

Lesson #1: "Pellets, Ships & Cars"

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Target Grade: 4th Grade Social Studies

Lesson Overview:

In 4th grade social studies the curriculum is devoted entirely to the study of MI, so tying in Great Lakes shipping makes sense on many levels. In this lesson my students will gain an understanding of the entire cycle of the maritime shipping of natural resources in the Great Lakes. Starting with where the iron ore is mined (&how), the ports that the freighters pick up the cargo from, and finishing with the ports to which the natural resources are delivered and what the resources are ultimately used for or made into.

Objectives:

At the end of this lesson, students will be able to...

- 1.) Locate on a MI map 2 U.P. and 2 L.P. port cities that iron ore is shipped to/from.
- 2.) Explain what a freighter is, its uses and how it functions.
- 3.) Explain the need for the lock system in Sault Sainte Marie and how a lock functions (either verbally or pictorially).
- 4.) Articulate the main steps in the iron ore mining process.
- 5.) Identify 5 objects made from iron ore (steel).
- 6.) Name 2 invasive species that have been invading MI's waterways, how they got here and why they are a problem, and how ballast mgmt. can help the situation.

Materials:

Cleveland Cliffs mining video and booklet (1), taconite sample (1), photos of steel products and port cities, MI & Great Lakes map (1 per group), Coast Guard pamphlet on invasive species/ballast mgmt.(1 per group), Soo Locks book and photos; various art supplies: poster boards, markers, colored pencils for each cooperative group etc.

Room Arrangement:

I'll arrange the chairs (desks) into a long column facing the front of the room, to simulate the shape of a freighter. We'll also name our freighter after studying the names of vessels currently on the water and have a different "captain" each day to help with supplies.

Background Information:

- Cleveland Cliffs mining video/booklet
- “Locks & Ships” book
- MI SS Text book
- Coast Guard Ballast Management brochure
- maps of MI's ports/locks/natural resources

-lists of products made with iron ore (Steel)

State of Michigan Content Standards

<u>Soc.I.2.LE1.Grade 4</u>
Summarize the sequence of key events in stories describing life from the past in the state of Michigan.
<u>SS.IV.2.LE3 Grade 4</u>
Examine the historical and contemporary role a major industry has played in their community.
<u>SOC.II.4.LE.1.Grade 4</u>
Draw sketch maps of the Michigan.
<u>SS.IV.4.LE3 Grade 4</u>
Analyze how Michigan's location has impacted its economic development.
<u>SOC.II.4.LE.5.Grade 4</u>
Describe the Great Lakes ecosystem and explain physical and human processes that act upon them.
<u>SS.IV.5.LE1 Grade 4</u>
Trace the national origin of common household items and the trade flows, which brought them to the United States.
<u>SS.IV.5.LE3 Grade 4</u>
Describe how businesses are involved in trade as producers, distributors, importers and exporters.
<u>SOC.II.1.LE.2.Grade 4</u>
Locate and describe diverse kinds of communities in Michigan and explain the reasons for their characteristics and locations.

SCIENCE; Constructing Standard B, Benchmark 2

Develop solutions to problems through reasoning, observation, and investigations. (diff. water levels-locks)

Science; Constructing Standard C, Benchmark 3

Construct charts and graphs and prepare summaries of observations. (lake depths)

Vocabulary:

Natural resources- useful things found in nature

Mining process- the steps by which iron ore is mined from the earth and the changes (process) that it goes through to become a useable natural resource.

Freighter-ship for transporting cargo

Shipping- transportation of cargo (freighter, train, rail, truck)

Maritime shipping- transportation of cargo via waterways.

Port- a city or town with a harbor for loading/unloading cargo from a ship.

Lock- a water elevator

Invasive species- non-native species that are transported to a new area that typically have no natural predators (ex: zebra mussels)

Ballast management- careful regulation (rules) of where ships can pick up or dump ballast water, important in helping to keep invasive species out

Pre-Assessment:

I would provide each of my students with a map of MI and the Great Lakes. Then I'd ask them to circle the areas where iron is mined, circle the ports where it is picked up and the ports where it is delivered. I'd also ask them to draw an invasive species found in the Great Lakes.

