



Learning on the Great Lakes Seaway Trail

One of America's Byways

Lesson #5

Subject: History - Lighthouses

Grades: 4-6th

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Anticipatory Set:

Ask the students what is the purpose of a lighthouse. Where are lighthouses located? Are there any lighthouses that still exist today?

New York State Standards:

Standard 1.1, 1.2 - History of the United States and New York

Objective:

Students will be able to identify the different lighthouses along the New York Seaway Trail by reconstructing a model of a lighthouse and writing an essay about the history of the lighthouse.

Purpose:

The students will understand how important lighthouses were in navigation along the Lakes Ontario and Erie and the Niagara and St. Lawrence Rivers.

Summary:

Along the Seaway Trail you find a number of historical lighthouses that extend 454 miles in length. They follow four major waterways in upstate New York; they include Lake Erie, the Niagara River, Lake Ontario and the St. Lawrence River. Along the shores of the Seaway Trail you will see more than twenty lighthouses. Each lighthouse was built with their own kind of uniqueness and history. They were either built out of stone or wood and have several kinds of architectural styles like Gothic Revival or Shingle style.

Since the time of the American Revolution the Lakes Erie and Ontario had become prime transportation routes for the nation. The building of the lighthouses along the Seaway Trail went hand-in hand with our nation's economic growth. There were enormous shipments of grain, lumber and coal heading eastward as finished goods headed west. By the early nineteenth century, the Great Lakes had become the most important single transportation system in the United States. In the year 1825 the Erie Canal opened and 1855 the shipping canal at Sault Ste. Marie was completed and linked Lake Superior with the lower part of the Great Lakes. Soon large quantities of iron ore and copper were shipped to factories in the east. By the Civil War, the Great Lakes system moved the nation's economy in natural resources and agricultural products from America's heartland and moved manufactured goods from the industrialized Northeast.

Lighthouses were built to either mark the entry to a river or harbor, or to warn the ships of dangerous points, shoals, islands, or reefs. About two-thirds of the lighthouses on the Seaway Trail were built at harbor or river entrances and the others were to mark any dangerous locations along the waterways. The Lighthouse Service used these and the



Learning on the Great Lakes Seaway Trail

One of America's Byways

other lighthouse to help protect ships from the dangers along the waterways and protect them from any loss of lives and fortunes caused in shipwrecks. In 1789, the Congress of the United States recognized the importance of lighting of the shores, making the construction and maintenance of the lighthouses a federal responsibility. Presidents Washington, Adams, and Jefferson personally oversaw the early lighthouses, but as the governing of the country became more complicated, the duty was handed over to the Secretary of the Treasury.

In 1820 the lighthouses became the responsibility of the Fifth Auditor of the Treasury, Stephen Pleasonton, who was very frugal. By 1851 the lighthouses were found to be technologically behind those in Europe, where the European lighthouses used superior lens since 1822. An in-depth investigation was done and the Lighthouse Service was revamped and the Lighthouse Board was established. Within the next ten years the lighthouses were updated with Fresnel lens imported from Paris, France. The board also set up stringent professional standards for the lighthouse keepers to follow. This brought the lighthouses up to date and they became well managed. Between 1910 and 1939 the Bureau of Lighthouses, who was run by civilians, had the lighthouses converted to electricity. They also had developed and installed radio beacons, electric buoys and fog signals. In 1939 the United States Coast Guard took on the responsibility for all aids to navigation, including lighthouses. Since then the Coast Guard has made technological improvements such as advanced radio techniques and solar powered beacons.

Development of the lighthouse lantern:

Over the centuries the lighthouse tower's lantern has undergone a number of changes. The first light source was probably a bonfire built on top of a hillside. As the towers were built the wood fire was placed on top of the tower, but the fires needed frequent tending and it depleted nearby forests. Coal was used because it burned brighter, but it also blacked the reflectors quickly and could not be enclosed. The earliest oil lamps were used up into the late 1700's. The oil emitted harsh fumes, which would burn the keepers' eyes and nostrils.

