



Photos Courtesy of the Sable Points Lighthouse Keepers Association

Lake Superior Lighthouses

Lesson plan prepared and provided by the Education Committee of the Sable Points Lighthouse Keepers Association (SPLKA)

Notes:

- While written for fourth-grade implementation, this lesson plan could be modified – or used in full – at other grade levels.
- The lesson can be implemented as described here, with little or no modification, or customized to focus on lighthouses found in a specific portion of the state or to further emphasize one or more components of the lesson.
- This lesson would require multiple class sessions to complete.

Content Areas:

Science

Social Studies

Language Arts

Lesson Title:

Lake Superior Lighthouses: Styles, Settings, and Unique Features

Objectives:

After completing this lesson, the students will be able to:

- Explain the geological processes that formed the Great Lakes and the various shoreline configurations of Lake Superior.
- Explain the importance of the Great Lakes to transportation, migration, and trade.
- Explain the dangers faced by shipping vessels on the Great Lakes, especially those that sailed the lakes in the mid-to-late Nineteenth Century and early Twentieth Century, and the role of lighthouses in preventing maritime disasters.
- Explain the factors that affect the effectiveness of lighthouse beams in penetrating out into the Great Lakes.
- Research and identify the location, design, and interesting features of specific Lake Superior lighthouses.

- Drawing from research found on the Internet, write a well-organized, informative essay on a lighthouse of choice.

MI Content Standards:

Science: 4-ESS2-1, 4-ESS2-2, 4-ESS3-2 (Earth’s Systems: Processes that Shape the Earth); 3-5-ETS1-1, 3-5-ETS1-2 (Engineering Design)

Social Studies: 4 – H3.0.1, 4 – H3.0.4 (History); 4 – G1.0.1, 4 – G1.0.3, 4 – G2.0.2, 4 – G4.0.1, 4 – G4.0.3 (Geography)

Reading Standards for Informational Text for Grade 4 Students (see 1, 3, 7, 9 and 10)

Writing Standards for Grade 4 Students (see 1, 2, 4, 5, 6, 7 and 10)

Standard 10: Range, Quality, Complexity of Student Reading K-5

Range of Text Types for K-5: Literary Nonfiction and Historical, Scientific, and Technical Texts

Materials:

Classroom computer with projection capability, student access to the Internet and writing technology

Activities:

- Provide an overview of the geological events that created the Great Lakes, emphasizing variations in lakeshores
- Discuss the importance of the Great Lakes for transportation, immigration, shipping and trade
- Discuss the various vessels that sailed the Great Lakes during the time when most lighthouses were built and the dangers the lakes presented to these vessels
- Explain the factors that affect penetration of lighthouse beams out into the lakes
- Discuss the various styles of lighthouses found on the Great Lakes and the relationship between lighthouse style and shoreline setting
- Assign Lake Superior Lighthouses Internet Scavenger Hunts #1 and #2 to individuals or small groups, score and discuss (see enclosed summary table for teacher reference)
- Assign research and written essay on a Lake Superior lighthouse (location, need, style and connection to setting, brief history, interesting features)

Assessment:

- Participation in individual/small-group research
- Participation in discussion
- Research and essay writing

Writing Assignment: Conduct Internet research on a Lake Superior lighthouse of choice. Based upon information from at least two websites, write a well-organized, informative essay that addresses the following:

- The location, setting, and corresponding style of the lighthouse
- The history of the lighthouse
- Features of the lighthouse and its history that you find especially interesting

Optional additional element for the assignment: Print off a map of Lake Superior lighthouses (for example, see: <https://www.miplace.org/4a7298/globalassets/documents/shpo/programs-and-services/michigan-lighthouse-assistance-program/2020-lighthouse-map-web.pdf>) and ask each member of the class to “claim” a different lighthouse for the required essay and, if you choose, a brief presentation to the class. After writing their essays, each member of the class presents a brief (e.g., five

minutes) overview of her/his chosen lighthouse to the class, drawing from at least two visual aids (e.g., photos, video clips, maps, drawings) projected on the classroom screen.

Lesson Content

The Great Lakes have been home to 379 lighthouses, 70 of which are found on Lake Superior. The state of Michigan borders on the three largest Great Lakes. Michigan is home to over 140 lighthouses, more than any other state; 39 of these historic structures are located on the Lake Superior shoreline. Michigan's lighthouses vary in structure and design, depending largely on their location and the nature of the shoreline on which they reside.