Attention Getter:

I'll tell my students that there is a problem in Detroit, they are running out of supplies to make cars. After researching the main component to make cars; steel (iron ore) I will tell them that if we want to remain the "Motor City" our challenge is to find the necessary materials and get them to Detroit.

Focus Question:

BUT...if the iron ore is in the U.P. and we are all the way in the L.P. what are we going to do?!?! Let the journey begin!

Describe Classroom Activity:

Our classroom activity will encompass our journey from the iron mine to Detroit. We will simulate the journey of the freighter as it transports this precious ore (taconite pellets).

1. Students will view various freighters to learn scale/dimensions, find out which ones are local to this area and what they are called. Which then help us name our classroom freighter that we will "travel" on throughout the lesson.
2. They will learn how freighters load/un load ore and simulate the process in our class.
3. Once the ore is loaded, we'll chart the route that we'll take to get to our final port in Detroit, and other ports we might pass.
4. While on the trip, we'll be forced to deal with problems, changes in water levels, invasive species clogging pipes, and how we get our mail while we're on board the freighter? The students will be involved in helping to "solve" these very real problems.
5. Through books, videos, websites and discussion I will provide a realistic context of what a freighter (and the people who work on her) encounters on a voyage through the Great Lakes.
6. As we're nearing Detroit on our journey, we'll learn about the many things that iron ore (steel) is used to make, and how useful it is, which will ultimately demonstrate how useful shipping is to us.

Assessment:

Twice weekly journal reflections will help the students and myself capture what has been happening in the journey aboard the freighter. I will ask them to take the perspective of someone riding on the freighter, ex: "Today we watched the huge freighter unload by..." Journals will be assessed as complete or incomplete based on whether or not the entry has 3 ideas/facts that were learned in class. Less than that I will consider not passing, and will discuss with students better note taking strategies.

Project:

Students will make a Great lakes map and will identify where iron ore is mined, the ship to/from ports, locate the Soo Locks and end with illustrations of items made from steel(iron ore). This project will be graded based on the following standard:

- all lakes identified
- one mining site is labeled
- one port city is labeled to load ore
- one port city is labeled to unload ore
- Soo Locks are labeled
- 2 items are shown that are made from steel

This adds up to 11 pieces of information, the grading criteria will be as follows:

- 11/11 Mastery A
- 10/11 Good B
- 9/11 Average C
- 8/11 Not Mastered D
- 7/11 & below Failing

Extensions/Enhancements:

Teaching this lesson from the perspective that we are aboard a freighter will deepen the lesson and hopefully give it a more meaningful context. For example, "Uh oh! The water level drops 21 during our journey from Lake Superior to Lake Huron on the St. Mary's River, we'll surely crash and sink...what should we do?!" A lesson on the Soo Locks would follow.

I'd like to take my students to visit a freighter, and will be looking into this as a field trip. You could also broaden this lesson by including other natural resources as well as the related topic of the shipwrecks in Whitefish Bay, and how the treacherous waters/weather impacted shipping.

Resources:

1. Cleveland Cliffs mining video "Steel Starts Here!"
2. Bergel, Colin. (2000). Mail by the Pail. Detroit: Wayne State University Press.
3. Holling Clancy. (1969) Paddle to the Sea. New York: Houghton Mifflin.
4. www.boartnerd.com Great Lakes & Seaway Shipping
5. www.greatlakesseaway.com St. Lawrence Seaway System

6. www.hwyl20.com promotes maritime shipping
7. www.lcships.com Lake Carriers Association contains U.S. Laker info.
8. Reed, Jan Mende. (2005) Locks and Ships. Sault Sainte Marie: Soo Locks Boat Tours.
9. McNergney-Vineyard, Dr. Joellen. (1997). Michigan: Adventures in Time and Place. New York: McMillan/McGraw-Hill.