



Photos Courtesy of the Sable Points Lighthouse Keepers Association

## Lake Huron 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 Huron 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 Huron.
- 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 Huron 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 Huron 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 Huron 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 Huron 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 Huron 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 Huron. The state of Michigan borders on the three largest Great Lakes. Michigan is home to over 140 lighthouses, more than any other state; 31 of these historic structures are located on the Lake Huron 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 Huron ports are located in protected bays, while others are situated near rocky shoals, at the mouths of rivers, or on points of land. 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](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 Huron 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 Huron 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 Huron Lighthouses

Name, Date	Location	Setting	Style	Notes
Fort Gratiot 1825	At the mouth of the treacherous St. Clair River, near the Bluewater Bridge in Port Huron	Sandy shoreline	Conical brick tower	Michigan's first lighthouse; tower rebuilt in 1829 and 1861; keeper's dwelling and fog whistle house remain; on an active Coast Guard facility
Port Sanilac 1886	Port Sanilac	Wooded shoreline	Dwelling, eight-sided brick tower	Active aid to navigation; private residence
Harbor Beach 1885	Harbor Beach	Far out on massive breakwater	"Sparkplug"-style	Created to protect the largest man-made fresh-water harbor in the world; abandoned lifesaving station, dormitory and boathouse remain
Pointe Aux Barques 1847	Lighthouse County Park at Huron City (tip of Michigan's Thumb)	Shoreline, at edge of rocky cliff	Dwelling, conical brick tower	Guides ships into Saginaw Bay; campground and museum
Port Austin Reef 1878	2 ½ mi. off the tip of Michigan's Thumb	Built on dangerous rock reef	Integral square brick tower	Visible from shore; unusual octagonal base; part of Thumb Area Bottomland Preserve for divers
Tawas Point 1853	Tawas Point State Park	Tip of hook-shaped peninsula	Integral conical brick tower	One of the most beautiful spots on the Lake Huron shore; active Coast Guard facility
Sturgeon Point 1870	Tip of Sturgeon Point, 5 mi. north of Harrisville	Sandy shoreline	Dwelling, conical brick tower	Contains original 3 ½ -Order Fresnel lens; owned by the Coast Guard;

				maritime museum, gift shop
Old Presque Isle 1840	South point of Presque Isle, between Alpena and Rogers City	Sandy shoreline	Schoolhouse-style; bottom of tower is conical and made of stone, upper part is round and made of brick	Presque Isle means “nearly an island”; charming keeper’s cottage is now a museum
New Presque Isle 1870	1 mi. north of “Old” light in Lighthouse Park	Wooded shoreline	Dwelling, conical brick tower	Contains original Third-Order Fresnel lens; museum, gift shop
Middle Island Light Station 1905	10 mi. north of Alpena, 4 mi. offshore	Island, rocky shoreline	Conical brick tower	Name: halfway between Thunder Bay and Presque Isle; island offered harbor of refuge from surrounding shallow shoals; two large buildings and other smaller buildings on former Coast Guard facility; overnight accommodations in keeper’s house
Forty Mile Point 1896	6 mi. north of Rogers City in Presque Isle Lighthouse Park, near P.H. Hoelt State Park	Beach	Integral square brick duplex	Fog whistle building nearby; half-buried shipwreck just west of lighthouse
Spectacle Reef 1874	12 mi. northeast of Cordwood Point, 11 mi. east of Straits of Mackinac	On shallow rocky offshore reef	Conical limestone tower	One of most difficult lighthouses to build on the Great Lakes; marks dangerous shoal at bottleneck of Great Lakes vessel traffic

Poe Reef 1929	2 ½ mi. northwest of Cordwood Point	On shallow rock reef	Integral square concrete and steel dwelling/tower	Marks a dangerous point where vessel traffic must squeeze into a narrow passage; uniquely painted in black and white
Cheboygan River Front Range 1880	West bank of Cheboygan River in Cheboygan	Shoreline of riverbank	Wooden dwelling, integral square tower	Remains an active aid to navigation and open to the public while under renovation; served as primary Coast Guard station for northern Lake Huron and the Straits of Mackinac until the mid-1980's; gift shop
Old Mackinac Point 1892	Mackinaw City, at the foot of the Mackinac Bridge	Rocky shoreline	Unique brick dwelling and integral round tower	Retired in 1957, replaced by lights on Mackinac Bridge; museum and shipwreck museum; fog signal building
Round Island 1896	NW tip of Round Island near Mackinac Island	At end of sandy point on NW shore of Round Island in the Hiawatha National Forest	Brick dwelling, integral square brick tower	Restored after being one of the most endangered lights on the Great Lakes; featured in 1982 movie <i>Somewhere in Time</i>
Martin Reef 1927	8 ½ mi. south of Port Dolomite	On a shallow rocky reef	Square concrete and steel tower	Located at a dangerous, busy waterway connecting the Straits of Mackinac with the St. Mary's River
De Tour Reef 1931	Mouth of the St. Mary's River	On a rock reef	Square concrete and steel tower	Located at easternmost point of Michigan's

				Upper Peninsula; foghorn is one of the few operational diaphone foghorns at a U.S. lighthouse
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### Lake Huron Lighthouses Internet Scavenger Hunt #1

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

- |   |                       |
|---|-----------------------|
| _____ 1. Active Coast Guard facility at the tip of a hook-shaped peninsula  | A. Harbor Beach       |
| _____ 2. One of the most difficult lighthouses to build on the Great Lakes  | B. Round Island       |
| _____ 3. Contains one of the few remaining operational diaphone foghorns on the Great Lakes   | C. De Tour Reef       |
| _____ 4. Located far out on a massive breakwater, created to protect the largest man-made fresh-water harbor in the world             | D. Old Mackinac Point |
| _____ 5. Includes two large buildings and other smaller buildings on a former Coast Guard facility, provides overnight accommodations | E. Tawas Point        |
| _____ 6. Unique brick building and integral round brick tower; site includes a museum, shipwreck museum, and fog signal building      | F. Poe Reef           |
| _____ 7. Marks a dangerous point where vessel traffic must squeeze into a narrow passage  | G. Sturgeon Point     |
| _____ 8. Featured in the 1982 film <i>Somewhere in Time</i>   | H. Middle Island      |
| _____ 9. Still contains its original 3 ½-Order Fresnel lens   | I. Spectacle Reef     |

Answer Key:

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

## Lake Huron Lighthouses Internet Scavenger Hunt #2

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

- |   |                                |
|---|--------------------------------|
| _____ 1. Charming keeper's dwelling is now a museum, located between Alpena and Rogers City                                 | A. Port Austin Reef            |
| _____ 2. Served as the primary Coast Guard station for northern Lake Huron and the Straits of Mackinac until the mid-1980's | B. Fort Gratiot                |
| _____ 3. Includes a dwelling and eight-sided brick tower  | C. Forty Mile Point            |
| _____ 4. Part of the Thumb Area Bottomland Preserve for divers  | D. Old Presque Isle            |
| _____ 5. Guides ships into Saginaw Bay  | E. Martin Reef                 |
| _____ 6. Half-buried shipwreck just west of this lighthouse   | F. Cheboygan River Front Range |
| _____ 7. Located at a dangerous, busy waterway connecting the Straits of Mackinac with the St Mary's River                  | G. Fort Sanilac                |
| _____ 8. Michigan's first lighthouse, located at the mouth of the treacherous St. Clair River                               | H. Pointe Aux Barques          |

Answer Key:

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

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](mailto:SPLKAofficemanager@gmail.com). Thanks!