ELEMENTARY

1. “Heave, Ho the Cargo!” by Judy Bowlus
   Kindergarten: math, science and social studies

Lesson Overview
Students will learn to identify, sort and graph samples of goods from the Great Lakes area using the criteria of living/non-living, natural/man-made, and above ground/below ground.

2. “Aye Aye Captain” by Judy Bowlus
   Kindergarten: math, reading and writing

Lesson Overview
Students will learn to identify and demonstrate directional and positional words (inside/outside, over/under, above/below, beside, between, in front of, in back of, right/left, etc.) using a cardboard boat, miscellaneous objects, and their bodies.

3. “The Edmund Fitzgerald-Vanished in the Night” by Sarah Stevens
   Kindergarten: science and social studies

Lesson Overview
These two lessons are intended to introduce kindergarten students to shipping on the Great Lakes by learning about the Edmund Fitzgerald. The reason I chose to focus on the Edmund Fitzgerald is because its sinking was the most famous disaster in the history of Great Lakes shipping. My goal is that children learn what the Great Lakes are and that they identify the lake closest to us---Lake Superior---which is also where the Edmund Fitzgerald sunk. My goal is to have students learn about the past and become familiar with how shipping affects our present everyday life.

4. Exploring Beach Erosion in the Great Lakes by Amy Martin-Crowel
   4th grade Science

Lesson Overview
This lesson is meant to expose students to an example of environmental change, beach erosion, in the Great Lakes. The lesson provides a brief overview of why the Great Lakes are important, then focuses on erosion as one of the challenges, explores beach erosion with a hands-on activity, and suggests ways of slowing beach erosion.

5. Impact of Invasive Species on Food Webs and Ecosystems by Amy Martin-Crowel
   5th grade Science

Lesson Overview
This lesson will expose students to an example of environmental change--beach erosion--in the Great Lakes. The lesson provides a brief overview of why the Great Lakes are important, then focuses on erosion as one of the challenges, explores beach erosion with a hands-on activity, and suggests ways of slowing beach erosion.
1. **Comparing Great Lakes Maritime Transportation Systems: 1800 to 1898** by Tim Evans  
   8th Grade American History

**Lesson Overview**
Great Lakes maritime transportation systems of the 19th century will be addressed in this lesson. The lesson will focus on ships, and shore side activities, and the economic and social impact they had on people and industries, locally and nationwide. Studying this topic will strengthen students’ understanding of transportation in 19th century America, which in contemporary textbooks is dominated by land transportation, by looking at the important role of waterways in America. Students will also communicate their understanding of the topic in writing.

2. **Lighthouses and Lenses** by Jay Sinclair  
   8th Grade Science

**Lesson Overview**
The lesson will cover the function and importance of lighthouses. The main focus (pun intended) will be on the use of Fresnel lenses to concentrate the beam of the light. The lesson will serve as an extension of the unit on optics and lenses, will connect to social studies topics, and will involve writing across the curriculum, a major school improvement goal in my district.

3. **The Great Lakes Storm of 1913** by Jay Sinclair  
   Grades 7-9 Earth Science

**Lesson Overview**
The lesson will cover the causes and effects of the Great Lakes Storm of 1913. Topics covered will include the meteorological causes of the event, as well as the human impact. The lesson will serve as an extension of the unit on weather, will connect to social studies topics, and will involve writing across the curriculum, a major school improvement goal in my district.

4. **Great Lakes Watershed** by Jon Way  
   8th Grade Earth Science

**Lesson Overview**
Students construct a plaster model of the Great Lakes watershed. Students will paint the major rivers that enter into the Great Lakes, the individual river and lake watersheds, and the area that would be considered the Great Lakes watershed. Students will compare the Great Lakes watershed with other major watersheds in the United States. My goal is for student to be able to identify the watershed in which they live in, as well as the interconnectedness of the Great Lakes waterway used for shipping goods to people across our country.

5. **Invasive Species** by Jon Way  
   8th Grade Science

**Lesson Overview**
This lesson introduces the topic of invasive species to students and will be taught in environmental science. Great Lakes shipping is one way that invasive species have entered the Great Lakes. This lesson fits into environmental problems and solutions. My goal is for students to have an understanding of non-native species, their impact on the Great Lakes and water bodies in the Great Lakes.
Lakes watershed, as well as, potential options for controlling or preventing their entry and movement in the watershed, including some of the new ship designs.

6. **Boat Design** by Rick Suckow  
   7th Grade Math, Social Studies or Science

**Lesson Overview**  
Students will design and build a clay boat that will carry the native ore from Marquette, Mi through the Sault Saint Marie Locks to the processing mill in Dearborn, Mi. The boat’s cargo will be nickel sulfide (old copper pennies) and be restricted to the size of the locks 30 cm by 15 cm.