Formation of the Great Lakes

A billion years ago, volcanic activity formed a fracture that developed in two forks from the current Lake Superior to the location of the current states of Alabama and Oklahoma. Over the next 20 million years, lava intermittently flowed from the fracture, creating mountains that covered areas now known as northern Wisconsin and Minnesota and eastern Canada that eroded over time. As volcanic activity continued over time, molten magma formed an enormous rock basin that eventually would hold Lake Superior.

The volcanic activity that formed the region was replaced by glaciers, thousands of feet thick in some places, about 14,000 years ago. The ice sheets that flowed over the land leveled mountains and created enormous valleys. In the north, where hard bedrock predominated, only the overlaying layers were removed; the softer shales and sandstone in the south were more significantly affected. The glaciers melted and began receding about 10,000 years ago; they left behind high ridges, between which huge lakes were left behind.

In the northern Great Lakes, the rock was resistant enough to leave rocky shorelines ringed by cliffs. The Bruce Peninsula, across Lake Huron from Alpena, MI, features rugged rocky cliffs and cobble beaches; however, sand beaches and dunes line the indented and protected shoreline on the opposite side of Lake Huron. On the other side of Michigan, the eastern shore of Lake Michigan has some of the finest sandy beaches in the world. The Great Lakes also contain an estimated 35,000 islands.

Importance of the Great Lakes

The Great Lakes contain 20% of the world's surface fresh water. All the lakes' basins are linked, forming a continuous drainage basin, and a series of lakes, rivers, and waterways connect them to the Atlantic Ocean. As a result, the Great Lakes have been a center for migration, transportation, fishing, and trade for thousands of years.

The Iroquois Nation were among the first settlers of the Great Lakes, followed by European explorers. The earliest trade was for fur; eventually, a bustling shipping industry, which reached its height by the late 1800's and early 1900's, moved grain, livestock, iron, coal, lumber, cement, stone, fish, salt, and even Christmas trees throughout the lakes.

Vessels, Dangers, and Lighthouses

For a very long time, the enormous size of the Great Lakes has presented the captains of trading vessels with both opportunities and dangers. With nearly 9,500 miles of coastline, the lakes have enabled shipping to play a significant role in the economics of the Great Lakes region. For example, some of the

nation's largest grain-shipping ports are located on the Great Lakes. Also, the iron ranges near Lake Superior have been the primary source of ore for North America's iron and steel production for more than a century.

Some Lake Superior ports are located in protected bays, while others are situated near rocky shoals, on high cliffs, at the mouths of rivers, or in narrow channels. To reach these ports, vessels often must sail along shorelines whose depth can change dramatically, and vessels often seek shelter in the ports during the violent storms that can suddenly develop on the Lakes. Storms that cross the Great Lakes arise when two air masses collide. As the wind blows across the surface of the lakes, energy is transferred from the wind to the surface of the water, causing currents and waves. Storms can arise unexpectedly, and the resulting waves can be enormous. Ice can also create dangerous conditions, especially if a ship captain miscalculates the depth or firmness of the ice.

Dangers like these have caused over 6,000 shipwrecks in the Great Lakes, with a loss of over 30,000 lives. As a result, some 379 lighthouses have been built at strategic locations to guide Great Lakes mariners, and over 200 of these beacons are still active. Most of the lighthouses were built in the mid-to-late 1800's, when wooden schooners and early steamships were especially susceptible to the dangerous conditions on the lakes (for example, see: <https://www.maritimehistoryofthegreatlakes.ca/documents/hgl/default.asp?ID=c023>).

For a lighthouse to be effective in alerting sailors to dangers, its beam must be visible for a considerable distance out onto the lake; this distance is limited by the curvature of the earth and by the elevation of the lighthouse. So, to be effective, a lighthouse on a high cliff or bluff would not need to be as tall as a lighthouse on the shoreline. Also, a lighthouse is visible farther out on the lake from the deck of a ship than from the surface of the water. For example, a 60-foot-tall structure is visible from a distance of 11 miles, or 16 miles on the deck of a ship; a 90-foot-tall structure is visible from a distance of 12 ½ miles, or 17 ½ miles on the deck of a ship; and a 110-foot-tall structure is visible from a distance of 14 miles, or 19 miles on the deck of a ship.

