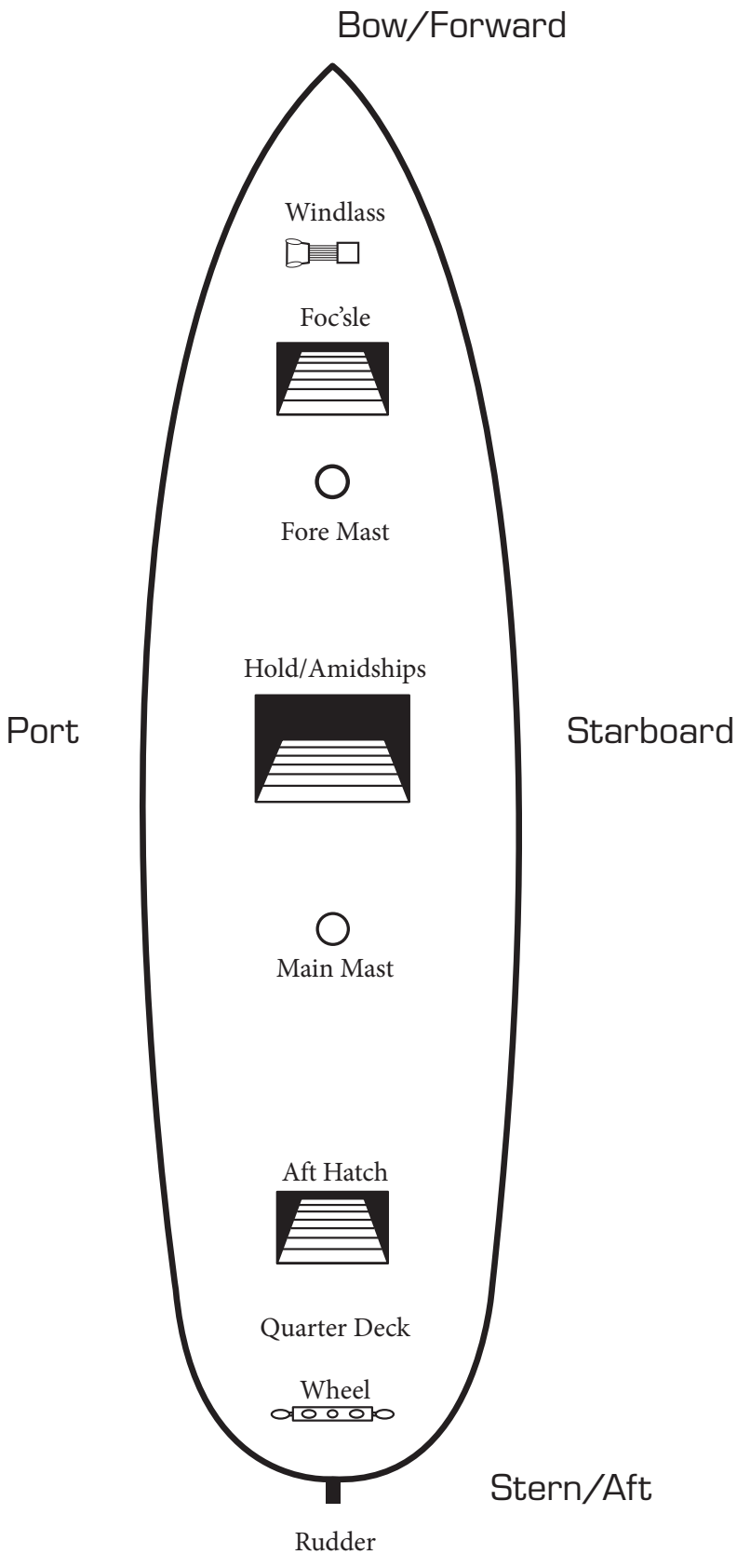
Closure

Remove the signs from the classroom. Review all the directions and parts of the ship. Discuss the possible reasons for having the names of each direction. Why do you think port and starboard are used instead of left and right? Sailors needed to know which side of the vessel was being referred to whether they were facing forward or aft. With port and starboard, you don't have the confusion of "my left or your left." The same applies to forward and aft: they remain fixed directions. Discuss why the sailors and officers lived and worked in different sections of the ship. Refer back to the terms learned in this lesson as you continue through the activities.

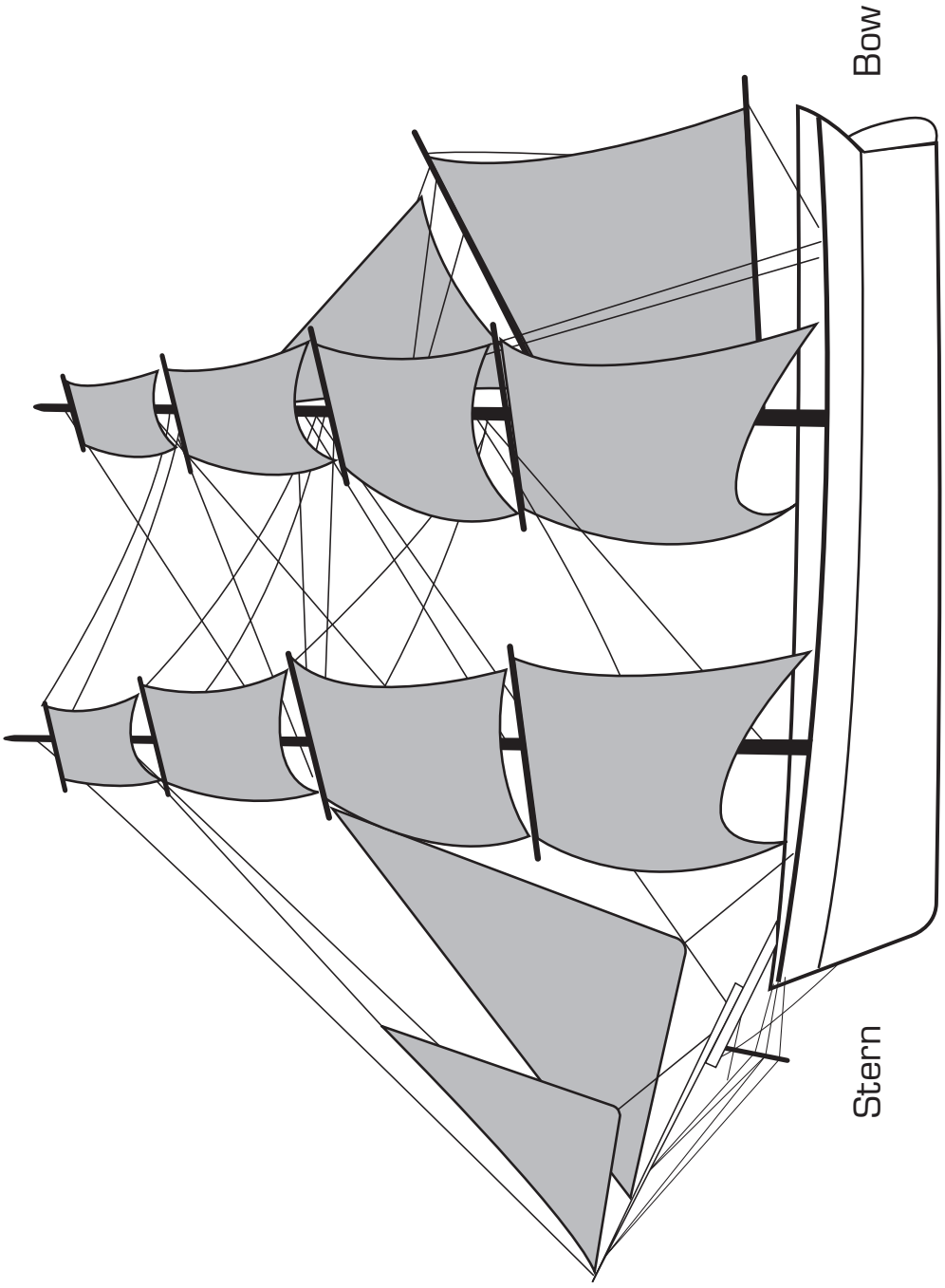
Extension

Learn more about ships, sailing, and nautical terms from websites listed in the Additional Resources section.

Vessel Diagram



Starboard Side Diagram



Labels for the Classroom

Bow

Forward

Stern

Aft

Port

Starboard

Foc'sle

Hold

Amidships

Quarter Deck

Maritime Vocabulary List

Aft: Toward the stern.

Amidships: Halfway between the bow and stern.

Bow: Forward end of the ship.

Foc'sle: The most-forward living space on a vessel, allotted to the common sailors. Also called forecastle.

Forward: Toward the bow.

Hatch: Entry port from deck level to below decks.

Hold: Area of a vessel where cargo was stored.

Mast: A vertical spar to carry a vessel's sails.

Port: The left side of a vessel when you are facing forward. Loading ports were located on this side of a vessel.

Quarter deck: The raised afterdeck of a vessel.

Rudder: A moveable vertical board attached to the stern that steers the vessel through the water. It is controlled from the wheel.

Spar: Wooden poles that sails are secured to.

Starboard: The right side of a vessel when you are facing forward. The word *starboard* comes from the term *steer board*. In early ships a paddle used for steering was located on this side.

Stern: The aft (rear) end of a vessel.

Watch (as in starboard and port watches): A division of sailors that alternately remain on deck, usually four hours at a time, and are responsible for sailing the vessel.

Wheel: Steering device attached to the rudder that maneuvers a vessel.

Windlass: A device for heaving in the anchor chain.

Activity 6.2: Boat Float

Goal

To understand the effects of boat design on buoyancy

Objectives

The student will:

- Experiment with a variety of boat designs
- Compare and contrast various designs
- Hypothesize and modify an investigation based on data
- Demonstrate an understanding of buoyancy through analysis of data

Overview

Shipwrights consider the purpose of ships they design and build. In this activity, students will think and act like shipwrights as they attempt to construct a simple boat that can both float and carry cargo.

Skills and Strategies

Observing, recording, analyzing, evaluating, synthesizing

Materials

- Aluminum foil (one square foot) or modeling clay (fist-sized lump)
- Boat Float Challenge activity sheet (one per student)
- Pennies or small weights (about ten per group)
- Tub of water for each group
- Paper towels for clean-up
- A selection of picture books of boats for students to browse
- Computer with Internet access (optional)

Procedures

1. Engage students in a discussion of buoyancy, reviewing the basic principles: what floats and what does not, and why (see Teacher Background for Chapter 6). Remind students that many boats and ships have steel or even cement hulls, so the material is not the only issue; the shape is also important. Discuss briefly some common boats (canoe, rowboat, sailboat, steamer), their shapes, and the materials used in their construction. Explain to the students that they will be acting as shipwrights (designers who construct vessels), and that they will be free to create boats of any shape from the material (foil or clay) you have selected.

Name _____ Date _____

Boat Float Challenge

Draw your first boat here.

Hypothesis: What will happen when you put your boat in the water? _____

_____

_____

Number of weights in your final boat design: _____

What worked? _____

What didn't work? _____

Conclusion _____

_____

Draw your final boat design here.

2. Pass out boat material (foil or clay) to each student. Pass out the Boat Float Challenge activity sheet to each student. Explain that students will be experimenting with boat designs. Demonstrate the concept of buoyancy by crumpling a sheet of foil into a tight ball (or make a tight ball of clay) and place it in a tub of water. The ball will sink. Have students draw their initial design of their boat in the box at the top of the Boat Float Challenge sheet. At this point they should not be using outside images for help.
3. Have students use their ideas in their drawings to construct their models. They should not have any material left over.
4. When they are finished building their boats, have each student guess what will happen when their boat is placed in the water. Will it float? Will it sink? Will it tip over? Allow students a few minutes to write their hypotheses.
5. Collect activity sheets to prevent them from getting wet.
6. Divide students into groups of four or five. Each group should have ten pennies or weights, a tub of water, and paper towel to clean up spills.
7. Have students test their designs by floating the boats in the tub of water. If the boats do not float, have students modify their boat design, either by increasing its surface area or making a more stable hull shape.
8. Allow students time to modify and test their boats. At this point they may browse through books, find Internet resources containing vessel images, or look at their classmates' work.
9. After they get them to float, challenge students to fill their boats with weights. Add pennies or weights one at a time. If the boat sinks, have them continue to modify their boat design. Also, experiment with weight placement and observe how the boat reacts to different distributions of weight.
10. After students clean up and dry their areas, pass back their Boat Float Challenge activity sheets. Have students draw a picture of their final boat design in the box at the bottom of the sheet and then have them fill in the remainder of the worksheet with how many weights the final design held, what worked and didn't work, and their final conclusions.
11. Have students share their final boat designs; then discuss and determine which designs worked best. Which of the hypotheses proved true, and which turned out to be false? On a chalkboard or transparency, list attributes of the boats that floated best. On a second list, have students determine attributes of the boats that held the greatest amount of weight. Consider those boat designs that were successful in both categories. Complete the discussion by focusing on the following:

    Why is it critical to design a boat that floats?

    What factors caused some boats to sink? What factors helped others to float?

    Would the same factors be true for huge ships? Why?

    Would some boat designs work well in some instances and not in others? For example, a flat raft works well in a slow moving stream or river but not in open water. Conversely, an ocean-going vessel that sits relatively deep in the water would not work in shallow areas.

Extension

Have students explore the Internet for kid-friendly sites on buoyancy. See the Additional Resources section for options.

Sailors and Keepers

Activity 7.1: Create Your Own Lighthouse

7

Goal

To understand the importance of lighthouses to the shipping industry and to safety on the Great Lakes

Objectives

The student will:

- Construct a model of a lighthouse
- Discuss the importance of lighthouses
- Imagine a scenario in which there are no lighthouses

Overview

Lighthouses were designed to help ships navigate inland seas and oceans. Lighthouses are used to mark hazardous coastlines, shoals/reefs, and safe entries to harbors.