In 1781, Ami Argand, a Swiss scientist, invented a lamp with a hollow wick allowing oxygen to flow freely, producing a bright and smokeless flame. In 1810 Winslow Lewis convinced the government to use his adaptation of the Argand lamp and parabolic reflector in all the nation's lighthouses. A few years later, Augustin Fresnel, a French physicist, invented a lens system, which resembled an enormous hollow beehive around a single lamp. The light was refracted by prisms at the top and bottom of the lens, creating a single sheet of light, which was then magnified many times by a powerful magnifying glass. This produced a beam of light that could be seen several miles away.

The first type of oil used in the United States was whale oil. Sperm whale oil was used most because it burned evenly and brightly. As the price of whale oil rose the Lighthouse Board tried several different types of fuel. They tried fuels like colza oil, lard oil, kerosene, gasoline, natural gas, fish oil, olive oil and even porpoise oil. Using the different fuels kept the lighthouse keepers busy. They had to keep the oil reservoirs full, trim the wicks and keep them lit. They had to keep the lantern free from smoke and the Argand reflectors and the Fresnel lens had to be kept absolutely clean.



Learning on the Great Lakes Seaway Trail *One of America's Byways*

The first American lighthouse to use electricity was the Statue of Liberty in 1886. Electricity came slowly to the other lighthouses; many of them had to use generators since they had no power lines. By the 1930's, most of the lighthouses had been converted to electricity. Jobs as lighthouse keepers soon became eliminated. The use of timer switches and multiple bulb holders further the reduction of lighthouse keeper's jobs. Today the lighthouses are either electrically, battery or solar powered. Photovoltaic cells within the solar mechanism generate energy, which keep the batteries charged twenty-four hours a day. The lifestyle once known to a lighthouse keeper where the whole family was involved has changed to a job of keeping the lights on that only requires a routine check every spring and fall.

Lighthouses of the Seaway Trail:

Old Fort Niagara Lighthouse, Youngstown, New York (1781, 1823, 1872-public)

The first unofficial lighthouse on the Great Lakes was built in 1781 at the mouth of the Niagara River at Fort Niagara in Youngstown, New York. With the increase in military and commercial traffic precipitated by the American Revolution, the need for a navigational aid at the river's mouth became evident.

Galoo Island, Off Henderson Harbor, New York (1820,1867)(private)

The lighthouse is located on the outer edge of a group of islands and shoals that guard Sackets Harbor and the entry to the St. Lawrence River. The island's first light was established in 1820; with the present lighthouse erected in 1867. The conical stone tower is 60 feet high with an attached one and one half story keeper's dwelling. Both are built out of gray limestone quarried on the island. A square, iron oil house and steam fog signal house stand nearby.

Stony Point, Henderson Harbor, New York (1830, 1869)(private)

Immediately east of Galoo and Stony Islands lies Stony Point peninsula. The Stony Point Lighthouse was erected in 1869 consisting of a 73-foot square tower with an attached keeper's dwelling. This lighthouse replaced an 1830 lighthouse whose foundation still remains. The lighthouse was removed from service in 1945.

Horse Island Lighthouse, Sackets Harbor, New York (1870) (private)

Horse Island lies at the entrance to Sackets Harbor, the nation's most important shipbuilding center during the War of 1812. During the war, one third of the United States Army and a quarter of the Navy were stationed at Sackets Harbor. Horse Island served as the British staging area during the second Battle at Sackets Harbor on May 29, 1813. Successfully defended by the first U.S. Light Dragoons under Col. Electus Backus and the militia under Gen. Jacob Brown, Sackets continued to serve a critical role until the war's end. The first American Great Lakes steamship, *Ontario*, was constructed at the Sackets Harbor shipworks. Sackets Harbor served as a principal shipping point for the region's lumber, agricultural and manufacturing industries. The Horse Island lighthouse was erected in 1870. Similar to Stony Point's architectural style with a square tower and an attached keeper's dwelling the Horse Island lighthouse was constructed of native brick



Learning on the Great Lakes Seaway Trail

One of America's Byways

and since been painted. The structure and the 28-acre island on which it stands are now privately owned.

