

Great Lakes/Great Ships

Lesson Four Board Game

Target Group:

Grades 4-8 (Upper Elementary/Middle School)

Goal:

To introduce and celebrate Great Lakes Maritime Transportation to elementary and middle school students.

Objective(s):

The student will read and analyze information about Maritime shipping as they role-play the part of a working freighter on the Great Lakes.

Michigan Benchmark(s):

Social Studies:

Strand III Geographic Perspective

Content Standard 2 “The students will describe, compare and explain the locations and characteristics of ecosystems, resources, human adaptation and environmental impact, and the interrelationships among them.”

EE #1 Describe how people use the environment to meet human needs and wants.

LE

MS Describe the consequences of human /environment interactions in several different types of ecosystems.

Content Standard 3 “All students will describe, compare, and explain the locations and characteristic of economic activities, migration, information flow and the interrelationships among them..”

LE # 4 Describe some of the major movements of goods, people, jobs and information within Michigan and the United States and explain the reasons for the movement.

MS #4 Describe the major economic and political connections between the United States and different world regions and explain causes and consequences.

Science:

Strand V.2 Hydrosphere (EH)

Content Standard 2 “All students will describe the characteristics of water and demonstrate where water is found on Earth; how water moves; analyze the interaction of human activities with the hydrosphere.”

EL #3 Identify sources of water and its uses.

MS #1 Use maps of the Earth to locate water in its various forms and describe the conditions under which they exist.

MS #2 Describe how surface water in Michigan reaches the oceans and returns.

Strand V.1 Geosphere (EG)

Content Standard 1 “All students will describe the Earth’s surface; how the Earth’s features change over time; analyze effects of technology on the Earth’s surface and resources.”

EL #1 Describe major features of the Earth’s surface.

MS #1 Describe and identify surface features using maps.

Reading:

Word Recognition and Word Study

Vocabulary (R.WS.06.07) “The student will in context, determine the meaning of words and phrases including regional idioms, literary and technical terms, and content vocabulary using strategies including connotation, denotation, and authentic content-related resources.”

Materials:

(templates follow)

Game boards one for every 5 or 6 students

One standard die, with the 1 and 2 sides covered with the numbers 3 and 4 to speed play

Three cardboard dice with sides labeled for port, ship and cargo

Benefit cards

Hazard cards

Game markers (small figures, ships, or buttons)

Room Arrangement:

Students will play in groups of 4 to 6. Desks or table should be arranged so all students in the group can see and access the gameboard and cards.

Time Needed:

The game will take at least two class periods to play successfully. The first day (45 minutes) will be needed to learn the rules and play a practice game. The next day students should take about 45 minutes to play the game to completion. Multiple games may be needed to learn all the given information. The game may be used more than once.

Lesson Summary:

The students will teach each other as they play through the game in several rounds. Rules of play follow.

First:

Set up the gameboard, sets of Hazard and Benefit cards, ship markers and dice.

Next:

Each player rolls the ship die to determine if they will be playing as a Laker or a Salty.

Each player rolls the cargo die to determine if they are carrying Taconite, Coal or Grain

Each player rolls the port die to determine if they are headed to Chicago Illinois, Erie Pennsylvania, or Windsor, Ontario.

These dice may be cast simultaneously. Players should record their roles.

Third:

All ships leave from Duluth, Minnesota. Roll the numbered die to determine the order of play.

The object of the game is to be the first freighter to make a complete round trip from Duluth to the assigned port and return. First to do so is Commander of the Fleet!

Play begins when the first player rolls the numbered die and moves the indicated spaces. If the player lands on a hazard or benefit card, that student must read that card aloud to the group and proceed as indicated on the card. If a ship lands on a space occupied by another ship travelling in the same direction, the ship already occupying that space must move back two spaces to allow the ‘faster’ ship to proceed. If the space it retreats to is occupied, the ship it displaces must retreat to the next unoccupied space behind it. No ship may move ahead except by rolling or as directed on a benefit card. If the ships are moving in opposite directions, they may remain on the same square of the gameboard until their next turn.