Skills and Strategies

Labeling, modeling, synthesizing

Materials

- Large and small paper plates
- Large and small paper cups
- Wooden beads
- Colored pencils and markers
- Glue
- *Great Ships on the Great Lakes* reader

Procedure

1. After reviewing Chapter 7, ask the class the following questions to focus the activity:

   Where are lighthouses located?

   Why are lighthouses important?

   What would happen to ships on the Great Lakes if there were no lighthouses?

2. Give each student a large paper plate, a small paper plate, a large paper cup, a small paper cup, a wooden bead, and glue.
3. Have students glue the large paper cup onto the paper plate. Next, have students glue the small paper plate on top of the cup. Then students should glue the small cup onto the small paper plate. The wooden bead is the light that goes on the top. Invite students to decorate as desired using colored pencils and markers.
4. Using the map on page 76 of the reader, have students choose a location on a coastline or island. Have the students label their lighthouse with their chosen location on the paper plate base.

Closure

Come back to the focus questions and end the class with a discussion. Student responses should be more accurate than before.

Extension

Have students choose an actual lighthouse on the Great Lakes (or an island in the Great Lakes) to research. Research should include the state it's located in, the lake it's on, when it was built, and how tall it is. Students could also research the history of the lighthouse: Who lived there? Are there any famous stories about the lighthouse? Were there any shipwrecks or big storms near the lighthouse? Have students give a short oral report to their classmates highlighting their lighthouse. For more on lighthouses, see the Additional Resources section.

Adapted from the Chesapeake Chapter U.S. Lighthouse Society.

Activity 7.2: Lighthouse Keeper

Goal

To understand the role of a lighthouse keeper through the use of primary source materials

Objectives

The student will:

- Read the "Lighthouse Keepers" section of reader
- Listen to primary source readings from Martin Knudson
- Create a story web describing the life of a lighthouse keeper
- Illustrate their story
- Write a journal entry role-playing their day as a lighthouse keeper

Overview

The life of a lighthouse keeper is busy, boring, dangerous, and lonely all in one. The government required each lighthouse keeper to keep a logbook of daily events, shipping traffic, and weather. Their daily routines consisted of cleaning the lens, trimming the wick, and cleaning the windows.

In this lesson, students will put themselves into the shoes of a lighthouse keeper in order to create a descriptive writing piece. Refer back to Chapter 7 for further information.

Skills and Strategies

Reading, listening, creative writing

Materials

- *Great Ships on the Great Lakes* reader
- Colored pencils or markers
- Drawing paper
- Lighthouse Narrative: A Real-Life Lighthouse Keeper
- Computers with Internet access

Teacher Prep

Get computer access for students to log on to the website found in the Additional Resources. Open book to Chapter 7 and read the section on "Lighthouse Keepers."

Procedures

1. Have students read aloud the "Lighthouse Keepers" section from Chapter 7 of the book. Then, read them the narrative about real-life lighthouse keeper Martin Knudson. Depending on time, you can skip the first two readings (on lighthouse-keeping tasks) and read about Martin's work rescuing the survivors of the *A. P. Nichols*. If time allows, you can also read about the wreck of the *A. P. Nichols* in Chapter 8, page 98.
2. Discuss with the students what it was like to be a lighthouse keeper. Was it dangerous, boring, busy, or lonely? Hand out drawing paper and markers or colored pencils, and have students, in pairs, create a story web. Ask them to draw a picture or series of pictures to tell their story.
3. Get out the student-made lighthouses from the previous lesson.
4. Tell students that they are the keeper of their lighthouse. Using the story web they created, have students write a journal entry describing a day in the life of a lighthouse keeper.

Closure

Talk about how important the lighthouse keeper was for safety on the Great Lakes.

Extension

Take the lesson one step further by having students research the families and children of the lighthouse keepers. They can start by reading the section on "Lighthouse Families" in the reader, pages 80–83. What was life like for them? Have students create another story web, this time about the children of the lighthouse keepers. Using the web, have students create a journal entry describing the day in the life of a lighthouse keeper. For more on lighthouses, see the Additional Resources section.

Lighthouse Narrative: A Real-Life Lighthouse Keeper

Martin Knudson was a lighthouse keeper from the 1870s to the 1900s. With his wife, Theresa, he kept the lighthouse at Pilot Island in Death's Door Passage off of Door County, Wisconsin, and South Manitou Island off the coast of Michigan. His adventures are recounted in *A Gleam Across the Wave: The Biography of Martin Nicolai Knudsen, Lighthouse Keeper on Lake Michigan*, by Arthur and Evelyn Knudson, published in 1948 (pages 39–40, 44, and 57–60).

Martin Knudson became an assistant lighthouse keeper at Pilot Island around 1880.

Martin felt that he had entered the service in a very modern era. The old **lard-oil** (oil made from the fat of animals) lamps had been **superseded** (made out of date) by those burning **kerosene** (a kind of gasoline). Martin knew all about the **inconvenience** (hassle) and hard work connected with the use of lard-oil. In cold weather it hardened and had to be warmed up before it could be used. It was smoky, smelly, dirty and unreliable, and the keepers worked endlessly trying to keep the lighthouse clean. To produce enough light to be seen for any distance on the water, several lard-oil lamps had to be used, each lamp placed in front of a tin reflector. With the **advent** (coming) of the kerosene lamp and the glass lens, only one lamp was needed, and the white walls of the lantern room stayed clean for a much longer period of time.

Later, Martin became keeper of the lighthouse at South Manitou Island off the coast of Michigan.

Martin spent his first days on South Manitou Island in getting acquainted with the lighthouse and the light **mechanism** (machinery). The first time he climbed the circular iron staircase which wound upward around and around inside the tower, it seemed a tremendous height. The great glass lens was placed on an iron platform which **revolved** (turned) by means of clockwork weights. The lens was so large that one day when six ladies from a handsome yacht were visiting the lighthouse, they stepped inside of the lens just as a matter of curiosity to see how many people it would hold. The large kerosene lamp which was placed inside the lens had three wicks of three different heights.

A good lighthouse keeper kept everything shining and spotless with **meticulous** (taking care of every detail) care. Each morning he washed and polished his lamp chimneys, trimmed his wicks, filled his lamps, rubbed the lens with a **chamois skin** (leather material made from goat skin) so that no smudge, finger mark or **infinitesimal** (very small) piece of lint remained on it, wound up his clockwork, and looked around the walls of the lantern room to see whether they were in need of washing or a new coat of gleaming white paint. The circular iron stairs must at all times be clean and well painted, and lighthouse and dwelling ready for inspection at any time.

Library of Congress, Prints & Photographs Division, HABS MICH,45-GLAR,8A—1

The lighthouse at South Manitou Island.

There was adventure and excitement **a-plenty** (more than enough), and even danger, in the life of a lighthouse keeper in the 1860s. At that time there were no coast guard stations on the islands. Although it was not in his specified line of duty, the lighthouse keeper felt responsible for the safety of those on the waters of the lighthouse as far as he could see. He was keeper of the waves as well as keeper of the light; and it was the lighthouse keeper who was called upon to go whenever there was need of an emergency trip to the mainland.

The following story recounts the wreck of the A. P. Nichols *off the coast of Pilot Island, October 28, 1892. At the time, Martin was the main lighthouse keeper. He had two assistants and a young family.*

It was a dull, gray day, and the great waves were **leaden** (gray) in color. Martin had been watching the **barometer** (instrument that measures air pressure) going lower and lower. The wind increased in **velocity** (speed) with every passing hour. . . ."Keep a sharp eye out today, boys, for any vessel in distress," said Martin to his assistants. "We want to do whatever we can."

. . . By afternoon it was sleeting and snowing, the wind shrieking and wailing around the lighthouse like a **banshee** (ghost or spirit). The men took advantage of every moment of visibility to look out onto the lake in order to see whether there were any vessels near the island. There were four or five that were trying to anchor in the **lee** (side away from the wind) of Plum Island but were experiencing great difficulty in making their anchors hold. . . . It was close to 2:00 in the afternoon when the keepers at Pilot Island sighted a three-masted schooner, the *A. P. Nichols*. . . . She was unable to come to anchorage and was being inevitably (certain to happen) driven toward Pilot Island.

At Pilot Island lighthouse the atmosphere was tense and anxious. The men had watched this mortal combat between the **gallant** (brave) ship and the **elements** (weather). Darkness had come on with the fate of the vessel still hanging in the balance. The light atop the lighthouse was sending out its beams; and once in a while the snow and sleet **squalls** (storms) would **abate** (lessen) enough so that the men could see the ship. It seemed to them, each time the flash of light came around so that they could see her, that she was getting closer to the island. Martin had remarked to his wife at the supper table: "I'm very much afraid, Ma, that we are going to have another wreck."

About 8:00 or 8:30 that evening, the men, dressed in **oilskins** (waterproof clothes) with high rubber boots on, were all in the warm kitchen of the lighthouse having a hasty cup of hot coffee before going out again into the **gale** (storm with high winds). Suddenly there was a terrific crash that sounded above the storm from the west side of the island. For a moment they all stood rooted to the spot. "God help us all," said Theresa. The men put down their coffee cups and rushed out the door. Theresa snatched a shawl and followed them. When the next flash of the lighthouse **beacon** (signal) came round, it looked to her as though a large vessel had run up into the shore, with its **jib boom** (long pole sticking out from the front of the ship) extending over the land. When Theresa got closer, she saw that the boat was actually a short distance off shore but quite close to the deck of the wrecked *Forest* [a ship that had wrecked sometime earlier], in fact, her **starboard** (right-hand side) almost touched the bow of the deck of the *Forest*. She was rolling from side to side like a creature in mortal agony, and when she rolled toward the *Forest* she came in contact with the deck and **bore** (pushed) it down so that it sloped toward the deep water at a dangerous angle. Theresa came upon the second assistant keeper watching from the shore. "Where are Martin and Hans?" she asked him. "Out there, on the *Forest*," he told her. And in the next shaft of light from the lighthouse, she saw Martin and Hans out on the wreck, trying to get as close to the *Nichols* as they could. With her heart pounding in anxiety and a prayer constantly on her lips, Theresa stood on shore, waiting breathlessly for each beam of light to swing around so that she could see what was going on.

Martin and Hans had now **formulated** (come up with) their plans for an attempt at rescuing the people on the *Nichols*. They both knew every inch of the deck of the *Forest*, just where the uncovered hatches were, and what handholds they could depend on. Hans was to stand on the land side of the wreck, while Martin was to get as close as he could to the forward end of it, and wrap his arm around the **pawl bit** (part of ship that keeps the anchor chain or rope in place), which stood **staunch** (unmoving)

and firm in the old deck. The plan was to have the passengers of the *Nichols*, when she rolled toward the *Forest*, jump from her deck to where Martin stood. He would grab them and try to help them back to where Hans stood, and Hans would guide them safely up over the rocks onto land. They would have to work fast, as it was a great gamble as to how long the *Nichols* could withstand the terrific pounding she was getting without going to pieces. When the starboard side of the deck of the *Nichols* rolled down, it was not far from where Martin stood. With much loud shouting back and forth, an agreement and understanding was reached as to what was to be done, and Martin braced himself, ready for the first jumper. The young captain was the first to try it. It required courage, as the surging waters between the two wrecks were a wild, turbulent **maelstrom** (whirlpool). He jumped as Martin directed, and was immersed in water up to his neck, and he missed his footing on the deck. Just as the flash [of light] came round, Martin saw his disappearing head and made a quick grab, got him by the hair and dragged him to safety just in time to escape the next downward roll of the *Nichols*.

"Are you all right?" yelled Martin, above the noise of the **tempest** (storm). "I guess so," replied the young man, wiping the water out of his eyes with his hand. "Gosh! That was a narrow escape." . . .

One by one those on board the ill-fated *Nichols* were rescued, and guided over the hazards of the old deck of the wrecked *Forest*, across the half-submerged rocks, up onto the island, and taken into the warm kitchen of the lighthouse for first aid. Oh, how good the hot coffee was, and how comforting dry **garments** (clothing) and a cozy fire!

Shipwrecks

8

Teacher Background

Underwater Archaeology

Archaeologists use clues from a wreck site to answer questions about the past, such as determining why the vessel sank and what life was like on the vessel for the sailors. The process by which the vessel changes from being afloat to what it looks like today is called the "site formation process." The site formation process includes all the factors that contributed to the sinking of the vessel, as well as those factors that have affected the wreck site over time, like salvage attempts and artifact theft. Environmental factors in particular constantly influence the wreck site and must be considered when drawing conclusions about the vessel and why it wrecked. Churning water, ice formation on shallow wrecks, wave action, and damage by marine microorganisms all contribute to the slow deterioration of an underwater archaeological site.

Archaeologists learn about the past by studying artifacts (physical objects left behind by people) and human-made structures, such as houses and ships. Archaeologists document their finds with great detail and accuracy because they can hypothesize about what happened at a site only through careful documentation and interpretation of artifacts. Because they can recreate only the parts of a site that have been thoroughly investigated and accurately recorded, archaeologists realize that as they remove artifacts and excavate features, they are, in fact, irreversibly altering the site. The archaeologists' documentation (maps, site descriptions, etc.) then becomes a representation of the site, which in turn provides us with insights into the lives of those who lived in the past.

Activity 8.1: What Causes Ships to Wreck?

Goal

To understand that shipwrecks happen for a variety of reasons

Objectives

The student will:

- Learn about the causes of shipwrecks
- Match the causes of shipwrecks to specific ships
- Write an imaginary eyewitness report on a shipwreck
- Learn about the site formation process (optional)

Overview

In this activity, students will explore some of the causes of shipwrecks by learning about six historical shipwrecks from Lakes Michigan and Superior. Students will have a chance to "report" on the shipwreck by creating a drawing of the wreck and writing an "eyewitness" interpretation. Students must visualize the site formation process (by using clues from the provided narrative) in order to develop an accurate report (see Teacher Background). A discussion about the wrecking of the *Lucerne* will help set the context and establish parameters for the activity.