Great Lakes lighthouses are located along sandy shorelines (e.g., Little Sable Point Lighthouse: <https://www.lighthousefriends.com/light.asp?ID=193>), on rocky cliffs (e.g., Split Rock Lighthouse: <https://northshorevisitor.com/attractions/state-parks/split-rock-lighthouse/>), at the ends of long piers (e.g., Grand Haven Lighthouse: <https://www.lighthousefriends.com/light.asp?ID=189>), on rock reefs or rocky shoals (e.g., Port Austin Light: <https://portaustinarea.com/port-austin-reef-light>), at river mouths (e.g., Cheboygan River Front Range Lighthouse: <https://www.lighthousefriends.com/light.asp?ID=216>), on islands (e.g., Grand Island North Lighthouse: https://marinas.com/view/lighthouse/lraewp_Grand_Island_North_Channel_Light_Lighthouse_Munising_MI_United_States), and on points of land (e.g., Whitefish Point Light Station: <https://www.michigan.org/property/great-lakes-shipwreck-museum-whitefish-point-light-station>).

A person standing anywhere in Michigan is within 85 miles of one of the Great Lakes. Michigan has over 3,200 miles of shoreline, more than any other state except Alaska, and the most freshwater shoreline in the world; over 140 lighthouses, more than any other state, have been built along its shores.

Michigan lighthouse dwellings and towers were designed in a variety of styles. While some lighthouses were designed with their own individual styles, others fell within one of several style categories: *Schoolhouse*: Sand Point Lighthouse - <https://www.us-lighthouses.com/sand-point-lighthouse>
Norman Gothic: White River Light Station - <https://www.splka.org/whiteriver.html>

Conical: Tawas Point Lighthouse - <https://www.lighthousefriends.com/light.asp?ID=175>
Skeletal: Whitefish Point Light Station - <https://stignace.com/attractions/great-lakes-shipwreck-museum-whitefish-point-light-station/>
Pyramidal: Manistique East Breakwater Lighthouse - <https://www.us-lighthouses.com/manistique-east-breakwater-lighthouse>
Square: Forty Mile Point Lighthouse - <https://40milepointlighthouse.org/>
Round: Point Betsie Lighthouse - <https://www.us-lighthouses.com/point-betsie-lighthouse>
Even “sparkplug” style: Harbor Beach Lighthouse - <https://www.us-lighthouses.com/harbor-beach-lighthouse>

For context, project the map of Michigan Lighthouses:

<https://www.miplace.org/4a1b40/globalassets/documents/shpo/programs-and-services/michigan-lighthouse-assistance-program/2020-lighthouse-map-web.pdf>

Scroll through the list of Lake Superior lighthouses. Ask students if they have visited any of them; do an Internet search of lighthouses noted and project photos. Ask students if they are interested in any of the other Lake Superior lighthouses; search and project photos of these.

Additional resource: Although portions are quite technical in nature, you might consider showing and discussing all or parts of the National Geographic Channel’s documentary *Drain the Great Lakes*:

<https://www.youtube.com/watch?v=VAo4qvP6o2E>

References

Environmental Education for Kids: <https://www.eekwi.org/great-lakes/great-lakes-formation-and-physical-features/how-were-great-lakes-formed>

U.S. Army Corps of Engineers: <https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Coastal-Program/Coastal-Processes/>

Wisconsin Sea Grant: <https://www.seagrant.wisc.edu/resources/the-formation-of-the-great-lakes/how-they-were-made/>

Awesome Mitten: <https://www.awesomemitten.com/how-the-great-lakes-were-formed/>

EOS – Science News by Advancing Earth and Space Science: <https://eos.org/articles/long-live-the-laurentian-great-lakes>

Maritime History of the Great Lakes:

<https://www.maritimehistoryofthegreatlakes.ca/documents/hgl/default.asp?ID=c023>

Bruce Peninsula Biosphere Association: <http://www.bpba.ca/bpcsp/uploads/CH3Shore140518.pdf>

Minnesota Historical Society:

<https://www.mnhs.org/places/nationalregister/shipwrecks/mpdf/craft.php>

A Century of Light – Captain Edward Hermann:

<http://www.lighthouseiscovery.com/Sailing%20the%20gl.html>

Great Lakes Shipwreck Museum: <https://www.shipwreckmuseum.com/underwater-research/shipwrecks/>

Michigan Economic Development Corporation:

<https://www.miplace.org/4a7298/globalassets/documents/shpo/programs-and-services/michigan-lighthouse-assistance-program/2020-lighthouse-map-web.pdf>