Tibbetts Point Lighthouse, Cape Vincent, New York (1827,1854) (public)

Tibbetts Point Lighthouse marks the entrance into the St. Lawrence River. The three-acre lighthouse site was deeded to the U.S. Government, which erected a lighthouse in 1827. The lighthouse was fueled by whale oil until the construction of the present tower in 1854. The conical lighthouse tower (64 feet high of white stucco) contained a 50 candlepower oil lamp of fixed beam and was equipped with a fourth order Fresnel lens. Later on the oil lamps were replaced with a 500-watt, 1500 candlepower light with the lens remaining. The steam-operated fog whistle was added in 1896. In 1927, it was replaced by an air diaphone powered by a diesel engine with the blasts automatically timed. The whistle and air diaphone were replaced by a radio beacon which guides ships into the river. The lighthouse complex consists of the tower, a two-story residence, steam fog signal building, a one-story brick building housing two air compressors, and an iron oil house. The tower, a State Historical Site, is still an active light maintained by the Coast Guard.

Other Lighthouses along the Seaway Trail:

1. Barcelona Lighthouse, Barcelona, New York (1829) (private)
2. Dunkirk Light Station, Dunkirk, New York (1826,1875) (private)
3. Buffalo Main Light, Buffalo, New York (1818, 1933) (public) (Buffalo Intake Crib Light, Grand Island Lighthouse, North Breakwater South End Light, Horseshoe Reef Light, South Buffalo South Side Light)
4. Thirty Mile Point Lighthouse, Barker, New York (1875) (public)
5. Braddock Point Lighthouse, Hilton, New York (1896) (private)
6. Charlotte-Genesee Lighthouse, Rochester, New York (1822, 1863) (public)
7. Old Sodus Lighthouse, Sodus Point, New York (1825, 1870-71) (public)
8. Oswego West Pierhead Lighthouse, Oswego, New York (1822, 1836, 1934) (private)
9. Selkirk Lighthouse, Port Ontario, New York (1838) (private)
10. East Charity Shoal Lighthouse, Off Cape Vincent, New York (Rebuilt on Lake Ontario, 1929)
11. Rock Island Lighthouse, Off Fisher's Landing, New York (1847, 1882) (public)
12. Sunken Rock Lighthouse, Off Alexandria Bay, New York (1847) (private)
13. Sisters Island Lighthouse, Off Chippewa, New York (1870) (private)
14. Crossover Island Lighthouse, Off Chippewa Bay, New York (1848, 1882) (private)
15. Ogdensburg Harbor Lighthouse, Ogdensburg, New York (1834, 1900) (private)
16. Land Lighthouse, Erie, Pennsylvania, (1818, 1867)
17. Presque Isle Light Station, Erie, Pennsylvania, (1872)

Materials:

1. Materials to construct a lighthouse. Example: wood, Popsicle sticks, small stones, milk carton, clay etc.



Learning on the Great Lakes Seaway Trail

One of America's Byways

2. A map of the Seaway Trail for each student. Also need a large map to use with the class.

Teach:

1. Explain the importance of a lighthouse. Give the history of the lighthouse lantern. Talk about how the job of the lighthouse keeper often involved the whole family.
2. Show a large map of the Seaway Trail and mark where most of the lighthouses were located. Point out that the lighthouses were either at an entrance of a waterway or at an area where reefs and rocks were a danger to ships passing.
3. Give each student a lighthouse to research. Instruct the students that they are to create a model of the lighthouse. You give the students the dimensions you want the lighthouse to be. Give the minimum and maximum height, length and width.
4. Have the students also write an essay about the history of the lighthouse.
 - a. When the lighthouse was built.
 - b. List the type of materials were used.
 - c. List the type of architecture styles the lighthouse had.
 - d. State whether the light is still in operation today.
 - e. List any important information about the area the lighthouse was built.
 - f. Use the map and mark the location of the lighthouse.
5. Give the students opportunities to research their lighthouse.
6. Have the students prepare an oral report about their lighthouse.

Guided Practice:

The teacher will assist the students in finding information about the lighthouses using books and the Internet for research.

Closure:

Ask the students what was the role of a lighthouse in navigation on the Seaway Trail. Ask the students what improvements have been made to the lighthouse.

Independent Practice:

Complete the model and write the essay on assigned lighthouse.

