Lighthouses Traveling Trunk

Cape Lookout National Seashore

How to Use This Trunk:

This traveling trunk is designed to be used in the classroom to introduce students to lighthouses. It is intended to be used for grades 3 through 6. The activities in this book are designed to fulfill some of the goals of the North Carolina Standard Course of Study. In the back of this book is a curriculum index that shows which goals of the Standard Course of Study each of the activities will fulfill.

The first section in this book contains background information for teachers to use in order to introduce the subject to students. It is followed by activities that can be done with the students in class. The materials needed for these activities are located in the trunk. The final section of this book contains student activity pages. These can be photocopied and given to the students to work on in class or at home. Please keep all of the originals in the book.

You will find an inventory page inside the trunk. Please be sure that everything is back in the trunk before returning it to the National Park Service.

Please complete the evaluation form contained in this trunk if you have any comments or suggestions for the Cape Lookout National Seashore Traveling Trunk Program. You can also feel free to contact the park's interpretive division at:

Cape Lookout National Seashore
131 Charles Street
Harkers Island NC 28531
252-728-2250

LIGHTHOUSES TRAVELING TRUNK

I. Lighthouses ----------3
- A. The First Lighthouses ----------3
- B. Lights ----------4
- C. The life of a Light Keeper ----------5
- D. The Cape Lookout Lighthouse ----------8
- E. Other Lighthouses of the North Carolina ----------9
  - Cape Hatteras Lighthouse ----------9
  - Bodie Island Lighthouse ----------10
  - Currituck Beach Lighthouse ----------10
  - Ocracoke Lighthouse ----------10
  - Bald Head Lighthouse ----------10
  - Oak Island Lighthouse ---------- 11
  - Price's Creek Lighthouse ---------- 11

II. Lighthouse Activities ----------12
- A. Activity 1: Why a Lighthouse on the Coast? ----------13
- B. Activity 2: A Variety of Lighthouses ----------14
- C. Activity 3: Lighthouse Locations ----------17
- D. Activity 4: Lighthouse Stories ---------- 20
- E. Activity 5: Lighthouse Poetry ---------- 21
- F. Activity 6: A Lighthouse Keeper's Diary ---------- 24
- G. Activity 7: The Lighthouse Keeper's Uniform ---------- 25
- H. Activity 8: Build your own Light ---------- 26
- I. Activity 9: How Tall are Lighthouses? ---------- 28
- J. Activity 10: Life at a Lighthouse ---------- 30
- K. Activity 11: A U.S. Lighthouse Tour ---------- 32

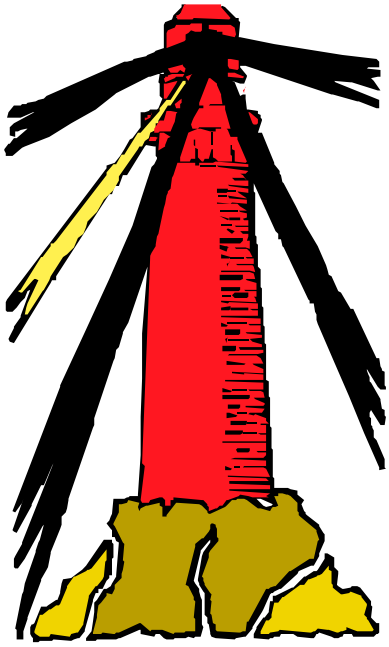
III. Student Activity Pages ---------- 44
- A. Lighthouse Word Search ---------- 45
- B. Lighthouse Quiz ---------- 46

IV. Glossary ---------- 48

V. Resources ---------- 49

VI. Curriculum Index ---------- 50

LIGHTHOUSES



In the days before radar and other modern technology, navigators on ships depended on the beacons of lighthouses to guide them along the Atlantic, Pacific, and Great Lakes coastlines. Dedicated and courageous lighthouse keepers kept the lights operating through all weather conditions. The United States Lighthouse Service was an outstanding organization of the U.S. Government that maintained over 600 lighthouses throughout its history.