If time permits, the activity can be expanded to include a discussion about factors that continue to affect the wreck site, such as salvage, unauthorized artifact removal, and environmental influences such as storms, ice, or zebra mussel colonization. These factors, also part of the site formation process, must be taken into account when considering why and how the ship sank. The changing nature of the wreck site often makes developing a wrecking scenario much more difficult.

Skills and Strategies

Reading, matching, interpreting, reporting, evaluating, synthesizing

Materials

- Shipwreck student pages (copies of each for each group of six)
  - *Niagara* student page
  - *Sevona* student page
  - *Pretoria* student page
  - *Noquebay* student page
  - *Louisiana* student page
  - *Selah Chamberlain* student sage

- Causes of Shipwrecks worksheet (one per group)
- Answer Key: Causes of Shipwrecks
- Writing paper (ruled) or a computer and printer
- White construction paper (large—18" x 24")
- Scissors
- Glue
- Crayons or colored pencils
- Computer with Internet access (optional)

Procedures

1. After reading Chapter 8, discuss the *Lucerne* shipwreck. What caused the *Lucerne* to wreck? Because there were no survivors, there was no one to report the tragic events. Ask students to imagine what the sinking of the *Lucerne* might have been like. Brainstorm ideas about what it would have been like to have been an eyewitness who actually saw the shipwreck take place: Was it cold? Were the people scared? What did the storm look like? What did the ship look like while being battered by the storm? Write student responses on the board.
2. Using the information in the reader, tell the students that shipwrecks happen for different reasons. Not all shipwrecks occur because of winter storms like the *Lucerne* wreck. Ask students what causes they can imagine for shipwrecks. Encourage them to revisit Chapter 8 to help generate reasons. Explain that they will be learning about interpreting the events that led to six other shipwrecks.
3. Divide students into groups of six. Each group will be reading about all six shipwrecks. Assign each student in each group one of the six shipwrecks, and pass out appropriate activity sheets. Have students read silently the information about their ships.
4. Pass out a Causes of Shipwrecks worksheet to each group. Ask groups to discuss the material they have read, comparing the causes and circumstances of individual wrecks. After the discussion, have each group list each shipwreck under the appropriate causes of destruction. What other important historical details (ship type, construction material, etc.) did they find in the narrative? Did they notice that the *Sevona* and *Pretoria* sank during the same storm?
5. Hand out writing paper. (Or, they can use a computer for this part of the activity and print the result.) Ask students to reflect on the shipwreck they read about and imagine what it would have been like to be an eyewitness observer. **Note:** This narrative will be pasted onto the poster that each group creates, so it must be no larger than one sheet of paper. Have students answer the following questions: What did it look like? What did it feel like? What happened?
6. Have students write one to two paragraphs about the shipwreck as if they were reporting on it as underwater archaeologists, sharing the information they have found.
7. Pass out construction paper, scissors, glue, and crayons or markers. Have students fold and unfold the construction paper in thirds so they have three rectangles.
8. The rectangle on the left will be the "Before" picture. Students can cut out and paste the ship picture from their ship's student page in the first box, or they can draw the ship themselves. The "Before" box should include the name of the ship and the size. In the middle rectangle, have students glue down the shipwreck narration they wrote. The rectangle on the right will be the "After" picture. Students should draw a picture of the ship during the disaster (in the storm or on fire, etc.) or after the wreck (on the bottom of the lake). The "After" box should include the date of the shipwreck and any casualties. Point out that shipwrecks on the lake bottom do not always look exactly like ships afloat. Underwater archaeologists must use clues to determine how the ship wrecked and, in the absence of historic photographs, how the ship looked when it was afloat.

Closure

Have students volunteer to share their shipwreck stories with the class. Discus some of the similarities and differences among shipwrecks. Discuss what caused these ships to wreck. Collect the shipwreck posters for assessment and display.

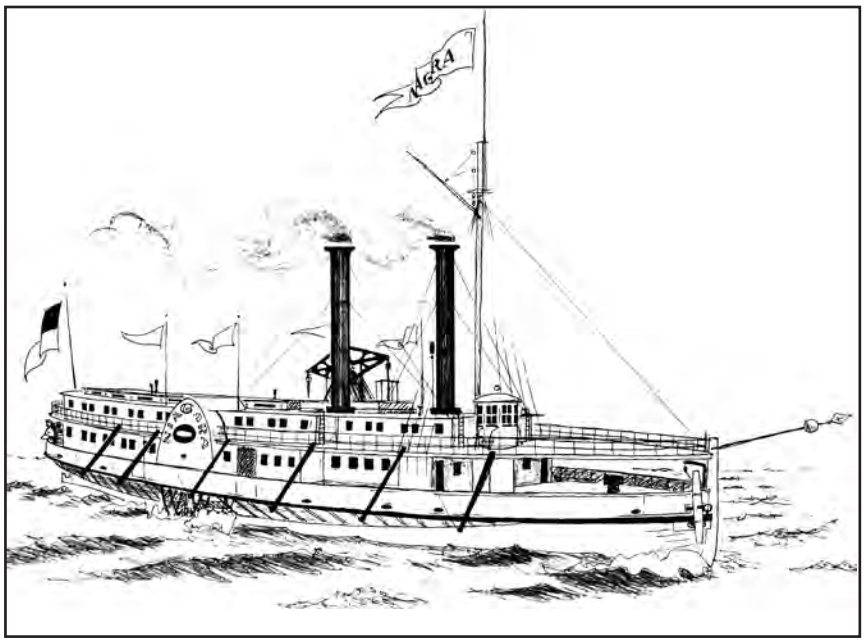
Extension

Students can learn more about these and many other Wisconsin and Michigan shipwrecks on the University of Wisconsin Sea Grant Institute Shipwrecks website and at the Thunder bay National Marine Sanctuary website (see Additional Resources). These websites include historical narratives and images, wreck descriptions and site plans, and underwater photographs and video for dozens of shipwrecks. The sites can be incorporated into the activity. Students can do historical research on the Wisconsin site to find more detail to add to their reports, or you may add or substitute additional shipwrecks using the Michigan site.

The *Niagara*

The steamer *Niagara* was built in 1846 near Buffalo, New York, by shipbuilders Bidwell and Banta. When the *Niagara* was built, it was one of the largest, fastest, and most beautiful steamboats on the Great Lakes.

The *Niagara* was 245 feet long and had a thirty-three-foot **beam** (the width of a ship). Powered by a steam engine that drove two thirty-foot side paddlewheels, the steamer could carry hundreds of passengers and large cargoes.

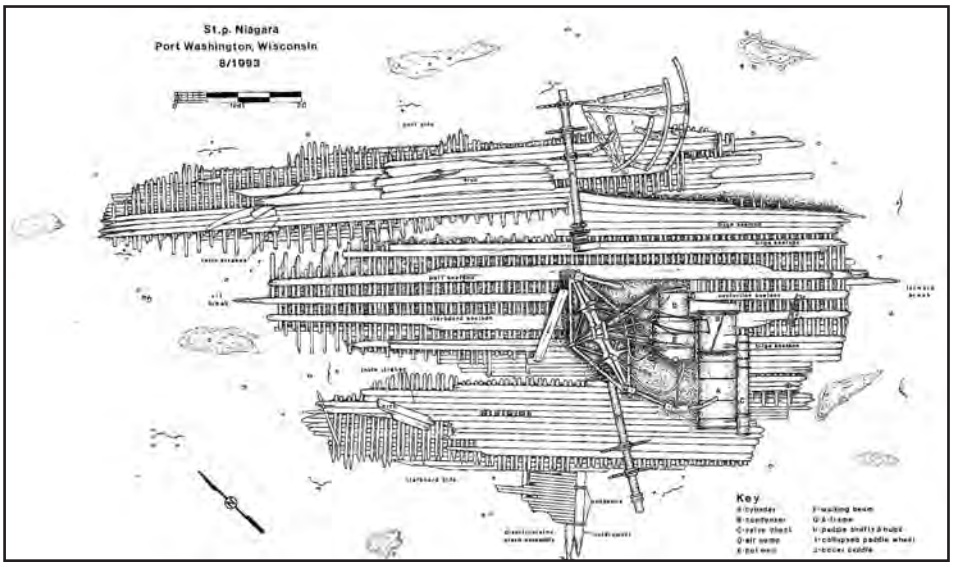


Underwater Archaeology, WHS

Drawing of the *Niagara*

On September 24, 1856, the *Niagara* left Sheboygan, Wisconsin, for Port Washington, thirty miles to the south. After the ship got past Sheboygan, Captain Fred Miller went to his cabin for an afternoon nap. He was not asleep for long when cries of panic awoke him—the *Niagara* was on fire! The captain ordered the ship turned toward shore, but the fire quickly brought the engine to a halt and left the vessel ablaze and drifting. Like many other boats of the time, the *Niagara* carried no life preservers. The captain and crew threw cabin doors and other **buoyant** (able to float) items into the water for passengers to hold on to. This was a common practice during the early days of steamships.

As fire burned up the middle of the steamer, passengers became stranded at the **stern** (back of the boat) while the ships' crew was isolated at the **bow** (front of the boat). Panicked and inexperienced passengers attempted to use the lifeboats. The largest one **capsized** (turned upside-down in the water). Women and children on another lifeboat drowned when former US Congressman John Macy jumped into the lifeboat and accidentally broke the back of the boat off. Sadly, sixty people died in this wreck, one of Wisconsin's deadliest transportation disasters. The *Niagara* sank in approximately fifty feet of water.



National Park Service

A site map of the *Niagara* wreck

The *Sevona*

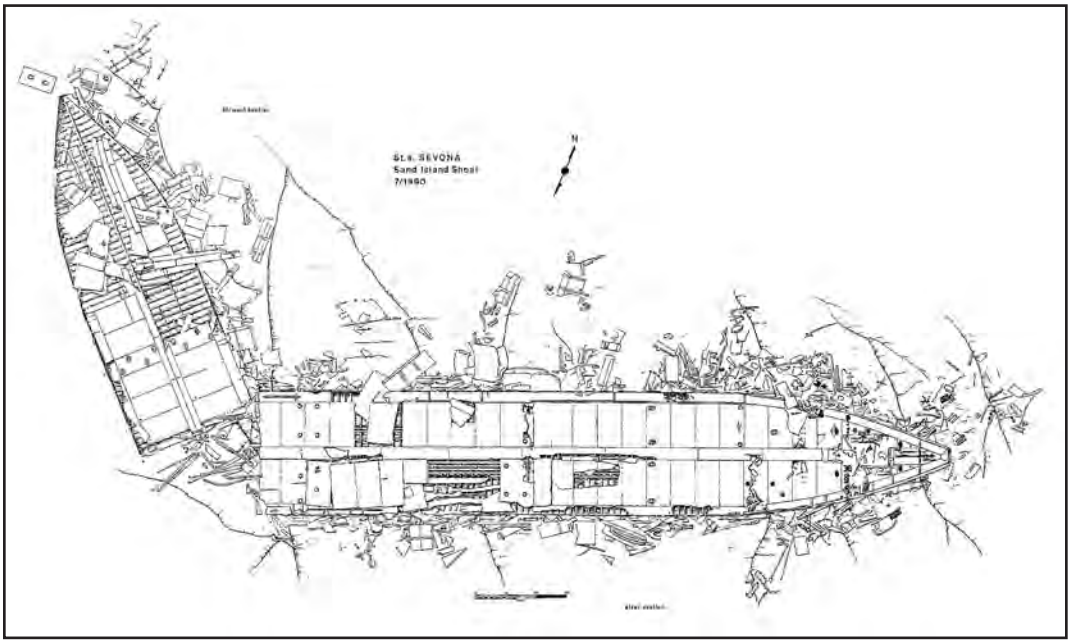
Institute for Great Lakes Research at Bowling Green University

The *Sevona* under steam

Originally named the *Emily P. Weed*, the **bulk carrier** (large ship designed to carry heavy cargo) *Sevona* was built by the shipbuilders F. W. Wheeler & Company of Bay City, Michigan. Completed in 1890, the ship was the company's second vessel with a steel **hull** (body of a ship) and one of the largest on the Great Lakes at that time. Powered by a steam engine that drove a propeller, the *Sevona* was three hundred feet in length and had a forty-one-foot **beam** (width). In 1905, the ship was cut in half and seventy-two feet of hull was added.

On the evening of September 1, 1905, the *Sevona* left Superior, Wisconsin, for Erie, Pennsylvania. It was carrying six thousand tons of iron ore and had a crew of twenty-four people, including two women who were guests of the owner. The weather was calm on Lake Superior, but within a few hours the winds began to pick up. By midnight the storm became a gale, known as a Lake Superior ***nor'easter*** (storm from the northeast).

At 2:00 a.m., the *Sevona*'s captain, Donald S. McDonald, decided to turn the boat around. He was hoping to find shelter in the Apostle Islands. The crew was blinded by fog, rain, and rough waters, and the *Sevona* **ran aground** (got stuck on a shallow bottom or rocks) on Sand Island. The collision tore a hole in the ship's bow. The crew tried to signal for help by blowing the ship's whistle and shooting rockets in the air, but there were no other boats in the area to help. Trapped in the bow without a lifeboat, a group of seven men made their own lifeboat from broken pieces of wood. The others on board piled into lifeboats. Although the storm was fierce, they made it to safety. However, the group of seven men on the raft did not survive. Later, archaeologists decided that the missing lifeboat was probably removed during the rebuilding of the ship and was never returned. Today the *Sevona* is broken nearly in half, and for many years people believed that the ship broke at the spot where the additional seventy-two feet of hull were added. Underwater archaeologists determined this was not the case; the ship actually broke much closer to the bow. The *Sevona* rests in about twenty feet of water.



