Great Lakes Shipping Routes

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School: Northwestern High School
Subject: Science
Category: Life/Earth Science
Grade Level: 10th - 12th [Students With Special Needs]
Duration: 55 minute periods [5 days]

Great Lakes Maritime Transportation Summer Teacher Institute is the exploration of the historical, economical, and environmental aspects of the Great Lakes. It encompasses the many aspects of the shipping industry within the framework of intermodal transportation, port safety, ports of the Great Lakes, and international destinations.

~Adapted from Great Lakes Maritime Transportation Teacher Institute, Course Description

Lesson Overview: This lesson will address the Great Lakes ecosystems, natural resources, water cycles, weather patterns, and the three states of matter in which water on Earth can be found. Students will name the Great Lakes, identify locations of major ports; and examine how human interaction affects the natural resources of the Great Lakes.

Goals:
- Prompt students to think about the water systems in their community
- Familiarize students with the different bodies of water
- Demonstrate a connection between Science:
  - Biology, Ecology, Earth, and Chemistry
  - Science Skills: Observing, comparing, recording, classifying, analyzing
  - Science Education Standards
  - Scientific Inquiry
  - Populations and ecosystems
  - Science and human impact
- Math; Reading Comprehension
- Demonstrate a connection to geography
- Promote appropriate use of technology

Learning Objectives [Scaffold Instruction]:
- Name the five Great Lakes
- Understand that the Great Lakes are consist of a relationship between two countries, the United States and Canada
- Identify the geographical location of each of the five Great Lakes on the map
- Identify the geographical location of the 24 major ports in the United States and Canada
- Find out the geographical distance from student’s residence to each of the Great Lakes
- Develop an understanding of the interdependence of the variety of populations, communities and ecosystems the Great Lakes region.
- Develop an understanding of how human interaction and use of natural resources affects the environment
- Develop an understanding that Earth is a planet nearly covered with water and that water on Earth can be found in three states, solid, liquid, and gas

**Essential Questions:**
1. How do people interact with the Great Lakes?
2. What determines the location of ports on the Great Lakes?
3. How many Great Lakes do we have?

**Materials: [Per class]**
- Computer & LCD projector
- Video: The Great Lakes St. Lawrence Seaway System: A Vital Waterway
- Port Activity Cards [created by Dr. Del Reese]

**Resources: [Per student]**
- Notebooks
- Index cards
- Whiteboards [one per team of two students]
- Maps of the Great Lakes
- Great Lakes worksheets
- Teacher made activity cards

**Procedures:**

*Day 1-Day 2*
- TW ask students what they already know about the bodies of water around them. SWBAT demonstrate their prior knowledge through brainstorming and team collaboration. SWBAT write their ideas on whiteboards; per team of two students. This will be used to introduce the unit and begin a discussion of what the students think will be studied.

**Activity Plan: Direct Instruction**
- TW use the to introduce Video: The Great Lakes St. Lawrence Seaway System: A Vital Waterway to introduce the Great Lakes

*Day 3*
- The TW introduce the following terms. TW distribute index cards to each student [one per word], SW write the term on the blank side and the definition on the line side. SWBAT define and explain the function of the following:
  - ecosystem
  - population
  - river
  - lake
  - pond
  - oceans
  - port [24 major ports]
Day 4

➢ SWBAT work in teams of two to play match the tree and Great Lakes term with definition, using teacher made cards.

Day 5

➢ SWBAT work in teams of four to play, match the port with the Great Lake, using teacher made cards. SWBAT take turns to match ports to Great Lakes; teams will consist of: captain, scorer, card sorter, and timekeeper. Each team member will have 30 seconds to match the port with the Great Lake. The winner will be the one with the most correct matches.

Assessment:

Use the student’s completed Great Lakes worksheet to assess their knowledge of the Great Lakes. SWBAT match the ports to the correct Great Lake on matching assessment.

Michigan Content Standards:

Ecosystems L.EC: Develop an understanding of the interdependence of the variety of populations, communities and ecosystems, including those in the Great Lakes region. Develop an understanding of different types of interdependence and that biotic (living) and abiotic (non-living) factors affect the balance of an ecosystem. Understand that all organisms cause changes, some detrimental and others beneficial, in the environment where they live.

L.EC.M.3 Biotic and Abiotic Factors
   o L.EC.06.31 Identify the living (biotic) and nonliving (abiotic) components of an ecosystem

Earth Systems E.ES: Develop an understanding of the warning of the Earth by the sun as the major source of energy for phenomenon on Earth and how the sun’s warming relates to weather, climate, seasons, and the water cycle. Understand how human interaction and use of natural resources affects the environment.

E.ES.E.4 Natural Resources
   o E.ES.03.41 Identify natural resources (metals, fuels, fresh water, fertile soil, and forests)
E.ES.M.8 Water Cycle
   o E.ES.07.82 Analyze the flow of water between the components of a watershed, including surface features (lakes, streams, rivers, wetlands) and groundwater

Fluid Earth E.FE: Develop an understanding that Earth is a planet nearly covered with water and that water on Earth can be found in three states, solid, liquid, and gas. Understand how water on Earth moves in predictable patterns. Understand Earth’s atmosphere as a mixture of gases and water vapor.

E.FE.E.1 Water
- E.FE.02.11 Identify water sources (wells, springs, lakes, rivers, oceans)
- E.FE.E.2 Water Movement
  - E.FE.02.22 Describe the major bodies of water on the Earth’s surface (lakes, ponds, oceans, rivers, streams)

**Resources**