On the Outer Banks, lighthouses and their keepers provided an invaluable service assisting with navigation through the "Graveyard of the Atlantic." This area's fierce storms and dangerous **shoals** made for some difficult navigation.

This traveling trunk will teach students about an important aspect of maritime history on the Outer Banks.

THE FIRST LIGHTHOUSES

The first lighthouse in the United States was the Boston Light in Boston Harbor, which began operation in 1716. Until 1789, lighthouses in North Carolina were authorized by the State Legislature. During the Colonial period, each state was responsible for its own lighthouses. After America became a nation, the federal government assumed control of lighthouses. One of George Washington's first acts as President was to authorize the construction of lighthouses along the coast of the 13 original states.

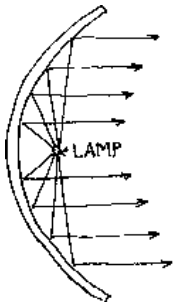
Lighthouses were built in places where ships pass close to land. They were used to warn passing ships of dangerous conditions, as well as to assist in

navigation. Each lighthouse along the North Carolina coast has a different flash pattern and different exterior markings, or **daymarks**. This is so navigators can keep track of where they are both day and night. The U.S. Lighthouse Service operated these lighthouses until 1939, when it joined the U.S. Coast Guard.

LIGHTS

The lights used to illuminate lighthouses have changed quite a bit through the years. The earliest lighthouses were simply wood fires built on hilltops. The fires were later elevated on towers and became known as lighthouses. As the wood around the lighthouses was consumed, alternate fuels were needed. Eventually coal and oils were used for illumination.

Fires were eventually replaced by candles. Reflectors were used to make the light brighter. In the early 1800's early reflectors were replaced by parabolic reflectors, which had the ability to reflect light in straight lines from a fixed point. Parabolic reflectors were used in Europe as far back as 1761, but didn't become popular in America until about 1812.

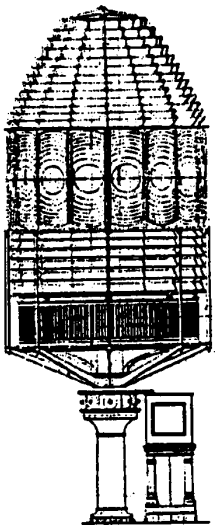


Parabolic reflector

Later, lamps were invented that burned oils from whales, porpoises, fish, olives, and animal fat. Oil from sperm whales was a favored lighthouse fuel. These oils were eventually replaced by **kerosene** in the late 1870's. Oil was getting more expensive as more whales were depleted.

The development of the **Argand** lamp was an improvement over earlier lights. The Argand lamp used hollow wicks. Oxygen passed through the center and around the outside of the wick through a glass chimney. This resulted in an intense, bright flame with little smoke.

Fresnel lens



In 1822, the Fresnel lens (pronounced "franel") was invented by Auguste' Fresnel, a French scientist. His breakthrough design used prisms to direct the beam to the center, or eye, of the lens. The lens was made of hundreds of pieces of specially cut glass with a magnifying glass in the middle. There were seven orders of Fresnel lenses. A first order lens, like the original one in the Cape Lookout lighthouse, was large enough for a person to stand inside of. Fresnel lenses are still used today.

Early lights were rotated by a devise called a **clockworks**. A falling weight would be dropped down a **drop tube** that extended from the light room to the bottom of the tower. The keeper would crank the weight to the top of the drop tube and let it slowly fall, rotating the lamp and reflectors.

By the 1920's, lighthouse beacons had changed to electric lights. The Statue of Liberty was the first lighthouse in the United States to use electricity.