Underwater Archaeology, WHS

A site map of the *Sevona* wreck

The *Pretoria*

Launching the *Pretoria*

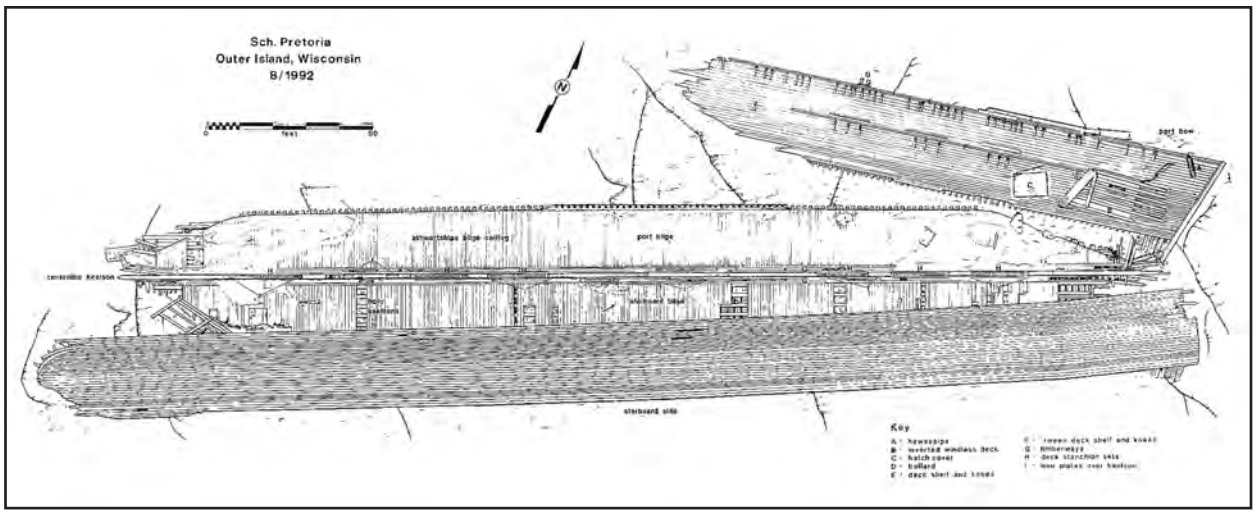
Institute for Great Lakes Research at Bowling Green University

The *Pretoria* was built at the turn of the twentieth century in West Bay City, Michigan, by James Davidson. A famous shipbuilder, Davidson was known for building huge wooden vessels. His 338-foot *Pretoria* was one of the largest wooden ships ever built. The *Pretoria* was a schooner-barge. Schooner-barges were built to be towed by steamships and sailed only in an emergency or to help speed the tow.

On September 1, 1905, the *Pretoria* took on a load of iron ore in Superior, Wisconsin. The weather forecast was favorable, so late that morning the schooner-barge left Superior in tow of the steamer *Venezuela*, which also was carrying a heavy cargo of ore. They were sailing to Chicago.

Unfortunately, the weather turned bad later that evening, and at 7:30 the next morning the *Pretoria* could no longer steer itself. The *Pretoria's* captain signaled the *Venezuela*, which tried to help the schooner-barge get to the safety of the Apostle Islands—but the towline connecting the two ships broke at both ends and fell into the lake. The *Venezuela* searched for the drifting *Pretoria* but was unable to find her and headed to Ashland, Wisconsin, for safety.

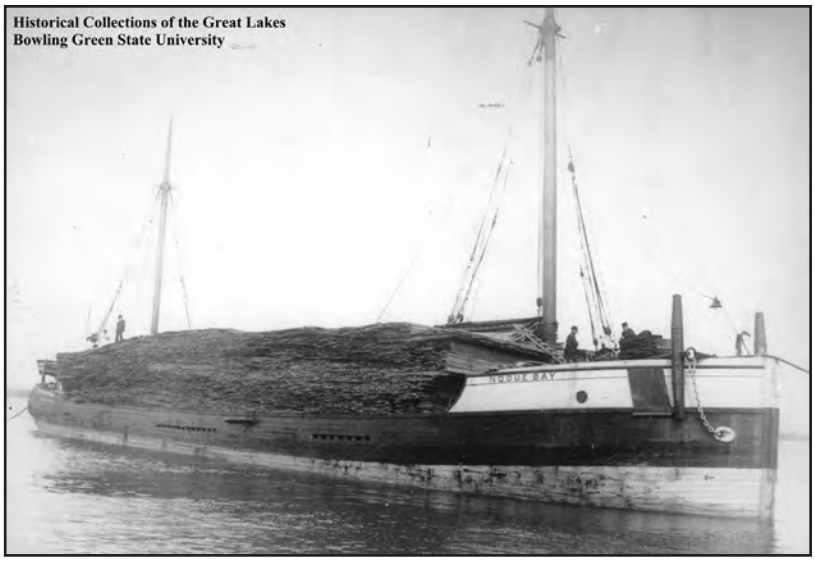
The crew on the *Pretoria* tried to raise a sail to help move the boat, but the winds were too powerful. Though it was a strong, well-built ship, the waves and wind of the storm beat against the *Pretoria*, breaking her apart. Soon water was rushing into the ship, and the boat began to sink, eventually coming to rest in fifty-five feet of water. The crew of nine men, including the captain, took a lifeboat to shore, but as they neared the shore a huge wave threw the men ten feet into the air. Five of them drowned.



A site map of the *Pretoria* wreck

Underwater Archaeology, WHS

The *Noquebay*



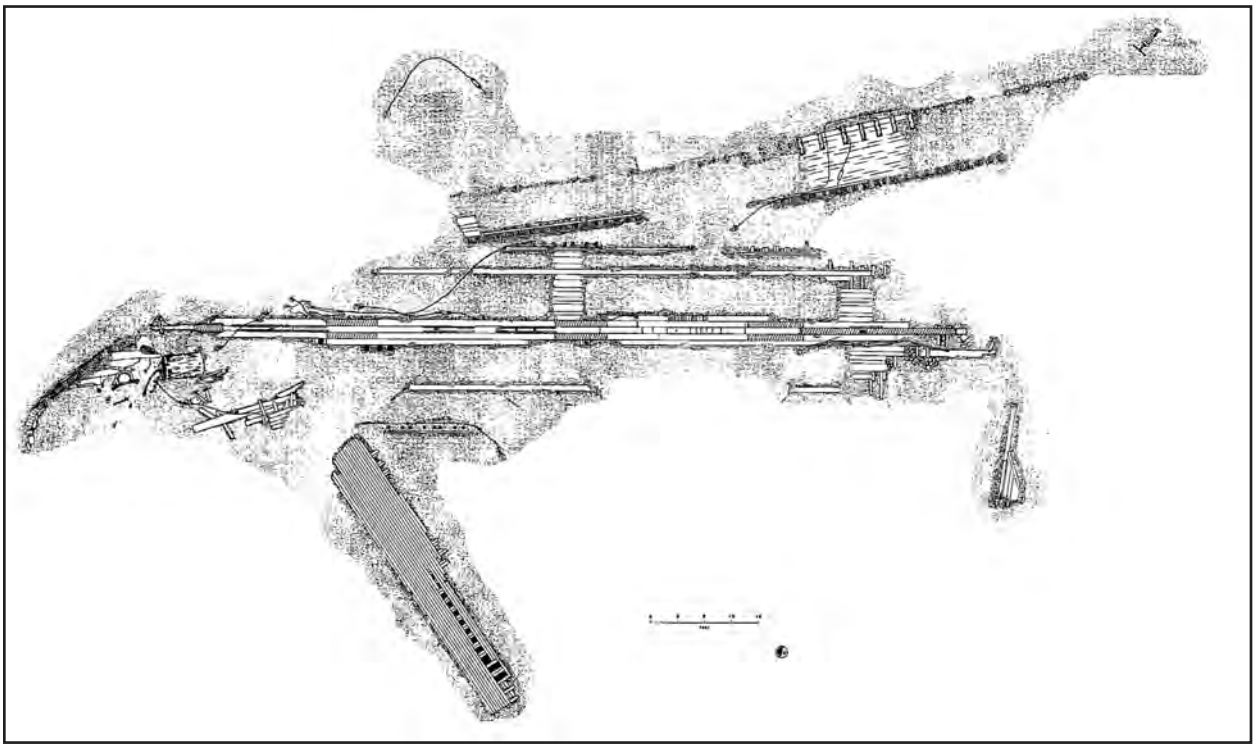
Milwaukee Public Library

The *Noquebay* with a full load of lumber

The *Noquebay* (pronounced "NAHK-bay") was built in 1872 by Alvin A. Turner of Trenton, Michigan. This schooner-barge was built to carry bulk cargo and was towed by a steamship. The *Noquebay* could carry over one million feet of lumber or 1,350 tons of coal—about as much as fourteen railroad cars could haul! The wooden vessel was 205 feet long and had a thirty-five-foot **beam** (width).

On October 6, 1905, the *Noquebay* and her sister ship *Mautenee* were towed out of Bayfield, Wisconsin, by the steamer the *Lizzie Madden*. The *Noquebay* was heading for Bay City, Michigan, with 600,000 feet of lumber.

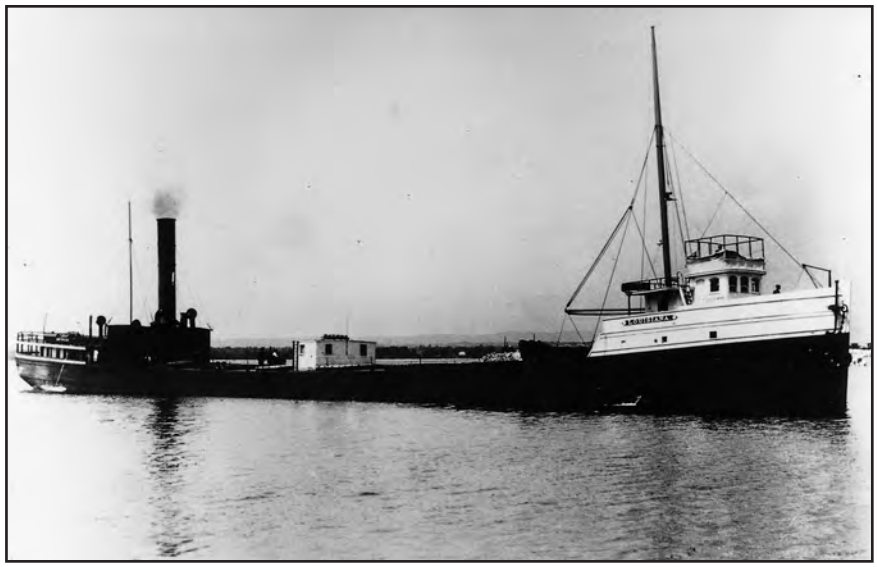
About twenty miles northeast of Bayfield, the *Noquebay* caught fire in the **forward** (front) part of the ship, apparently near the **donkey boiler** (a small boiler that provided steam to run machines on deck). The crew was eating lunch at the time and failed to notice the fire, which quickly spread. The *Lizzie Madden* turned toward Stockton Island, the nearest land, in an effort to get the burning vessel to the shore. Meanwhile, the *Noquebay's* crew tossed about 175,000 board feet of lumber overboard before they had to abandon the ship. Amazingly, no lives were lost. Today the *Noquebay* can be found in just ten feet of water.



Underwater Archaeology, WHS

A site map of the *Noquebay* wreck

The *Louisiana*



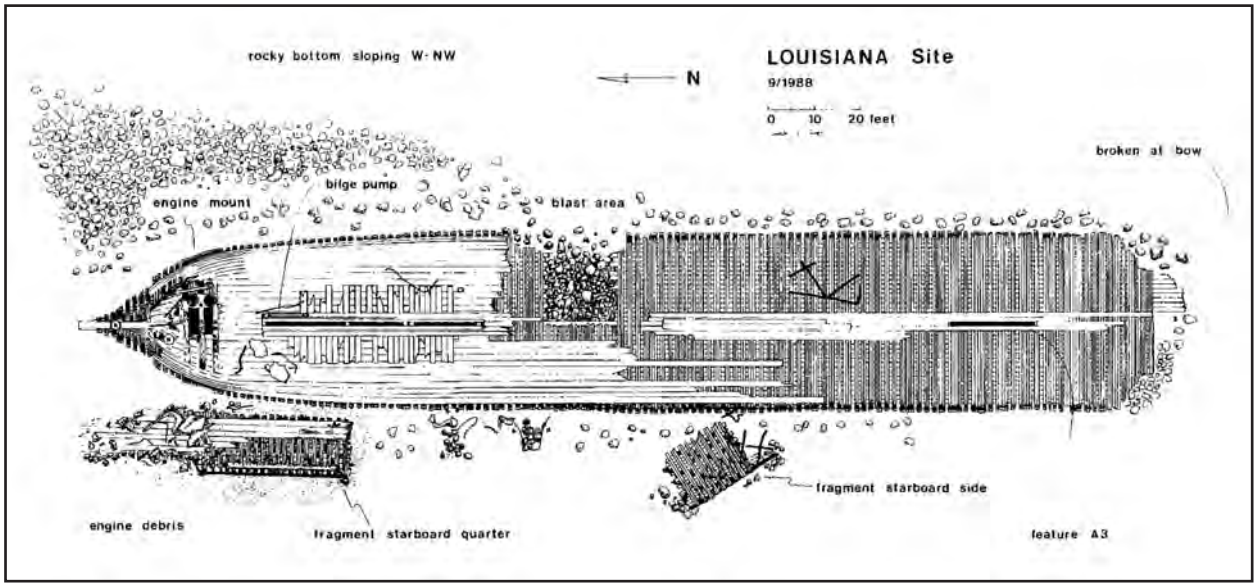
Milwaukee Public Library

The bulk carrier *Louisiana*

The *Louisiana* was built in 1887 in Marine City, Michigan, by shipbuilders Morley and Hill. Powered by a steam engine that drove a propeller, the vessel was 267 feet long and had a forty-foot **beam** (width). The *Louisiana* was a bulk carrier. It was designed to carry large amounts of dry cargo, such as iron ore and grain, in a watertight hold.