Seeing the Light (Terry Pepper): <http://www.terrypepper.com/lights/lists/visibility.htm>

Selected Lake Superior Lighthouses

Name, Date	Location	Setting	Style	Notes
Point Iroquois 1870	Southern shore of Whitefish Bay, at the entrance to the St. Mary's River and the Soo Locks	On a small, sandy bluff overlooking the beach	Dwelling, conical brick tower	Marks one of the busiest shipping lanes in the world; the point once included a school for the children of the lighthouse keepers and local fisherman; museum, gift shop
Whitefish Point 1849	Tip of Whitefish Point, at the northwest edge of Whitefish Bay	Beach	Dwelling, iron skeletal tower	One of the first lighthouses on Lake Superior; marks the entrance to Whitefish Bay and its shelter from the fury of Lake Superior; critical turning point for all ships entering and leaving Lake Superior; the lighthouse and former Coast Guard buildings form one of the best maritime and lighthouse museums on the Great Lakes; gift shop
Crisp Point 1904	14 mi. west of Whitefish Point	Beach	Conical brick tower	Significantly restored in recent years; boulders placed in front of the lighthouse help to control erosion; very remote but once the site of a United States Lifesaving Service

				station; visitor center
Au Sable Point 1874	31 mi. east of Munising in Pictured Rocks National Lakeshore	Wooded, sandy shoreline	Dwelling, conical brick tower	Managed by the National Park Service; shipwreck remains occasionally wash ashore near the lighthouse; very scenic area
Grand Island East Channel 1868	Southeast shore of Grand Island, near Munising	Sandy island shoreline	Schoolhouse-style, integral wooden tower	Recently restored after nearly collapsing into ruins, but retains its rustic appearance; best viewed from tour boats
Grand Island North 1867	North side of Grand Island, near Munising	High atop island sandstone cliff	Schoolhouse-style brick dwelling, integral brick tower	Now a private residence after significant restoration, with access strictly limited; best viewed from the air
Munising Range Front, Range Rear 1908	West end of Munising Bay	Front range light near shoreline, rear range light on inland hillside	Both white conical cast iron towers	Replaced Grand Island East Channel Lighthouse in 1908; dwelling currently used by National Park Service; other buildings on site
Marquette Harbor 1866	Just north of Marquette downtown waterfront	Sits atop a massive rock	Schoolhouse-style with adjoining square tower	Active Coast Guard station that guides vessels in/out of harbor; nearby local maritime museum and gift shop
Stannard's Rock 1882	44 mi. north of Marquette	On dangerous reef 25 mi. off coast of the Upper Peninsula	Conical tower and attached building made of granite blocks	Active lighthouse where water depth goes from 30 in. to 546 ft. in a space of less

				than two mi.; nicknamed “the loneliest place in the world” and sometimes referred to as “Sailor’s Graveyard”
Big Bay Point 1896	25 mi. northwest of Marquette	Atop a bluff 100 ft. over a rocky point	Schoolhouse-style with square integral brick tower	The only operational lighthouse with a bed and breakfast
Sand Point 1878	Just north of Baraga	At southern end of L’Anse Bay	Schoolhouse-style brick dwelling, integral square brick tower	In 1898, the lighthouse was raised and moved back 200 ft. due to shoreline erosion
Keweenaw Waterway 1950	In McLean State Park, west of Calumet	On the east pierhead of the lower entrance to the Portage Ship Canal; arrowhead breakwaters protect the waterway’s entrance	Octagonal steel and concrete tower	Marks the entrance to a channel that cuts through the Keweenaw Peninsula, connecting Keweenaw Bay to Lake Superior; operated by the Coast Guard
Copper Harbor 1866	East point of Copper Harbor on the Keweenaw Peninsula, in Fort Wilkins Historic State Park	Rocky shoreline	Schoolhouse-style brick dwelling and tower	Currently houses a maritime museum; original 1949 detached dwelling still stands nearby
Eagle Harbor 1871	West end of Eagle Harbor, 16 mi. west of Copper Harbor	Rocky shoreline	Octagonal brick tower and attached brick Norman Gothic-style dwelling	Active lighthouse; nautical and historical museum in the lighthouse and surrounding buildings; two wooden residences near the lighthouse were floated across the bay from a Coast