Extended Activities:

1. Take the students on a field trip to a public lighthouse in the area. If there is not one try to find a local museum that may have information on lighthouses. See if the students could display their lighthouses at a local museum.
2. Have the students create a board game about lighthouses. The playing pieces could be ships trying to go from St. Lawrence River to Buffalo. Have the ship pieces move along from one lighthouse to another with obstacles along the way like a storm or a shoreline with rocks.
3. Have students research other famous lighthouses in North America.
4. Have the students write a story or a journal about being a sailor on a ship seeing the lighthouses along the way. The story could be about how the lighthouse saved the ship during a storm. Or the story could be about a lighthouse keeper working on keeping the light lit for ships.



Learning on the Great Lakes Seaway Trail

One of America's Byways

Web sites:

1. <http://www.rudyalicelighthouse.net/index.htm>
The web site is set up listing the lighthouses by regions. The site gives you a map where you click on the lighthouse and you can get a great summary and pictures. The site is great for students and teachers to use.
2. http://www.uscg.mil/hq/g-cp/history/h_lhindex.html
The web site gives great detail on how lighthouses have developed. The site also has a lesson plan for teachers for k-4 grades. The lesson gives great detail on how the lantern was developed for the lighthouse. This is a great site for teachers to go to find information.
3. <http://www.cr.nps.gov/maritime/light/ny.htm>
The web site gives photos and an outline of information on each lighthouse. This site is great for students to go to find all the information for the essay.
4. <http://www.ipl.org/div/light/Geoidx.html>
The site lists the lighthouses in the Great Lakes. Go to the section for Lake Ontario and click on the lighthouse. You get a picture and a brief summary about the lighthouse. The web site is great for the students and the teacher to go to for information.
5. <http://www.geocities/Heartland/Meadows/3702/jefflights2.html>
The web site is a site that gives you pictures and information on several lighthouses in Jefferson County.
6. <http://www.us-lighthouses.com/displaysstate.php?stateID=1>
The web site has great pictures of the lighthouses and has a very brief summary of the lighthouse.
7. <http://www.welovelighthouses.com/lighthouses.htm>
The web site gives you great photos and a brief summary of the lighthouses in New York.

Resources:

1. "Seaway Trail Lighthouses, 4th Edition", James Tinney, Mary Burdette-Watkins, Seaway Trail Foundation, Inc., 2003, ISBN 0943689058
2. "Lighthouses of the United States 2nd Edition", Peter D. Bachelder, Robert Hartnett, Hartnett House Publishing, April 2001, ISBN 1888216220
3. "Keep the Lights Burning Abbie Study Guide, Rebecca Gilleland, Progeny Press, Sept. 1993, ISBN 1586091123 (Study guide to go with book #3 on children's list.)
4. "The Lighthouse Encyclopedia: The Definitive Reference", Ray Jones, Globe Pequot Press, Dec 2003, ISBN 0762727357
5. "The Golden Age of American Lighthouses: A Nostalgic Look at U.S. Lights From 1850-1939", Tim Harrison, Ray Jones, Globe Pequot Press, June 2002, ISBN 0762712767
6. "Guardians of the Lights: Stories of US Lighthouse Keepers", Elinor De Wire, Aug 1998, ISBN 1561641197



Learning on the Great Lakes Seaway Trail

One of America's Byways

Books for Children:

1. "Eastern Great Lakes Lighthouses: Ontario, Erie, and Huron" Bruce Roberts, Ray Jones, Chelsea House Pub. Dec 1999, ASIN 079105487x, (young adult)
2. "The Girls of Lighthouse Lane #1: Katherine's Story", Thomas Kinkade, Harper Collins, March 2004, ISBN 0060543418 (ages 9-12)
3. "Keep the Lights Burning Abbie", Peter and Connie Roop, Carolrhoda Books, 1985, ISBN 0876142757
4. "Birdie's Lighthouse", Deborah Hopkinson, Kimberly Bulcken Root, Aladdin Paperbacks, June 2000, ISBN 0689835299 (ages 4-8)
5. "Beacons of Light: Lighthouses", Gail Gibbons, HarperCollins Publishers, March 1990, ISBN 0688073794, (ages 4-8)
6. "Easy-To-Make Lighthouse (Models and Toys)", Edmund V. Gillon, Dover Publications, Jan 1992, ISBN 0486269434 (ages 9-12)