The *Louisiana* left Lorain, Ohio, on November 2, 1913, loaded with coal and headed for Milwaukee. After delivering her cargo in Milwaukee, she left for Escanaba, Michigan, to pick up a load of iron ore. Around midnight on November 8, 1913, the ship passed through Death's Door Passage just as a snowstorm began. Trapped by seventy-mile-an-hour winds, blinding snow, and hazardous **shoals** (stretches of shallow water) and islands, the steamer sought shelter at Washington Island and dropped her anchors. The wind was too strong, however, and the ship **ran aground** (got stuck on a shallow bottom or rocks) in Washington Harbor.

Instead of trying to reach land on the small and dangerous lifeboats, the crew chose to wait out the storm on board. By morning, however, the storm was still strong, and the ship remained on the rocks. The ship eventually caught fire. A team from the US Lifesaving Service arrived, but the fury of the storm made a rescue impossible. Incredibly, while the lifesaving crew watched helplessly, the *Louisiana's* crew made their way safely ashore. They were lucky indeed. The storm, later known as the "Big Blow of 1913," wrecked twenty vessels, damaged seventy-one others, and drowned 248 sailors, but no one on the *Louisiana* died. The *Louisiana* rests in ten to twenty-five feet of water.



Underwater Archaeology, WHS

A site map of the *Louisiana* wreck

The *Selah Chamberlain*

Institute for Great Lakes Research at Bowling Green University

This ship, the *W. L. Wetmore*, is very much like the *Selah Chamberlain*.

The *Selah Chamberlain* was built in 1873 by the company of Quayle and Martin in Cleveland, Ohio. A wooden steam ship, the vessel was 212 feet long and had a thirty-four-foot **beam** (width). The *Chamberlain* was powered by a steam engine that drove a propeller, rather than sails, and carried bulk cargo such as iron ore and grain. However, the *Chamberlain* not only carried cargo but also towed barges, called **consorts** (a ship that travels with another ship).

On October 13, 1886, the *Chamberlain*, towing the barge Fayette Brown, left Chicago bound for Escanaba, Michigan. There the ship was to take on a load of iron ore. Near Sheboygan, the two vessels came into a thick fog, and the *Chamberlain* began sounding her whistle regularly, hoping to alert any nearby ships to prevent a collision. At 9:30 p.m., however, the *John Pridgeon Jr.* collided with the *Chamberlain* and damaged the steamship's port side. The *Chamberlain's* captain ordered the crew to take to the lifeboats, and in the confusion seven crewmembers scrambled into the smaller of the ship's two lifeboats. Five of the men fell into the water. The rest of the crew rowed to shore and walked a mile and a half to Sheboygan.

The *Chamberlain* sank in only fifteen minutes, but the *Pridgeon* searched in vain for another three hours. Assuming that the vessel he struck was undamaged, the captain of the Pridgeon headed for Milwaukee. The following day the men of the Sheboygan Lifesaving Station searched for the five men reported missing; sadly, there was no sign of the missing crew. Several attempts were made to raise the *Chamberlain*. All were unsuccessful and only further damaged the wreck. To this day the steam engine and boiler, as well as the propeller and rudder, all sit in their original positions.

Tamara Thomsen, Wisconsin Historical Society

The *Selah Chamberlain* today

Name _____ Date _____

Causes of Shipwrecks

Fire	Storm	Running Aground	Collision

Answer Key: Causes of Shipwrecks

Fire	Storm	Running Aground	Collision
Niagara	Sevona	Sevona	Chamberlain
Noquebay	Pretoria	Louisiana	
Louisiana	Louisiana		

Exploring Shipwrecks

Activity 9.1: Photo Mosaics and Site Plans

9

Goal

To understand how photo mosaics and site plans aid archaeologists in documenting and interpreting shipwrecks

Objectives

The student will:

- Differentiate between a site plan and a photo mosaic
- Create a photo mosaic and combine it with a site plan
- Identify a shipwreck from their photo mosaic

Overview

Students will piece together individual images of a shipwreck and create a photo mosaic like real maritime archaeologists. This activity should be completed after students have read Chapters 8 and 9 in *Great Ships on the Great Lakes*.

Skills and Strategies

Understanding, constructing, analyzing, concluding

Materials

- Site Plan of the EB Allen (overhead)
- *Great Ships on the Great Lakes* reader
- *Kyle Spangler* Information Page
- Site plans for the *Kyle Spangler, Pewabic*, and *Windiate*
- Photo Mosaics for the *Kyle Spangler, Pewabic*, and *Windiate*
- Scissors
- Paper clips
- Labeled envelopes
- Vessel Identification worksheet
- Answer Key: Vessel Identification

Teacher Background

This activity will explore in detail two techniques underwater archaeologists use to obtain information about shipwrecks: photo mosaics and site plans. **Photo mosaics** are made of many small pictures put together to make a large picture of shipwreck sites. They allow archaeologists to see a lot more detail than if they took just one picture. When archaeologists are diving, they can only see a little of the wreck at a time. By creating a photo mosaic, they can study the whole thing but still see all the detail they did when they were up close. **Site plans** are maps underwater archaeologists draw to create a picture of the shipwreck from above. Although site plans are also helpful to archaeologists, photo mosaics are sometimes an easier way to document deep wrecks because divers have very limited time to measure and draw the site.

To introduce the activity you will show the students a site map of the E.B. Allen, a two-masted wooden schooner. On its last voyage, the *E.B. Allen* was bound for Buffalo, New York, carrying a cargo of grain. When it was about 2 miles southeast of Thunder Bay Island, it met the *Newsboy* in heavy fog. The two ships collided, and the *Newsboy* tore a large hole in the *Allen's* portside. As the ship began to sink, the *Allen's* crew was taken on board the other vessel. Today, the *E.B. Allen* sits on the floor of Lake Huron, with its hull largely intact. Although the masts are broken and most of the decking is gone, the windlass, anchor chains, and rudder are still in place.

Teacher Prep

1. Make copies of each of site plan on 11" x 17" paper, making sure the ship's name does not appear.
2. Print out copies of the ship photo mosaics on 8" x 11" paper. Cut each into a grid of 8 rectangular pieces and paperclip the pieces together. Depending on the size of the class, you may need to repeat site plans and mosaics. Make sure to keep track of which site plan goes with which mosaic.

Procedures

1. Discuss the differences between photo mosaics and site plans (review material from Chapter 9), using the overhead to show students a site plan from the wreck of the *E.B. Allen* (see information on this ship in the Teacher Background above). Site plans are carefully measured drawings made of shipwreck sites. Photo mosaics are made of many small pictures put together to make a large picture of shipwreck sites. Ask students what they might do if they didn't have a site plan to rely on. What if they had to rely instead upon different pieces of the puzzle to figure out which ship has been discovered? Explain that in this activity, they will determine the identity of one of three ships based the type of ship it was, what its cargo might have been, and other physical clues.
2. Break the class into groups of four or five, and hand a site plan out to each group. Each group will be assigned a different wreck, but do not tell them which wreck it is. Teams will have to figure this out during the discussion.
3. Ask students to read about the *Pewabic* and *Windiate* in chapters 8 and 9 in *Great Ships on the Great Lakes*, and the *Kyle Spangler* using the information sheet provided with this activity.
4. Give each group one paper-clipped bundle of photo mosaic puzzle pieces matching their ship site plan.
5. Have students match the cut-out pieces to their team's ship layout. Students should attach pieces of the photo mosaic onto the larger ship layout.
6. Once teams have added the pieces of their photo mosaic to the site plan, hand them the Vessel Identification worksheet. To complete the activity, they need to fill in the worksheet accurately, listing their vessel's name and giving three reasons why they believe their answer is correct. Remind them that shipwrecks can be similar and archaeologists must look for small details to tell them apart.

Closure

Close with a discussion which may include the following questions:

What type of ship did your group have and why do you think it is that type? (See answer key to the Vessel Identification worksheet.)

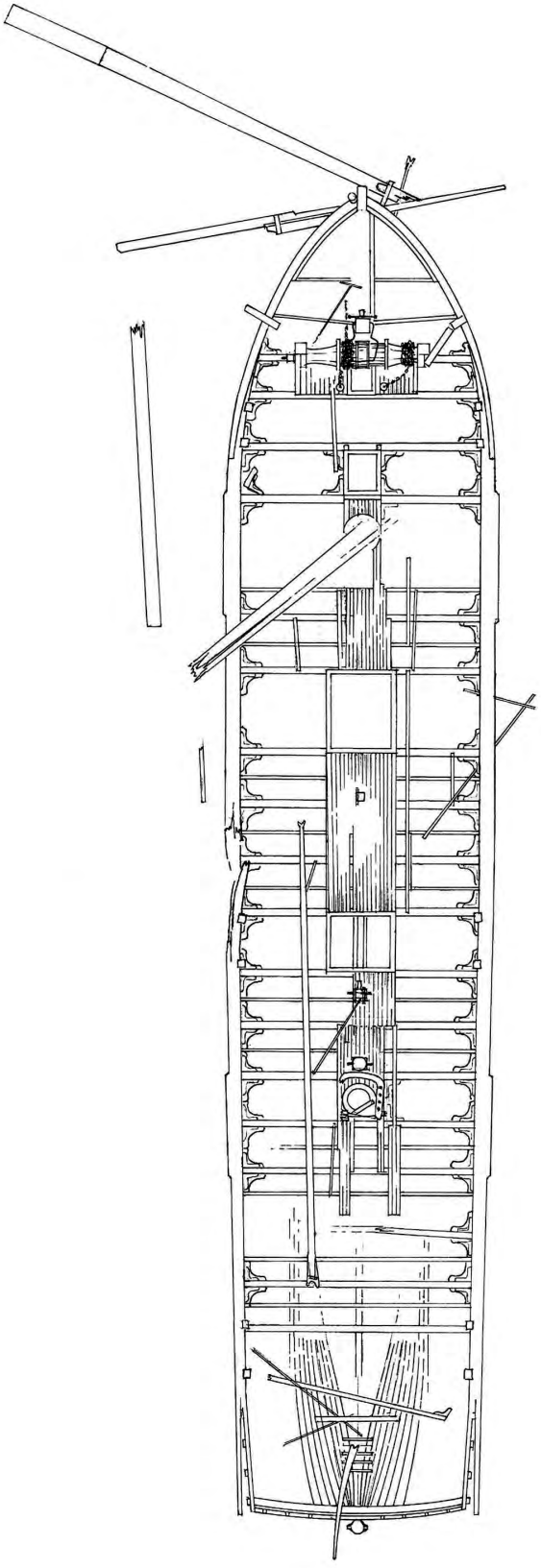
Which was more helpful to you, the photomosaic or the site map? Why do you think that is?

How might archaeologists use photo mosaics and site plans to better understand shipwreck sites?

Extension

Visit the Thunder Bay National Maritime Sanctuary website and the Alpena County Library for information about the shipwrecks of Thunder Bay and further education. Also visit the National Oceanic and Atmospheric Administration's website for information about the Maritime Heritage Program and other national marine sanctuaries (see Additional Resources).

Site Plan of the *EB Allen*



NOAA, Thunder Bay National Marine Sanctuary

Kyle Spangler Information Page

Depth: 155 Feet

Wreck Length: 130 Feet

Cargo: Corn

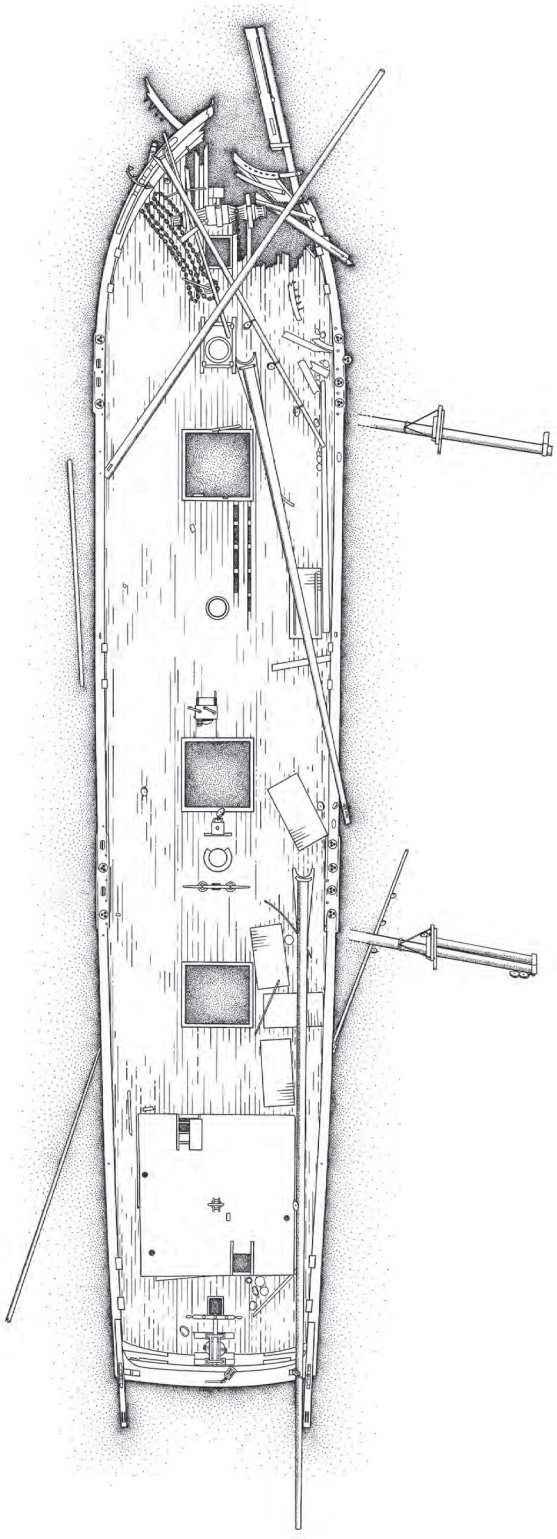
Launched: 1856 by William Jones at Black River, Ohio

Wrecked: November 7, 1860

The *Kyle Spangler* was one of many Great Lakes schooners that made trips to the Atlantic coast in the early days of trade with ports on the East Coast. The ship left the lakes with a load of lumber in 1859, returning the following spring. Not long after, while traveling across Lake Huron on a dark night with a load of corn, it collided with the schooner *Racine* a few miles off Presque Isle (presk eel). The collision shattered the *Spangler's* bow, sinking it in deep water, but the crewmen were taken safely onboard the *Racine*. Today, the ship rests almost undamaged except for the bow. It rests upright with its masts and cabin intact.

