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 overlying 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/Iraewp_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
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
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/
Minnesota Historical Society: https://www.mnhs.org/places/nationalregister/shipwrecks/mpdf/craft.php
A Century of Light – Captain Edward Hermann: https://www.lighthousefriends.com/Sailing%20the%20gl.html
Great Lakes Shipwreck Museum: https://www.shipwreckmuseum.com/underwater-research/shipwrecks/
Seeing the Light (Terry Pepper): http://www.terrypepper.com/ligths/lists/visibility.htm
<table>
<thead>
<tr>
<th>Name, Date</th>
<th>Location</th>
<th>Setting</th>
<th>Style</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Gratiot</td>
<td>At the mouth of the treacherous St. Clair River, near the Bluewater Bridge in Port Huron</td>
<td>Sandy shoreline</td>
<td>Conical brick tower</td>
<td>Michigan’s first lighthouse; tower rebuilt in 1829 and 1861; keeper’s dwelling and fog whistle house remain; on an active Coast Guard facility</td>
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<tr>
<td>1825</td>
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<tr>
<td>Port Sanilac</td>
<td>Port Sanilac</td>
<td>Wooded shoreline</td>
<td>Dwelling, eight-sided brick tower</td>
<td>Active aid to navigation; private residence</td>
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<td>1886</td>
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<tr>
<td>Harbor Beach</td>
<td>Harbor Beach</td>
<td>Far out on massive breakwater</td>
<td>“Sparkplug”-style tower</td>
<td>Created to protect the largest man-made fresh-water harbor in the world; abandoned lifesaving station, dormitory and boathouse remain</td>
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<td>1885</td>
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<tr>
<td>Pointe Aux Barques</td>
<td>Lighthouse County Park at Huron City (tip of Michigan’s Thumb)</td>
<td>Shoreline, at edge of rocky cliff</td>
<td>Dwelling, conical brick tower</td>
<td>Guides ships into Saginaw Bay; campground and museum</td>
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<td>1847</td>
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<tr>
<td>Port Austin Reef</td>
<td>2 ½ mi. off the tip of Michigan’s Thumb</td>
<td>Built on dangerous rock reef</td>
<td>Integral square brick tower</td>
<td>Visible from shore; unusual octagonal base; part of Thumb Area Bottomland Preserve for divers</td>
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<tr>
<td>1878</td>
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<tr>
<td>Tawas Point</td>
<td>Tawas Point State Park</td>
<td>Tip of hook-shaped peninsula</td>
<td>Integral conical brick tower</td>
<td>One of the most beautiful spots on the Lake Huron shore; active Coast Guard facility</td>
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<td>1853</td>
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<tr>
<td>Sturgeon Point</td>
<td>Tip of Sturgeon Point, 5 mi. north of Harrisville</td>
<td>Sandy shoreline</td>
<td>Dwelling, conical brick tower</td>
<td>Contains original 3 ½ -Order Fresnel lens; owned by the Coast Guard;</td>
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<tr>
<td>1870</td>
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<tr>
<td>Light Station</td>
<td>Location Details</td>
<td>Scenery</td>
<td>Description</td>
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<tr>
<td>Old Presque Isle 1840</td>
<td>South point of Presque Isle, between Alpena and Rogers City</td>
<td>Sandy shoreline</td>
<td>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.</td>
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<tr>
<td>New Presque Isle 1870</td>
<td>1 mi. north of “Old” light in Lighthouse Park</td>
<td>Wooded shoreline</td>
<td>Dwelling, conical brick tower. Contains original Third-Order Fresnel lens; museum, gift shop.</td>
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</tr>
<tr>
<td>Middle Island Light Station 1905</td>
<td>10 mi. north of Alpena, 4 mi. offshore</td>
<td>Island, rocky shoreline</td>
<td>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.</td>
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</tr>
<tr>
<td>Forty Mile Point 1896</td>
<td>6 mi. north of Rogers City in Presque Isle Lighthouse Park, near P.H. Hoeft State Park</td>
<td>Beach</td>
<td>Integral square brick duplex. Fog whistle building nearby; half-buried shipwreck just west of lighthouse.</td>
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<tr>
<td>Spectacle Reef 1874</td>
<td>12 mi. northeast of Cordwood Point, 11 mi. east of Straits of Mackinac</td>
<td>On shallow rocky offshore reef</td>
<td>Conical limestone tower. One of most difficult lighthouses to build on the Great Lakes; marks dangerous shoal at bottleneck of Great Lakes vessel traffic.</td>
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<tr>
<td>Reef/Range</td>
<td>Location</td>
<td>Landmark Details</td>
<td>Description</td>
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<tr>
<td>Poe Reef 1929</td>
<td>2 ½ mi. northwest of Cordwood Point</td>
<td>On shallow rock reef</td>
<td>Marks a dangerous point where vessel traffic must squeeze into a narrow passage; uniquely painted in black and white</td>
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<tr>
<td>Cheboygan River Front Range 1880</td>
<td>West bank of Cheboygan River in Cheboygan</td>
<td>Shoreline of riverbank</td>
<td>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</td>
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<tr>
<td>Old Mackinac Point 1892</td>
<td>Mackinaw City, at the foot of the Mackinac Bridge</td>
<td>Rocky shoreline</td>
<td>Retired in 1957, replaced by lights on Mackinac Bridge; museum and shipwreck museum; fog signal building</td>
<td></td>
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<tr>
<td>Round Island 1896</td>
<td>NW tip of Round Island near Mackinac Island</td>
<td>At end of sandy point on NW shore of Round Island in the Hiawatha National Forest</td>
<td>Restored after being one of the most endangered lights on the Great Lakes; featured in 1982 movie <em>Somewhere in Time</em></td>
<td></td>
</tr>
<tr>
<td>Martin Reef 1927</td>
<td>8 ½ mi. south of Port Dolomite</td>
<td>On a shallow rocky reef</td>
<td>Located at a dangerous, busy waterway connecting the Straits of Mackinac with the St. Mary’s River</td>
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<tr>
<td>De Tour Reef 1931</td>
<td>Mouth of the St. Mary’s River</td>
<td>On a rock reef</td>
<td>Located at easternmost point of Michigan’s</td>
<td></td>
</tr>
</tbody>
</table>
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 *Somewhere in Time*  
   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
   B. Fort Gratiot

_____ 2. Served as the primary Coast Guard station for northern Lake Huron and the Straits of Mackinac until the mid-1980’s  
   C. Forty Mile Point
   D. Old Presque Isle

_____ 3. Includes a dwelling and eight-sided brick tower  
   E. Martin Reef
   F. Cheboygan River Front Range

_____ 4. Part of the Thumb Area Bottomland Preserve for divers  
   G. Fort Sanilac

_____ 5. Guides ships into Saginaw Bay  
   H. Pointe Aux Barques

_____ 6. Half-buried shipwreck just west of this lighthouse  
   I. Cheboygan River Front Range

_____ 7. Located at a dangerous, busy waterway connecting the Straits of Mackinac with the St Mary’s River  
   J. Fort Sanilac

_____ 8. Michigan’s first lighthouse, located at the mouth of the treacherous St. Clair River  
   K. Cheboygan River Front Range

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. Thanks!