Assessment:

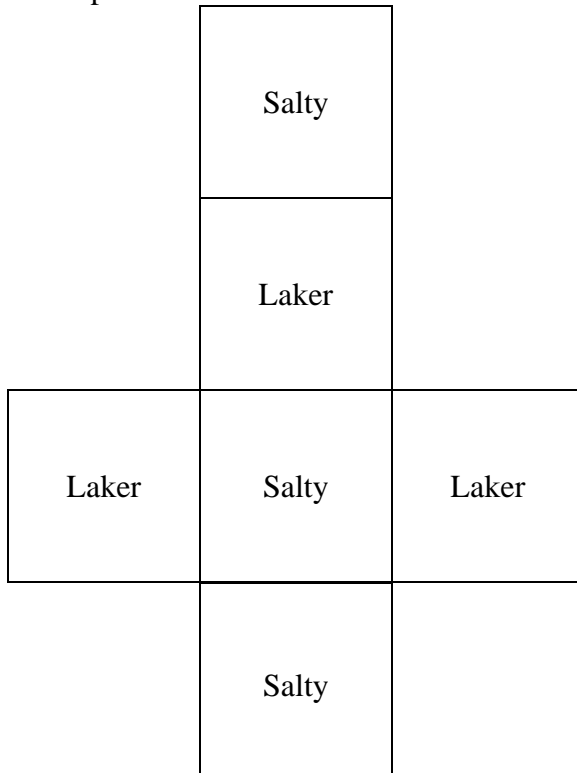
Students should take the pre/post test and record should be kept of their knowledge of Great Lakes maritime shipping both before they play the game and again after play.

Great Lakes/Great Ships

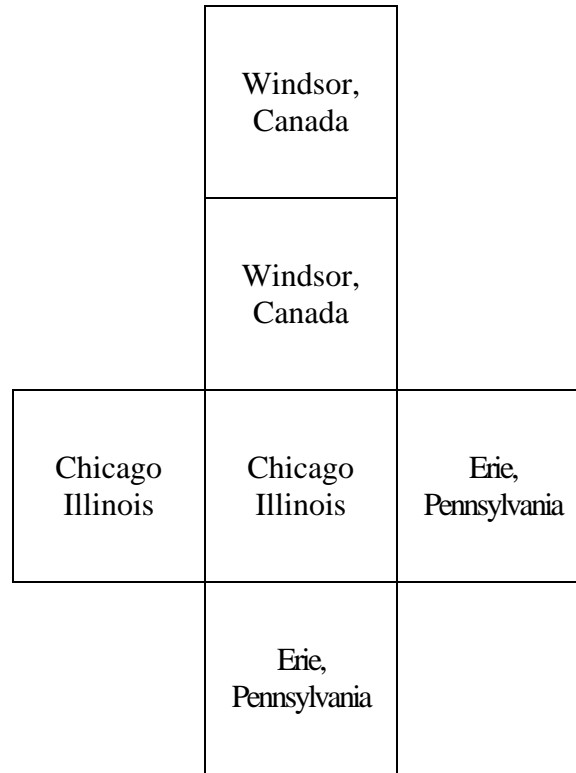
Board Game Materials

DICE:

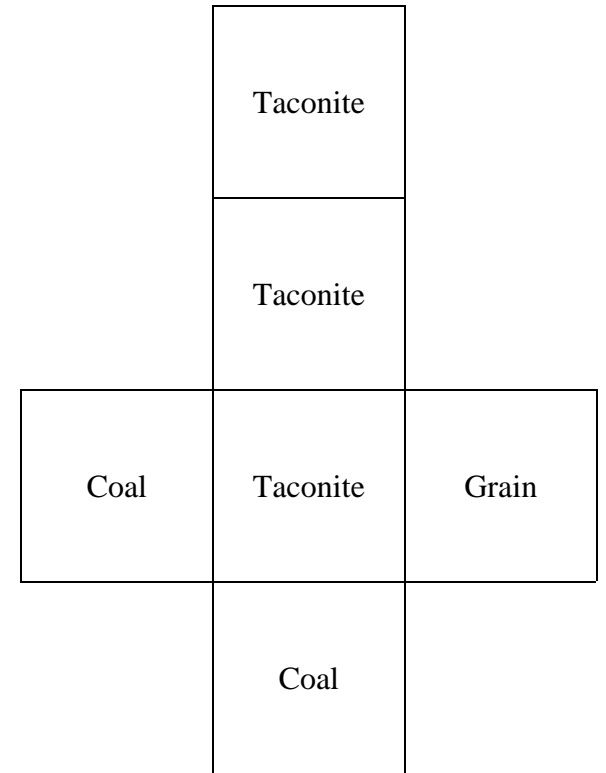
#1 Ships:



#2 Ports:



#3 Cargo:



Hazard Cards

Print two of each and laminate.

Shoals

Shoals are underwater rocks that make shallow spots that ships can run aground on which will bring them to a halt or damage their hulls and even sink them. Captains must keep track constantly of their position on the lakes using global positioning systems (GPS) and traditional nautical charts to be certain they do not encounter shoals!

Go back two spaces

Headwind

A headwind is a strong wind blowing directly at a ship. The ship must plow through the wind as well as the water and waves the wind creates. Headwinds slow ships down and cost time, fuel, and profits.