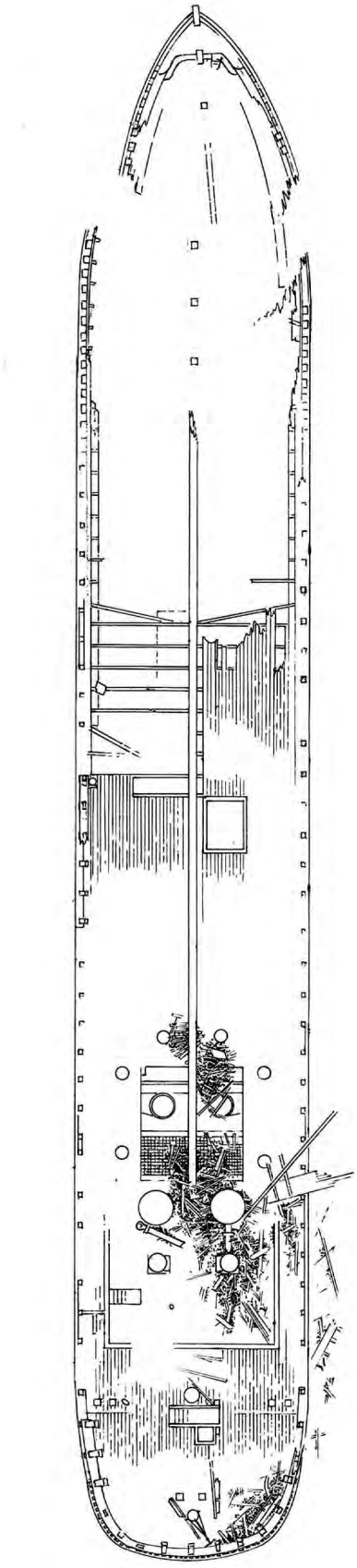
The Kyle Spangler was mapped by archaeologists with the help of a recreational scuba diver who first found the wreck. This "citizen scientist" worked alongside archaeologists from Thunder Bay National Marine Sanctuary. He helped document the wreck so that future generations of scuba divers could visit.

Kyle Spangler Site Plan



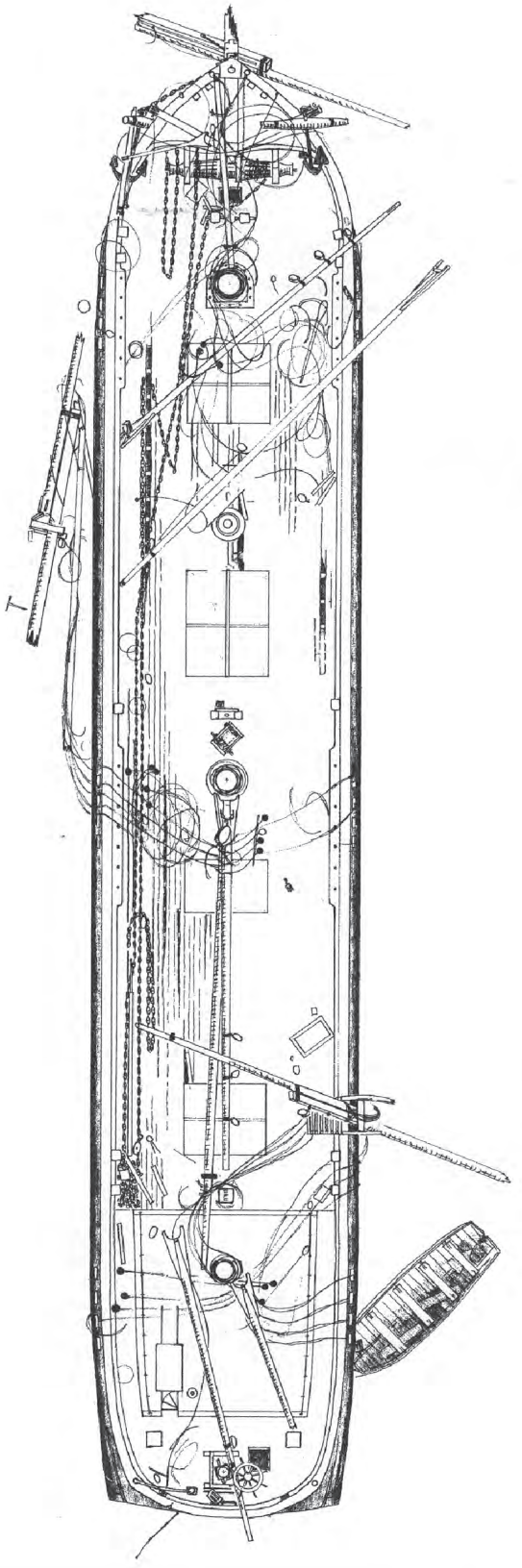
NOAA, Thunder Bay National Marine Sanctuary

Pewabic **Site Plan**



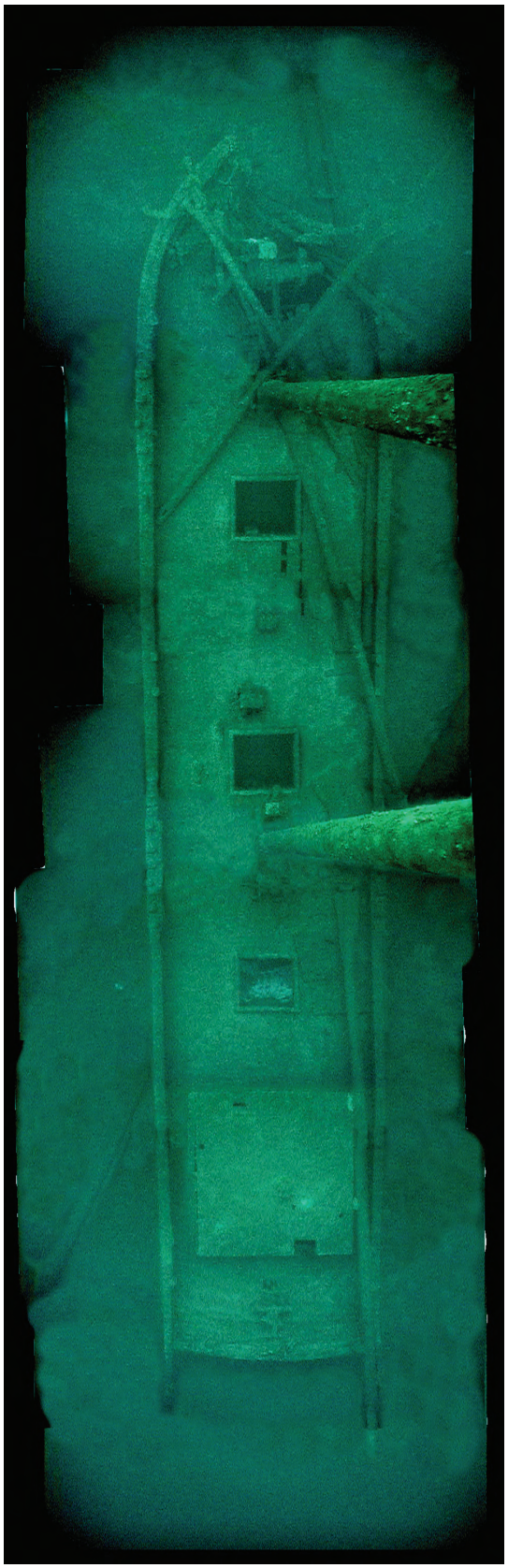
NOAA, Thunder Bay National Marine Sanctuary

Windiate Site Plan



NOAA, Thunder Bay National Marine Sanctuary

Kyle Spangler Photomosaic

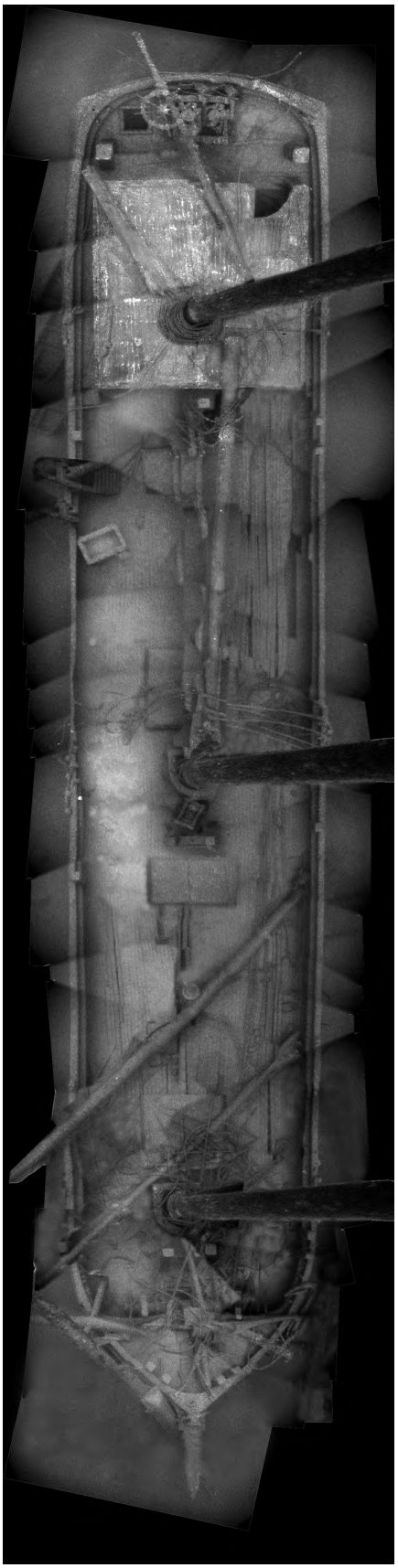


NOAA, Thunder Bay National Marine Sanctuary

Pewabic **Photomosaic**

NOAA, Thunder Bay National Marine Sanctuary

Windiate Photomosaic



NOAA, Thunder Bay National Marine Sanctuary

Name _____ Date _____

Vessel Identification

Vessel name: _____

Type of ship: _____

Why did it sink? _____

Why do you believe your identification is correct? List three reasons below in sentence format. Reasons can come from the vessel history, the type of ship, or physical evidence.

Reason 1: _____

_____

_____

Reason 2: _____

_____

_____

Reason 3: _____

_____

_____

Answer Key: Vessel Identification

Name: *Kyle Spangler*

Type: Schooner

Reason for sinking: Collision

Reasons: Its masts are still intact. The bow is smashed in. Unlike the *Windiate*, there is no lifeboat nearby.

Name: *Pewabic*

Type: Steam propeller

Reason for sinking: Collision

Reasons: It has two smoke stacks for the steam engine, no masts, and it is made of wood. It also has a large hole in the deck where salvagers took out the copper cargo.

Name: *Windiate*

Type: Wooden schooner

Reason for sinking: Winter storm

Reasons: It has masts, the deck and hatch covers are still there, and the lifeboat is sitting next to the wreck.

Activity 9.2: Shipwreck! Documenting an Underwater Site

Goal

To understand the importance of mapping the original location of artifacts in order to form accurate hypotheses about shipwrecks

Objective

The student will:

- Learn about the importance of leaving artifacts on site
- Simulate the discovery of a shipwreck
- Map an underwater archaeological site

Overview

As an archaeological site, a shipwreck can reveal important information about past peoples and events. This activity simulates the discovery and subsequent exploration of a historic shipwreck. For this activity, students will become underwater archaeologists from the future, documenting a ship that sank today. This will enable the activity coordinator to use modern "artifacts" and dated material, such as coins and magazines. Students will play underwater detective as they learn that the more clues available, the more accurate the historical record. When looters remove artifacts from the site, students will realize that once these artifacts are removed, the information they contain is lost forever.

Skills and Strategies

Observing, mapping, analyzing, classifying, inferring, synthesizing

Materials

- Mock Shipwreck Site Layout (outlined either on tarp or with masking tape)
- String (three long pieces to use as grid lines to separate mock wreck into eight sections)
- Artifacts (see list below)
- Shipwreck Detectives worksheet (one per student)
- Parts of a Ship diagram (one per student)
- Clipboard (one per group)

Teacher Prep

1. The mock shipwreck should be set up before the students arrive to begin the activity. Lay down the tarp or tape the outline of the wreck to the floor (the shipwreck should be at least ten to fifteen feet long, though a length of sixteen feet works best). Refer to the Mock Shipwreck Site Layout to create the outline.
2. Using string, create a grid of eight even sections, four on the port side and four on the starboard side, over the mock wreck (see Mock Shipwreck Layout).
3. Arrange the artifacts and data points in specific areas of the mock shipwreck. Artifacts will reflect what type of ship the mock shipwreck is supposed to represent and the different functions of the various areas on the ship. You might use the following:

   galley: pots and pans, dishes, mason jars, canned goods

   passenger cabins: suitcase, clothes, shoes, blankets, toys, magazines or books, coins

   crew cabins: backpack, rain jacket, tools

   cargo hold: boxes, flour sacks, salt, corn, or flour

   navigation area (near masts): compass, ship's log, sheets and ropes (for sails)

Procedures

1. Introduce the students to maritime archaeology. Tell the students that they are going to pretend to be underwater archaeologists and that they are about to make a dive on a recently discovered shipwreck. During the dive they will have to record what they find on the shipwreck in order to understand how the ship was used.
2. Separate the class into eight groups of about three students per group (numbers will depend on the number of students involved). Tell students they will be working together because, for safety, divers never dive alone. Tell the students that they will be answering questions based on their observations after they finish their dives.
3. Pass out the Parts of a Ship diagram and the Shipwreck Detectives worksheet to each student and a clipboard to each group.
4. Tell students to look at the artifacts found in their section of the wreck. Ask them questions such as:

   Can you tell what they are?