7. **Charting a Shipping Lane** by Rick Suckow  
   7th Grade Social Studies or Science

**Lesson Overview**  
A newly constructed steel mill located on the Rouge River will be using the ore obtained from a new mine located north of Marquette, Mi. Over the last five years the water level of the Great Lakes and its tributaries has dropped in depth. The shipping lane has to be measured and new buoys need to be placed. The Army Corps of Engineers may need to dredge the river that will allow the freighters to safely reach the mill.

**HIGH SCHOOL**

1. **Profiling the Enemy: Using the Internet to Identify Great Lake Invasive Species**  
   by William Hodges  
   10th Grade Biology

**Lesson Overview**  
In this lesson, students will receive pre-made dossiers for 6 varied invasive species in the Great Lakes. They will then need to use the internet to discover useful information about each species, including hypothesized method of invasion, trophic level of the food chain that is immediately affected, ecological damage, and methods of control.

2. **Becoming a Great Lakes Invasive Species Czar** by William Hodges  
   10th Grade Biology

**Lesson Overview**  
In this lesson, students will play a game where they will be given a role in the Michigan Department of Natural Resources where they will control where money is spent on different invasive species projects. They will deal with a budget that constantly changes, and they will need to put their money where they think it will do the most good. If they are successful, they will receive political points (useful in keeping one’s job). If they have too many failures, they will get fired. The purpose is to show how difficult it is to try to control invasive species in the Great Lakes, especially given the limited resources devoted to controlling them.
3. **Careers in the Maritime Field** by Jackie Johnson  
   Grade 11-12 Transition Exploration w/ Special Needs

**Lesson Overview**
Students will explore the OCIS website to select three jobs of interest that relate to the Maritime employment. They will determine what type of further training they may need in order to obtain these jobs. They will then search out where they can go to obtain this training. They will create a PowerPoint or other type of presentation to share the information with the class.

4. **What Shipping Job Would I Be Good At?** by Jackie Johnson  
   Grade 11-12 Transition Exploration w/Special Needs

**Lesson Overview**
The objective of the lesson is to take self inventories to determine what occupations are a good fit for our personality and learning styles. Students will play the SHIPS BINGO game to test their knowledge of maritime careers. We will then take the self inventories to find out what occupation fits them the best.

5. **Wind Through Your Socks** by Denise Little  
   Algebra 1 and Geometry

**Lesson Overview**
The students have been studying graphing and direction. This lesson focuses on more abstract applications. That is, determine wind direction and speed and to decide what is their importance in real life applications.

6. **Where Are They?** by Denise Little  
   High School Math

**Lesson Overview**
Students have been studying the coordinate system. They will use their knowledge to apply what they have learned to locate places throughout the world using longitude and latitude.

7. **What’s so GREAT about these Lakes?** by Carrie Wenta  
   High School Environmental Sciences

**Lesson Overview**
This lesson will be used to introduce students to the importance of the Great Lakes, contributing, both economically and environmentally, to the lives of people in the state of Michigan. Many students may have visited one of the lakes to camp, fish, or swim and have seen a large cargo ship moving far off in the distance. These students have not likely given thought to the connection between the goods and materials that these ships carry and their own lives.

8. **Clean Up This Mess: Addressing Ecological Impacts of Shipping** by Carrie Wenta  
   High School Environmental Sciences

**Lesson Overview**
This lesson will be used to look at the environmental impact of Great Lakes shipping. Students will break into groups to focus on each problem. Students will explain the problem, cause, current policy, cost to clean up, who is responsible, and potential solutions. Students will discover that other modes of transportation can create far more environmental damage than shipping.
9. Working on the Water by Nancy Jayne
   High School Career Education

Lesson Overview
As the high school guidance counselor, I advise high school students on post-high school career options. I created a website and a brochure to present the various maritime careers available to students—job descriptions, pay, etc.

COLLEGE

1. Historic Vessels of the Great Lakes: Evolution of Maritime Transportation by Tim Evans

Lesson Overview
This lesson uses images and data to demonstrate the types of ships that carried goods on the Great Lakes from the birch bark canoe of the 17th century to the 1000-foot steel freighters of today. Presenting the images in chronological order shows the evolutionary changes that have occurred with Great Lakes ships and their cargos. This lesson connects the evolving modes of transportation in the past with historical maritime events during the same time periods, and helps students associate ships with time periods, understand uses of ships, and recognize patterns of change.