Go back two spaces

Storm

The Great Lakes can be treacherous because of sudden storms. Captains monitor satellite weather constantly and take precautions during bad (heavy) weather. Lake Superior is especially notorious for bad weather and many shipwrecks and amazing rescues have occurred over time.

Go back three spaces

Shallow Channel

When rivers and streams flow into channels, sediment (dirt) is deposited on the lake floor. The water becomes more and more shallow over time. If the channel is not dredged (dug out) regularly, a big ship with a full load cannot get through and runs aground. This is a BIG problem on the Great Lakes where dredging is not done very often.

Go back 4 spaces

Low Lake Level

Evaporation during hot summers and warm winters when the Great Lakes do not freeze over, coupled with low rainfall, can cause lake levels to drop. When the level (depth) of the lake is lower, ships cannot carry a full load of cargo or they will run aground in shallow spots or channels. For every inch of draft (depth of a ship's hull below water) lost, a thousand foot laker will lose 267 tons of cargo carried. This results in loss of profit for the shipping company.

Lose your turn

Swish and Spit

Salties that travel from the ocean to the freshwater of the Great Lakes and back again can carry organisms from other ecosystems. If they are released in the Great Lakes, they may survive and create problems for our native plants and animals. To prevent this from happening, Salties that take on ballast water in foreign fresh water ports, must dump their freshwater while at sea and take on saltwater. Freshwater organisms cannot survive in salt water, so any living thing that is discharged out at sea will die there. The opposite is true when they come into port. Now if they dump their ballast while taking on cargo, it is all saltwater creatures that will die when put into the freshwater. This is called Swish and Spit. It is a very cheap and effective way of controlling exotic species but it does take time, and time is money!

Go back two spaces

Coast Guard Security Check

When an international ship comes into the Great Lakes, the Coast Guard checks the documentation and background of each member of the crew. Things they inspect are passports, visas, and immunization records and criminal history. If there are any problems with these records, the ship may be delayed or even fined. This is very expensive for the shipping company and may create a floating 'traffic jam' at the port!

Go back one space

Fueling Delay

Captains are required to contact a ground fueling station at least 24 hours in advance. They must then contact the Coast Guard at least 4 hours before fueling. Forgetting to call can cost a ship hours of delay and even a costly fine. At \$2500 an hour on average, this really hurts!!!!

Lose one turn

Wait to Dock

If the shipping company has any problems with the land transit of cargo or loading equipment on the loading equipment on the loading, ships must wait.

Sometimes they also must wait if a boat is ahead of them at dock.

At \$2500 per hour for a big laker, a ship's captain and the cargo company must work with the Port Authority to make loading as quick and efficient as possible.

Go back two spaces

Locked up at the Locks

The locks on the Saint Mary's River at Sault Saint Marie connects Lake Superior to the remaining four Great Lakes. No ship can pass from Lake Superior to any port on the lower lakes without passing through the locks. There are four locks at the Soo, but only one; the Poe lock is large enough for most freighter traffic. It takes about one hour to pass through the lock in either direction. Sometimes ships must wait for their turn to use the lock. Any delay is expensive in Maritime shipping!

Go back two spaces

Hogging and Sagging

Loading a freighter must be accomplished very quickly, but also very, very carefully! When cargo is not loaded with perfect balance, serious problems can occur. A ship that is not loaded correctly may be delayed or even sink! Hogging is when the ends are too heavy and the ship humps up in the middle. Sagging is when there is too much weight in the center. If there is too much weight on one side or another the ship will list, or lean to the side. It could even roll right over! The 'skin' of the ship can be as thin as 5/8ths of an inch.

Improper loading can rip a hole right in the hull, and sink the ship right at the loading dock!

Go back three spaces

GPS Breakdown

All commercial ships rely on Global Positioning Systems, or satellite navigation. Ships are also required to carry traditional paper navigational charts and the captain must know how to use them in an emergency!

Go back one space

Hull is Rusted

Oceangoing ships, or 'salties,' are very short lived compared to freshwater lakers. A salty only lasts about 30 years before the salt corrodes or eats through the hull of the ship. A laker, however can last 100 years or more. This makes a salty much more expensive to operate because the shipping company must replace them so often.

Go back two spaces ** If you are a Laker- skip this hazard and take two more spaces. Full steam ahead! **

Saint Lawrence Seaway Squish

The St. Lawrence Seaway was designed in 1954 and finished 5 years later. It is a system of 18 locks and the Welland canal and is the only route into or out of the Great Lakes from the ocean. When it was designed big ships were MUCH smaller! Lakers and many ocean-going vessels now exceed 1000 feet, because their size is much more efficient and profitable to run. But these big ships cannot fit through the Seaway and are 'stuck ' in the Great Lakes forever (or until the locks are made larger!) You are STUCK!