   Who might have used them?

   What might they have been used for?

   What do they have in common?
5. Remind them that the locations of these artifacts provide clues to the story of the shipwreck. As a maritime archaeologist, they would never disturb the artifacts by moving them.
6. Have students use their Shipwreck Detectives worksheet to list the artifacts they found during their dives and any other observations they made about the artifacts or the shipwreck itself. You may also ask them to label the location of their finds on their shipwreck layouts. Students should look for anything that will give them clues about the ship's history, especially names, symbols, dates, etc.
7. Students should try to figure out what their section of the shipwreck might have been used for based on the artifacts they found. Students can then try to figure out what kind of shipwreck they are looking at and what they can tell about the wreck from the artifacts left on it.

Closure

Review what the students learned about the wreck and about making a hypothesis from their collected data. Remind the students that shipwrecks are like underwater museums. If many people took just one item off of the shipwreck, there would soon be nothing left for anyone to learn from or enjoy. Discussion questions should include:

What kind of ship was it?

What was on the ship?

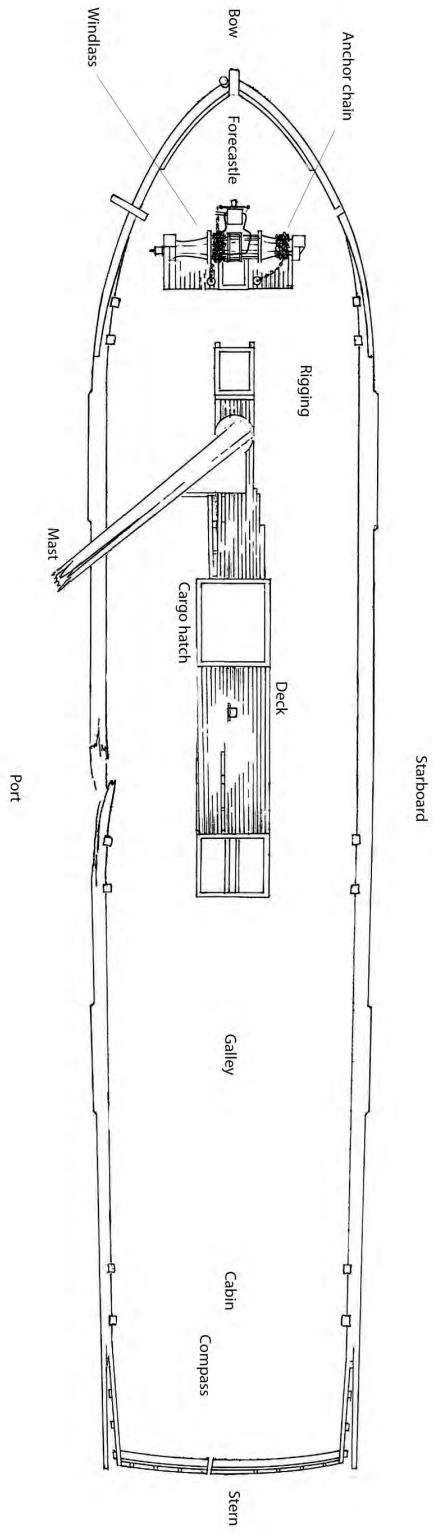
How old was the ship?

When did the ship sink?

What kinds of activities happened on the ship?

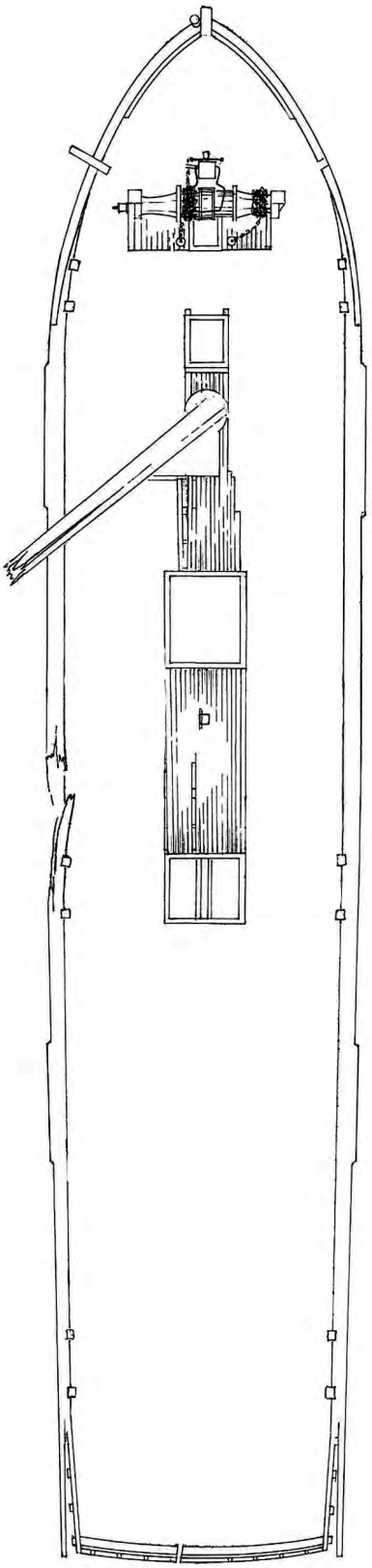
What kind of hypotheses can you make about the ship or its crew or passengers?

Mock Shipwreck Site Layout



NOAA, Thunder Bay National Marine Sanctuary

Parts of a Ship



NOAA, Thunder Bay National Marine Sanctuary

Name _____ Date _____

Shipwreck Detectives

Artifact 1: _____

Description: _____

_____

Location: _____

Observations:

1. _____
2. _____
3. _____

Who do you think used the artifact, and why?

_____

_____

Artifact 2: _____

Description: _____

_____

Location: _____

Observations:

1. _____
2. _____
3. _____

Who do you think used the artifact, and why?

_____

_____

Artifact 3: _____

Description: _____

_____

Location: _____

Observations:

1. _____
2. _____
3. _____

Who do you think used the artifact, and why?

_____

_____

What kinds of activities happened on the ship?

_____

_____

_____

Do the artifacts tell you anything about how the ship sank?

_____

_____

_____

What is your best guess for when the ship sunk? Why?

_____

Additional Resources

Chapter 1: What is Maritime History?

Publications

Project WET: Curriculum & Activity Guide 2.0. Bozeman, MT: The Watercourse and the Council for Environmental Education, 2011.

Malone, Bobbie and Jefferson J. Gray. *Working with Water: Wisconsin Waterways*. Madison: Wisconsin Historical Society Press, 2001.

Websites

Great Lakes Information Network: http://www.great-lakes.net/

NOAA Great Lakes Quick Facts: http://www.glerl.noaa.gov/pr/ourlakes/lakes.html#superior

University of Wisconsin Sea Grant Institute: http://www.seagrant.wisc.edu/home/

Places to Visit

Dossin Great Lakes Museum
100 Strand Drive, Belle Isle
Detroit, MI 48207
www.detroithistorical.org

Great Lakes Maritime Heritage Center
Thunder Bay National Marine Sanctuary
500 W. Fletcher St.
Alpena, MI 49707
thunderbay.noaa.gov

Michigan Maritime Museum
260 Dyckman Ave.
South Haven, MI 49090
www.michiganmaritimemuseum.org

Wisconsin Maritime Museum
75 Maritime Dr.
Manitowoc, WI 54220
www.wisconsinmaritime.org

Chapter 2: Lakes, Rivers, and Ice

Publications

Ayer, Eleanor. *Our Great Rivers and Waterways*. I Know America Series. Brookfield, CT: Millbrook, 1994.

Benton-Banai, Edward, illustrated by Joe Liles. *The Mishomis Book: Voice of the Ojibway*. Hayward, WI: Indian Country Communications, 1981.

Hiscock, Bruce. *The Big Rivers: The Missouri, the Mississippi, and the Ohio*. New York: Atheneum Books for Young Readers, 1997.

Kurtz, Jane, illustrated by Neil Brennan. *River Friendly, River Wild*. New York: Simon and Schuster, 2000.

Malone, Bobbie and Kori Oberle. "Chapter 2: Wisconsin: A Place with a Past." *Wisconsin: Our State, Our Story*. Madison: Wisconsin Historical Society Press, 2008.

Peterson, P. Nuzum. *The Lucky Kickapoo: A River Tells Its Story*. Self-published, 1997.

Vogel, Carole G. *The Great Midwest Flood*. New York: Little, Brown and Company, 1995.

Wick, Walter. *A Drop of Water*. New York: Scholastic Press, 1997.

Wisconsin Cartographers' Guild and Bobbie Malone. *Mapping Wisconsin History*. 2000. Madison: Wisconsin Historical Society Press, 2011. 1–16.

Web Sites

EPA Wetlands: http://water.epa.gov/type/wetlands/

Ice Age Trail: http://www.iceagetrail.org

NCIDC All About Glaciers: http://nsidc.org/cryosphere/glaciers/index.html

NOAA Great Lakes Quick Facts: http://www.glerl.noaa.gov/pr/ourlakes/lakes.html#superior

United States Geological Survey (USGS): http://education.usgs.gov/

USGS Education Resources: http://water.usgs.gov/education.html

USGS Water Resources in Wisconsin: http://wi.water.usgs.gov

Places to Visit

Chippewa Moraine Ice Age Interpretive Center
13394 County Hwy M
New Auburn, WI 54757
http://dnr.wi.gov/topic/parks/name/chipmoraine/naturecenter.html

Devil's Lake State Park
S5975 Park Rd.
Baraboo, WI 53913
www.devilslakewisconsin.com

Interstate Park Ice Age Interpretive Center
Hwy 35, PO Box 703
St. Croix Falls, WI 54024
dnr.wi.gov/topic/parks/name/interstate/

H. H. Bennett Studio
215 Broadway
PO Box 147
Wisconsin Dells, WI 53965
hhbennettstudio.wisconsinhistory.org

Kettle Moraine State Forest – Southern Unit
S91 W39091 Hwy. 59
Eagle, WI 53119
http://dnr.wi.gov/topic/parks/name/kms/

Harrington Beach State Park
531 County Hwy D
Belgium, WI 53004
www.wisconsinguides.net/southeast/harrington-beach-state-park-262.html

Wyalusing State Park
13342 Cty. C
Bagley, WI 53801
www.wyalusing.org

Chapter 3: Paddles and Pelts

Publications

Erdrich, Louise. *The Birchbark House*. New York: Hyperion Books for Children, 1999.

Ernst, Kathleen. *Trouble at Fort La Pointe*. Middleton, WI: Pleasant Company, 2000.

Fortier, John D., Susan M. Grady, & Karen R. Prickette. *Learning About Wisconsin*. Madison:

Wisconsin Department of Public Instruction, 1999, 47–49.

Johnston, Basil H., illustrated by David Beyer. *By Canoe and Moccasin: Some Native Place Names of the Great Lakes*. Lakefield, Ontario, Canada: Waapoone, 1986.

Leow, Patty. *Native People of Wisconsin*. Madison: Wisconsin Historical Society Press, 2003.

Malone, Bobbie and Kori Oberle. "Chapter 4: The Fur Trade Era: Exploration and Exchange in Wisconsin." *Wisconsin: Our State, Our Story*. Madison: Wisconsin Historical Society Press, 2008.

Peterson, Cris. *Birchbark Brigade: A Fur Trade History*. Honesdale, PA: Boyds Mill Press, 2009.

Waboose, Jane Bourdeau, illustrated by Karen Reczuch. *Morning on the Lake*. Toronto, Ontario, Canada: Kids Can Press, 1998.

Wisconsin Cartographers' Guild and Bobbie Malone. *Mapping Wisconsin History*. Madison: State Historical Society of Wisconsin, 2000. 41–42, 47.

Multimedia

"The Wisconsin: River of a Thousand Isles." Madison: Television Wisconsin, Inc., 1994.

Wisconsin Educational Communications Board. "The First Peoples of Wisconsin." *Investigating Wisconsin History*. Madison: ECB, 1998.

— "Cultures in Conflict." *Investigating Wisconsin History*. Madison: ECB,1998.

— "Maps: Our Windows on the World." *Investigating Wisconsin History*. Madison: ECB, 1998.

