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.

Photos Courtesy of the Sable Points Lighthouse Keepers Association
• 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
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/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
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
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
Great Lakes Shipwreck Museum: https://www.shipwreckmuseum.com/underwater-research/shipwrecks/
Seeing the Light (Terry Pepper): http://www.terrypepper.com/lights/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>Point Iroquois</td>
<td>Southern shore of Whitefish Bay, at the entrance to the St. Mary’s River and the Soo Locks</td>
<td>On a small, sandy bluff overlooking the beach</td>
<td>Dwelling, conical brick tower</td>
<td>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 fishermen; museum, gift shop</td>
</tr>
<tr>
<td>1870</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whitefish Point</td>
<td>Tip of Whitefish Point, at the northwest edge of Whitefish Bay</td>
<td>Beach</td>
<td>Dwelling, iron skeletal tower</td>
<td>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</td>
</tr>
<tr>
<td>1849</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisp Point</td>
<td>14 mi. west of Whitefish Point</td>
<td>Beach</td>
<td>Conical brick tower</td>
<td>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</td>
</tr>
<tr>
<td>1904</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Description</td>
<td>Features</td>
<td>Additional Information</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Au Sable Point 1874</td>
<td>31 mi. east of Munising in Pictured Rocks National Lakeshore</td>
<td>Wooded, sandy shoreline, Dwelling, conical brick tower</td>
<td>Managed by the National Park Service; shipwreck remains occasionally wash ashore near the lighthouse; very scenic area</td>
<td></td>
</tr>
<tr>
<td>Grand Island East Channel 1868</td>
<td>Southeast shore of Grand Island, near Munising</td>
<td>Sandy island shoreline, Schoolhouse-style integral wooden tower</td>
<td>Recently restored after nearly collapsing into ruins, but retains its rustic appearance; best viewed from tour boats</td>
<td></td>
</tr>
<tr>
<td>Grand Island North 1867</td>
<td>North side of Grand Island, near Munising</td>
<td>High atop island sandstone cliff, Schoolhouse-style brick dwelling, integral brick tower</td>
<td>Now a private residence after significant restoration, with access strictly limited; best viewed from the air</td>
<td></td>
</tr>
<tr>
<td>Munising Range Front, Range Rear 1908</td>
<td>West end of Munising Bay</td>
<td>Front range light near shoreline, rear range light on inland hillside, Both white conical cast iron towers</td>
<td>Replaced Grand Island East Channel Lighthouse in 1908; dwelling currently used by National Park Service; other buildings on site</td>
<td></td>
</tr>
<tr>
<td>Marquette Harbor 1866</td>
<td>Just north of Marquette downtown waterfront</td>
<td>Sits atop a massive rock, Schoolhouse-style with adjoining square tower</td>
<td>Active Coast Guard station that guides vessels in/out of harbor; nearby local maritime museum and gift shop</td>
<td></td>
</tr>
<tr>
<td>Stannard’s Rock 1882</td>
<td>44 mi. north of Marquette</td>
<td>On dangerous reef 25 mi. off coast of the Upper Peninsula, Conical tower and attached building made of granite blocks</td>
<td>Active lighthouse where water depth goes from 30 in. to 546 ft. in a space of less</td>
<td></td>
</tr>
</tbody>
</table>
than two mi.; nicknamed “the loneliest place in the world” and sometimes referred to as “Sailor’s Graveyard”

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance from Marquette</th>
<th>Location Details</th>
<th>Lighthouse Details</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Bay Point</td>
<td>25 mi. northwest of Marquette</td>
<td>Atop a bluff 100 ft. over a rocky point</td>
<td>Schoolhouse-style with square integral brick tower</td>
<td>The only operational lighthouse with a bed and breakfast</td>
</tr>
<tr>
<td>Sand Point</td>
<td>Just north of Baraga</td>
<td>At southern end of L’Anse Bay</td>
<td>Schoolhouse-style brick dwelling, integral square brick tower</td>
<td>In 1898, the lighthouse was raised and moved back 200 ft. due to shoreline erosion</td>
</tr>
<tr>
<td>Keweenaw Waterway</td>
<td>In McLean State Park, west of Calumet</td>
<td>On the east pierhead of the lower entrance to the Portage Ship Canal; arrowhead breakwaters protect the waterway’s entrance</td>
<td>Octagonal steel and concrete tower</td>
<td>Marks the entrance to a channel that cuts through the Keweenaw Peninsula, connecting Keweenaw Bay to Lake Superior; operated by the Coast Guard</td>
</tr>
<tr>
<td>Copper Harbor</td>
<td>East point of Copper Harbor on the Keweenaw Peninsula, in Fort Wilkins Historic State Park</td>
<td>Rocky shoreline</td>
<td>Schoolhouse-style brick dwelling and tower</td>
<td>Currently houses a maritime museum; original 1949 detached dwelling still stands nearby</td>
</tr>
<tr>
<td>Eagle Harbor</td>
<td>West end of Eagle Harbor, 16 mi. west of Copper Harbor</td>
<td>Rocky shoreline</td>
<td>Octagonal brick tower and attached brick Norman Gothic-style dwelling</td>
<td>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</td>
</tr>
<tr>
<td>Lighthouse</td>
<td>Location</td>
<td>Description</td>
<td>Features</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
<td>-------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Rock of Ages</td>
<td>1909</td>
<td>4.5 mi. off west end of Isle Royale, 18 mi. from mainland</td>
<td>Sits atop a small rock (150 ft. at longest point); part of Isle Royale National Park</td>
<td>Steel, masonry, and concrete conical bottle-shaped tower</td>
</tr>
<tr>
<td>Passage Island</td>
<td>1882</td>
<td>On the southwest end of Passage Island, 3.25 mi. northeast of Isle Royale on the northeast side of Isle Royale National Park</td>
<td>On a stone ridge at the edge of a sheer rock wall along the shoreline of a heavily forested island</td>
<td>Octagonal rough stone tower and attached Norman Gothic-style dwelling</td>
</tr>
<tr>
<td>Ontonagon</td>
<td>1866</td>
<td>West shore of the mouth of the Ontonagon River</td>
<td>Flat shoreline</td>
<td>Schoolhouse-style brick dwelling with attached square brick tower</td>
</tr>
</tbody>
</table>

Guard Station when it closed to provide housing for assistant lighthouse keepers

Rock of Ages 1909

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

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

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
B. Copper Harbor

_____ 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”

C. Grand Island North
D. Big Bay Point

_____ 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

E. Stannard’s Rock
F. Au Sable Point

_____ 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

G. Ontonagon

_____ 5. Marks the entrance to a channel that cuts through the Keweenaw Peninsula, connecting Keweenaw Bay to Lake Superior

H. Point Iroquois
I. Keweenaw Waterway

_____ 6. Sits high atop a sandstone cliff, a private residence that is best viewed from the air

_____ 7. Marks one of the busiest shipping lanes in the world at the entrance to the St. Mary’s River and the Soo Locks

_____ 8. The only operational lighthouse with a bed and breakfast

_____ 9. Schoolhouse-style brick dwelling and tower that currently houses a maritime museum, with the original 1949 detached dwelling still standing nearby

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.

_____ 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!