Lose one turn **Salties skip this card. You are small enough to pass through the locks. If you weren't, you wouldn't be here in the first place. **Go ahead two more spaces!** **

Bonus Cards

Print and laminate two of each.

Tailwind

A wind blowing from behind the ship towards the target port helps push the ship forward and saves on fuel.

Go ahead two spaces

Smooth Sailing

A calm lake with fine weather is a sailor's dream. This kind of weather is a rare occurrence on the Great Lakes!

Go ahead two spaces

No Wait to Load

Congratulations! You are next in line and your cargo is ready at the dock.

Go ahead two spaces

Backhaul

A ship contracts for a round trip to deliver cargo and return. If they can arrange with someone who needs to ship a suitable cargo on the way back towards Duluth, it is called a backhaul. A backhaul really increases efficiency and profits the ship owners. Limestone from Alpena or Roger's City would be an example of a backhaul.

Go ahead three spaces

Full of Fuel

Ships have very few choices on places they can fill up with fuel. Your tanks are full, and you can head full speed to port!

Go ahead three spaces

Deep Channels

Most ships using a port must pay a Harbor Maintenance tax, which is a small percentage of the value of their cargo. This fee is intended to be used to dredge channels and care for harbor structures. This has not been used often on the Great Lakes in the past. You are lucky though. Your channel is plenty deep for your ship's draft and you slide through with room to spare!

Go ahead three spaces

High Lake Level

The level of the lake effects how much cargo a ship can carry. The deeper the lake, the better for the maritime shipper! This year was a cold winter, the lakes froze completely over. (Lakes lose a lot of water to evaporation during the winter if they are not frozen.)

There was lots of snow in winter and rain in the spring, The Lakes are full and deep and you can carry lots of cargo!

Advance five spaces!

Next in Line at the Locks

Lake Superior is 600 feet above sea level. Lakes Michigan and Huron are only 577 feet. This means the water going from Superior to the lower lakes must fall 23 feet. Naturally, the water tumbled down the rapids (*sault* in French) of the Saint Mary's River. People have built locks in the river that act like a ship elevator. The first lock was built in the 1700's to move voyager's canoes without a long and costly *portage* (carry). These canoe locks were destroyed by the Americans in the war of 1812. There are four modern locks at Sault Saint Marie. Only one can take a freighter the size of your ship. Congratulations, no waiting on lock number two!

Go ahead four spaces

Integrated Tugboat

Ships are expensive to build and on the Great Lakes the engines wear out, or become outdated, faster than the hulls do. Your ship has an integrated tug. This means the hull can be detached from the engine (tug) allowing the engine to be upgraded or replaced easily. This is a new technology, which is a little like a semi tractor and trailer set-up. This design should reduce shipping costs over time.

Go ahead one space

Self Unloaded

New lake freighters (lakers) have a series of conveyor belts built into the bottom of the hold (cargo space inside the ship). Two belts move together 'squeezing' the bulk cargo, coal, taconite or grain, up and out of the ship automatically. This design is unique to American flagged ships.

Advance two spaces **If you are a salty, forget it! You still need a crane and a front loader to unload your ship. Stay put! **

Bow Thrusters

You have bow thrusters! A new feature of lakers, bow thrusters are open tubes in the front of the ship that jets water out the side to maneuver the ship from side to side. If you have bow thrusters, you don't need to wait for a tug to push or pull you to dock!

**Advance two spaces ** Salty?
Sorry- they don't have this
feature yet. You have to wait
for a tug! ****

Game Board

Game boards can be created from Michigan extension service maps of the Great Lakes Basin. (Extension Bulletin E-1865, available free from the Michigan State Extension Service)

Another, more expensive route is to purchase Department of Commerce, navigational chart #14500, which is larger, easier to read, and more detailed.

Each route from Duluth to the selected port is approximately 24 spaces. The spaces are created by using colored price label dots available at any variety store. A piece of narrow yarn was used under each line of dots to create a 'shipping route'. Boards should be laminated before using for durability. If using the smaller Great Lakes Basin maps, dots made from a common paper punch may be used, and glued to lines drawn on the map indicating the shipping lanes.

Whichever basic chart is used, bonus and hazard spaces should be placed somewhat randomly, but fairly closely, so that the students land on these spaces often. Black backgrounds can be used for the hazard spaces, and gold for the bonus spots. By the time a player travels from the head of the waters (Duluth) to their assigned port, they should know much more about Great Lakes maritime transportation, and have practiced many basic skills as well!