Web Sites

A Short History of the Fur Trade: http://www.wisconsinhistory.org/topics/shorthistory/furtrade.asp

Fur Trade Timeline: http://www.whiteoak.org/historical-library/fur-trade/time-line-a-brief-history-of-the-fur-trade/

Felting a Beaver Hat: http://teachers.cpcsc.k12.in.us/jstanley/websites/Making%20a%20Beaver%20Hat.htm

Michigan DNR / Michigan Historical Museum's First People: http://www.hal.state.mi.us/mhc/firstpeople/

Places to Visit

George W. Brown, Jr., Museum and Cultural Center
603 Peace Pipe Rd.
Lac Du Flambeau, WI 54538
www.ldfmuseum.com

Brule-St. Croix Portage Trail
Contact: Douglas County Chamber of Commerce Tourist Information Center
305 Harbor View Pkwy.
Superior, WI 54880
www.northcountrytrail.org/bsc/

Chippewa Valley Museum
1204 Carson Park Dr.
Eau Claire, WI 54703
www.cvmuseum.com

Forts Folle Avoine
8500 County Rd. U
Danbury, WI 54830
http://theforts.org/

Fox-Wisconsin Portage Trail
Contact: Portage Chamber of Commerce
104 West Cook Street
Portage, WI 53901
www.portagewi.com

Charles A. Grignon Mansion
1313 Augustine St.
Kaukauna, WI 54130
http://www.foxvalleyhistory.org/the-charles-a-grignon-mansion

Kenosha Public Museum
5500 First Avenue
Kenosha, WI 53140
www.kenosha.org/museum/

Madeline Island Museum
226 Colonel Woods Ave, PO Box 9
La Pointe, WI 54850
madelineislandmuseum.wisconsinhistory.org

The Michigan Historical Museum
702 W. Kalamazoo St.
Lansing, MI 48915
www.michigan.gov/museum

The Museum of Ojibwa Culture
566 N. State St.
St. Ignace, MI 49781

Neville Public Museum
210 Museum Pl.
Green Bay, WI 54303
www.nevillepublicmuseum.org

Perrot State Park
W26247 Sullivan Rd.
Trempealeau, WI 54661
http://dnr.wi.gov/topic/parks/name/perrot/

Rock Island State Park
Washington Island, WI 54246
http://dnr.wi.gov/topic/parks/name/rockisland/

Villa Louis
521 N. Villa Louis Rd.
Prairie Du Chien, WI 53821
villalouis.wisconsinhistory.org

Waswagoning at Lac du Flambeau
2750 County Road H
Lac du Flambeau, WI 54538
www.waswagoning.com

Whitefish Dunes State Park
3701 Clarks Lake Rd.
Sturgeon Bay, WI 54235
http://dnr.wi.gov/topic/parks/name/whitefish/

Heritage Hill State Historical Park
2640 South Webster Avenue
Green Bay, WI 543
http://heritagehillgb.org/contact/01

Chapter 4: Fighting for the Inland Seas

Publications

Bozonelis, Helen. *Primary Source Accounts of the War of 1812*. Berkeley Heights, NJ, Enslow Publishers, 2006.

Berton, Pierre. *Battle of Lake Erie: Battles of the War of 1812*. Toronto, McClelland &Stewart Limited, 1994.

Malcomson, Robert. *Warships of the Great Lakes*, 1754–1834. Annapolis, MD: Naval Institute Press, 2001.

Malone, Bobbie and Kori Oberle. "Chapter 4: the Fur Trade Era: Exploration and Exchange in Wisconsin." *Wisconsin: Our State, Our Story*. Madison: Wisconsin Historical Society Press, 2008.

Santella, Andrew. *The French and Indian War*. New York: The Children's Press, 2011.

Multimedia

Pennsylvania Public Broadcasting Station. *The War That Made America*. Pittsburg: WQED, 2006.

Websites

French and Indian War Activities Page: http://www.warforempire.org/learn/activities.aspx

Pennsylvania PBS "The War That Made America":
http://www.wqed.org/tv/specials/the-war-that-made-america/

Pennsylvania PBS "The War That Made America" Educator's Guide:
http://www.warforempire.org/documents/educatorsguide.pdf

Ships of the War of 1812: http://www.eighteentwelve.ca/?q=eng/Topic/27

Commodore Perry Biography: http://www.history.navy.mil/bios/perry_mc.htm

Places to Visit

Erie Maritime Museum and Homeport Flagship *Niagara*
150 East Front Street
Erie, PA 16507
www.eriemaritimemuseum.org

Great Lakes Naval Museum
610 Farragut Ave, Building 42
Great Lakes, IL 60888
www.history.navy.mil/museums/greatlakes/index.htm

Chapter 5: Connecting with Canals

Publications

Cohn, A. *From Sea to Shining Sea: A Treasury of American Folklore and Folk Songs*. New York: Scholastic, 1993.

Geisert, Bonnie and Arthur Geisert. *River Town*. Boston: Houghton Mifflin Company, 1999.

Kendall, Martha E. *The Erie Canal*. Des Moines: National Geographic Children's Books, 2008.

Rickard, Graham. *Canals*. New York: The Bookwright Press, 1988.

Malone, Bobbie and Kori Oberle. "Making the Journey." *Wisconsin: Our State, Our Story*. Madison: Wisconsin Historical Society Press, 2008.104–105.

Russell, Solveig Paulson. *The Big Ditch Waterways: The Story of Canals*. New York: Parents' Magazine Press, 1977.

Multimedia

Wisconsin Educational Communications Board. "Wisconsin's Cities and Towns." *Exploring Wisconsin, Our Home*. Madison: ECB, 1998.

— "Coming to Wisconsin." *Exploring Wisconsin*, *Our Home*. Madison: ECB, 1998.

Web Sites

Animated Lock Demonstration, U.S. Army Corps of Engineers: http://www.mvp.usace.army.mil/navigation/default.asp?pageid=166

Erie Canalway National Heritage Corridor: http://www.eriecanalway.org/index.htm

Turning Points: Great Lakes Steam Ships and Canals: http://www.wisconsinhistory.org/turningpoints/tp-016/

Places to Visit

Historic Indian Agency House
1490 Agency House Road
Portage, WI 53901
http://agencyhouse.org/

Milwaukee County Historical Center
910 N 3rd St.
Milwaukee, WI 53203
www.milwaukeehistory.net

Portage Canal
Contact: Portage Chamber of Commerce
139 West Cook St.
Portage, WI 53901
http://heritageparkway.org/sites/portage-canal/

Portage Canal Society
2201 Yellowstone
Portage, WI 53901
http://www.portagecanalsociety.com/

Portage Historical Society Museum
PO Box 672
Stevens Point, WI 54481
http://portagemuseum.org/

Soo Locks Park and Visitor Center
1808 Ashmun St.
Sault Ste. Marie, MI 49783

Sturgeon Bay Lake Michigan Ship Canal
Contact: Sturgeon Bay Visitor Center
36 South 3rd Avenue
Sturgeon Bay, WI 54235-0212
www.sturgeonbay.net/

Chapter 6: Sail and Steam

Publications

Gibbons, Gail. *The Great St. Lawrence Seaway*. New York: Morrow Junior Books, 1992.

Karamanski, Theodore J. *Schooner Passage: Sailing Ships and the Lake Michigan Frontier*. Detroit: Wayne State University Press, 2000.

Malone, Bobbie and Kori Oberle. "Shipping by Water: From Schooners to Steamers." *Wisconsin: Our State, Our Story*. Madison: Wisconsin Historical Society Press, 2008. 166–167.

Wisconsin Cartographers' Guild. *Wisconsin's Past and Present: A Historical Atlas*. Madison: University of Wisconsin Press, 1998. 56–67.

Wisconsin Cartographers' Guild and Bobbie Malone. *Mapping Wisconsin History*. Madison: State Historical Society of Wisconsin, 2000, 85–98.

Multimedia

PBS Nova Buoyancy Brainteasers: http://www.pbs.org/wgbh/nova/lasalle/buoyancy.html

Project WET: http://projectwet.org/

Wisconsin Educational Communications Board. "What We Grow and Where It Goes." *Exploring Wisconsin, Our Home*. Madison: ECB, 1998.

— "From Here to There." *Investigating Wisconsin History*. Madison: ECB, 1998.

Places to Visit

Alma Historical Society
407 S 2nd St.
Alma, WI 54610
www.almahistory.org

Apostle Islands National Lakeshore
415 Washington Ave
Bayfield, WI 54814
www.nps.gov/apis/index.htm

Ashland Historical Society Museum
509 Main St. West
Ashland, WI 54806
ashlandwihistory.com

Bayfield Maritime Museum
131 S 1st St.
Bayfield, WI 54814
bayfieldmaritimemuseum.org

Door County Maritime Museum
120 N Madison Ave.
Sturgeon Bay, WI 54235
www.dcmm.org

Northern Great Lakes Visitor Center
29270 County Highway G
Ashland WI 54806-9339
www.wisconsinhistory.org/libraryarchives/arcnet/histcenter.asp

SS Meteor Maritime Museum
300 Marina Dr.
Superior, WI 54880

UW–La Crosse Area Research Center Murphy Library Resource Center
University of Wisconsin–La Crosse
La Crosse, WI 5460l

Wisconsin Lake Schooner Education Association
500 N Harbor Dr.
Milwaukee, WI 53202

Wisconsin Maritime Museum
75 Maritime Dr.
Manitowoc, WI 54220
www.wisconsinmaritime.org

Chapter 7: Sailors and Keepers

Publications

Bachelder, Peter, and Robert Hartnett. *Lighthouses of the United States*. Freeport, ME: Harnett House Map Publishers, 1999.

House, Katherine L. *Lighthouses for Kids: History, Science and More with 21 Activities*. Chicago: Chicago Press Review, 2008.

Mielke, Phyl. *Eagle Bluff Journal 1895*. Door County, WI: Self-published, 1995.

Multimedia

"Islands of Wisconsin." *Discover Wisconsin Productions*, n.d.

"Keepers of the Door: The Story of Door County Lighthouses." DePere, WI: Com-Video, n.d.

Wisconsin Educational Communications Board. "Shine Where You Stand." *Cultural Horizons of Wisconsin*. CD-ROM. Madison: ECB, n.d.

Web Sites

Door County Lighthouses: http://www.lighthousefriends.com/door.html

Great Lakes Marine Collection Ship Illustrations, Wisconsin Maritime Historical Society: http://www.mpl.org/ship/illustrations_mvus.cfm#SLOOP

Great Lakes Lighthouse Keepers Association: http://www.gllka.com/

Lighthouse Friends: www.lighthousefriends.com

Lighthouses of the Great Lakes: http://lighthouse.boatnerd.com

Interactive Schooner Model: http://www.wisconsinshipwrecks.org/tools_educational_hull.cfm

PBS Legendary Lighthouses: http://www.pbs.org/legendarylighthouses

Teacher's Lighthouse Resource for Grades 1–4, US Coast Guard: http://www.uscg.mil/history/articles/lighthousecurriculum.pdf

Wisconsin's Maritime Trails: http://www.maritimetrails.org/

US Lighthouse Society: http://www.uslhs.org/resources_materials.php

Places to Visit

40 Mile Point Lighthouse Park
US 23 North
Rogers City, MI 49779
www.40milepointlighthouse.org

Apostle Islands National Lakeshore
415 Washington Ave
Bayfield, WI 54814
www.nps.gov/apis/planyourvisit/

Cana Island Lighthouse
8800 E Cana Island Rd.
Baileys Harbor, WI 54202
www.dcmm.org/cana-island-lighthouse/

Door County Maritime Museum
120 N. Madison Ave.
Sturgeon Bay, WI 54235
www.dcmm.org

Eagle Bluff Lighthouse, Peninsula State Park
9462 Shore Road
Fish Creek, WI 54212
eagleblufflighthouse.doorcountyhistoricalsociety.org

Old Mackinac Point Lighthouse
526 N. Huron Ave.
Mackinaw City, MI 49701

Chapters 8 and Chapter 9: Shipwrecks and Exploration

Publications

Butts, Ed. *Shipwrecks, Monsters, and Mysteries of the Great Lakes*. Ontario: Tundra Books, 2011.

Halsey, John R. and Wayne R. Lusardi. *Beneath the Inland Seas, Michigan's Underwater Archaeological Heritage*. Ann Arbor: Michigan Dept. of History, Arts, and Liberal Arts, 2008.

Hancock, Paul. *Shipwrecks of the Great Lakes*. San Diego: Thunder Bay Press, 2004.

Hertel, Captain Robert. *The Edmund Fitzgerald: Lost with All Hands*. Spring Lake, Michigan: River Road Publications, 1999.

Seymour, Tres. *The Gulls of the Edmund Fitzgerald*. New York: Orchard Books, 1996.

Varhola, Michael J. *Shipwrecks and Lost Treasures: Great Lakes Legends and Lore, Pirates and More*. Guilford, CT: Globe Pequot Press, 2007.

Multimedia:

Wisconsin's Great Lakes Shipwrecks: Dive into Wisconsin's Past. CD-ROM. Madison, WI: Wisconsin Historical Society and University of Wisconsin Sea Grant.

Web Sites

Death's Door Shipwrecks, University of Wisconsin Sea Grant: http://www.wisconsinshipwrecks.org/tools_deathsdoor.cfm

Great Lakes Shipwreck Museum: http://www.shipwreckmuseum.com

Guided Shipwreck Tour Videos: http://www.wisconsinshipwrecks.org/tools_videogallery.cfm

Schooner Man: www.schoonerman.com

Michigan Underwater Preserves: http://www.michiganpreserves.org/

National Oceanic and Atmospheric Administration: http://www.noaa.gov/

Thunder Bay National Marine Sanctuary: Thunder Bay History: http://thunderbay.noaa.gov

University of Wisconsin Sea Grant Underwater Exploration: http://www.seagrant.wisc.edu/madisonjason11/

Wisconsin Great Lakes Shipwrecks: http://www.wisconsinshipwrecks.org/

Wisconsin Historical Society Underwater Archeology: http://www.wisconsinhistory.org/shipwrecks/learn/

Wisconsin Historical Society Diver Depth Game: http://www.maritimetrails.org/diver_depth_game.php

Wisconsin Historical Society Sinking of the Lucerne Interactive Story: http://www.maritimetrails.org/lucerne_ship-of-death.php

Wisconsin Historical Society Underwater Archeology: http://www.wisconsinhistory.org/shipwrecks/learn/

Wisconsin's Maritime Trails: http://www.maritimetrails.org/

Wisconsin Sea Grant Institute Shipwrecks: http://wisconsinshipwrecks.org/explore_map.cfm

Wreck of The Edmund Fitzgerald: http://www.ssefo.com/

Places to Visit

Great Lakes Shipwreck Museum–White Fish Point
18335 N. Whitefish Point Road
Paradise, MI 49768
www.shipwreckmuseum.com/grouptours

Great Lakes Maritime Heritage Center
Thunder Bay National Marine Sanctuary
500 W. Fletcher St.
Alpena, MI 49707
http://thunderbay.noaa.gov/