				Guard Station when it closed to provide housing for assistant lighthouse keepers
Rock of Ages 1909	4.5 mi. off west end of Isle Royale, 18 mi. from mainland	Sits atop a small rock (150 ft. at longest point); part of Isle Royale National Park	Steel, masonry, and concrete conical bottle-shaped tower	130 ft. tall; active; one of the most remote lighthouses on the Great Lakes – early keepers had to sail 54 mi. to the nearest town (Thunder Bay, Ont.) for mail and supplies
Passage Island 1882	On the southwest end of Passage Island, 3.25 mi. northeast of Isle Royale on the northeast side of Isle Royale National Park	On a stone ridge at the edge of a sheer rock wall along the shoreline of a heavily forested island	Octagonal rough stone tower and attached Norman Gothic-style dwelling	The most northerly U.S. lighthouse on the Great Lakes; active light that marks the treacherous passage between Passage Island and Isle Royale for vessels heading into or out of Thunder Bay; wooden fog signal building and inclined steel tramway and winch house for unloading supplies still stand
Ontonagon 1866	West shore of the mouth of the Ontonagon River	Flat shoreline	Schoolhouse-style brick dwelling with attached square brick tower	Was moved back from shore as the land filled in with sediment dropped from waves off the lake; furnished with period furnishings from the early 1900's

Lake Superior Lighthouses Internet Scavenger Hunt #1

Directions: Using information found in Internet searches, match each Lake Superior lighthouse with its corresponding description.

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| _____ 1. Located in a very scenic area of Pictured Rocks National Lakeshore, managed by the National Park Service | A. Rock of Ages |
| _____ 2. Made of granite blocks, located on a dangerous reef 25 miles off the coast of the Upper Peninsula and nicknamed “the loneliest place in the world” | B. Copper Harbor |
| _____ 3. Schoolhouse-style brick dwelling with attached square brick tower that was moved back from shore as the land filled in with sediment dropped from waves off the lake | C. Grand Island North |
| _____ 4. Sits atop a small rock 4.5 miles off the west end of Isle Royale, 130 feet tall and one of the most remote lighthouses on the Great Lakes | D. Big Bay Point |
| _____ 5. Marks the entrance to a channel that cuts through the Keweenaw Peninsula, connecting Keweenaw Bay to Lake Superior | E. Stannard’s Rock |
| _____ 6. Sits high atop a sandstone cliff, a private residence that is best viewed from the air | F. Au Sable Point |
| _____ 7. Marks one of the busiest shipping lanes in the world at the entrance to the St. Mary’s River and the Soo Locks | G. Ontonagon |
| _____ 8. The only operational lighthouse with a bed and breakfast | H. Point Iroquois |
| _____ 9. Schoolhouse-style brick dwelling and tower that currently houses a maritime museum, with the original 1949 detached dwelling still standing nearby | I. Keweenaw Waterway |

Answer Key:

1. F
2. E
3. G
4. A
5. I
6. C
7. H
8. D
9. B

Lake Superior Lighthouses Internet Scavenger Hunt #2

Directions: Using information found in Internet searches, match each Lake Superior lighthouse with its corresponding description.

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| _____ 1. Significantly restored in recent years, very remote but once the site of a United States Lifesaving Service station | A. Whitefish Point |
| _____ 2. The most northerly U.S. lighthouse on the Great Lakes | B. Eagle Harbor |
| _____ 3. One of the first lighthouses on Lake Superior, marks a critical turning point for all ships entering and leaving Lake Superior | C. Marquette Harbor |
| _____ 4. Schoolhouse-style dwelling with integral wooden tower, recently restored after nearly collapsing into ruins | D. Passage Island |
| _____ 5. Octagonal brick tower and attached brick Norman Gothic-style dwelling, an active lighthouse with a nautical and historical museum in the lighthouse and surrounding buildings | E. Sand Point |
| _____ 6. Replaced the Grand Island East Channel lighthouse in 1908 | F. Grand Island East Channel |
| _____ 7. At the southern end of L'Anse Bay, in 1898 the lighthouse was raised and moved back 200 feet due to shoreline erosion | G. Crisp Point |
| _____ 8. An active Coast Guard station with a schoolhouse-style dwelling and attached tower that sits atop a massive rock | H. Munising Range Front, Range Rear |

Answer Key:

1. G
2. D
3. A
4. F
5. B
6. H
7. E
8. C

Note to teachers: SPLKA welcomes your feedback on this lesson plan. Please send any comments and suggestions for improvement to Cherie Hockenberger at the following address:

SPLKAofficemanager@gmail.com. Thanks!