THE LIFE OF A LIGHT KEEPER

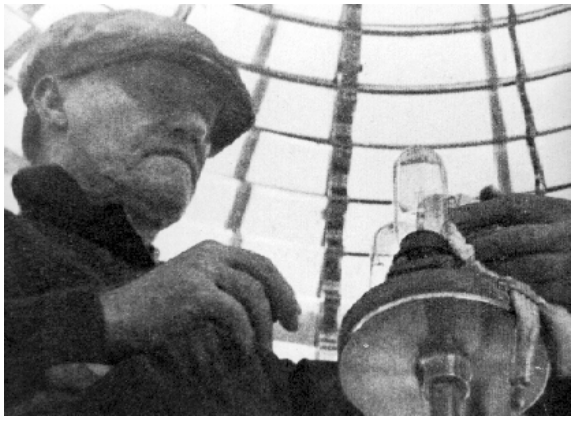
The people who maintained the lighthouses were called keepers. Lighthouse keepers were male and female, young and old. The most important part of the keeper's duties was to keep the light operating according to the daily schedule. At Cape Lookout, the light operated from about 4 p.m. until a little after dawn. During a storm like a hurricane or a "nor'easter," the light had to be kept in operation 24 hours a day until the storm was over.

The keeper began his day by dressing in the official uniform of the Lighthouse Service. This uniform consisted of blue pants, vest, suit jacket, and hat. The uniform had

to be worn at all times while on duty. If a keeper was found wearing the uniform improperly, he could be fined or even fired.

Once the keeper was dressed, he headed out to the **oil shed**. In the shed, which was usually near the lighthouse, he filled one or two five-gallon containers of oil and carried them up to the light. If the lighthouse was small, this could be an easy job, but in lighthouses like Cape Lookout it would require climbing over 200 stairs.

Upon reaching the top of the lighthouse, the lamp inside the lens had to be filled with oil. Once the lamp was filled, the keeper lit the wick. There was a clock-like mechanism that needed to be wound in order to turn the lamp. The keeper could then continue with the other duties of his shift.



It was important that the lens be kept as clean as possible. If the lens became dirty, the beam could not be seen by passing ships. This could easily cause a wreck. Keepers could be fired for not keeping their lenses clean. T he keeper polished and cleaned the lens and brass fittings of the lamp during each shift.

The keeper also had to monitor how much oil was being used in the lamps. One container of oil might not be enough to last an entire shift. If the oil ran low, the keeper had to climb back down to the shed and return with more.

The keeper's job involved more than just keeping the light clean and lit. It also involved keeping the outside windows clear in all weather; rain, snow, sleet, and ice. That meant going outside on the walk in high winds and clearing off the windows. Captains and pilots of ships depended on the light's being visible in all weather, particularly during storms.

Lighthouse keepers were responsible for routine maintenance and repairs of the lighthouse and any other buildings. They also kept records, wrote reports, ordered supplies, and greeted visitors and inspectors.

Many keepers were able to have their families with them at the lighthouse. They lived in quarters that were connected to the lighthouse or located nearby. Their lives were very different from ours. They had no radio, television, computers, or other conveniences that we have today. It was usually very isolated at a lighthouse, often times many miles from the mainland. Lighthouse families were often dependent on boats to bring them supplies. They had to place orders in catalogs for books, clothes, and other daily items.

Food was often grown in gardens, and animals were kept to provide eggs, milk, and meat. Some lighthouses were on rocky shores where it was impossible to have gardens, and food had to be shipped.

Keeping the light operating was the most important part of a keeper's job and sometimes required the help of the entire family. There were many women keepers that worked at lighthouses. They did the same job as the male keepers, although they were not required to wear the uniform. Charlotte Mason was a light keeper at Cape Lookout.

Charlotte Mason

In many cases, women took over for their husbands or fathers. One of the most famous women light keepers was Abbie Burgess. Abbie grew up at a lighthouse with her family. While her father was on the mainland and her mother was ill, Abbie had to keep the light going, even through serious storms. She went on to spend the rest of her life working in lighthouses. She spent 38 years of her life working at White Head Station in Maine, where she and her husband raised four children. After her husband passed away, Abbie took over his job as the light keeper and continued to work until her death in 1892.

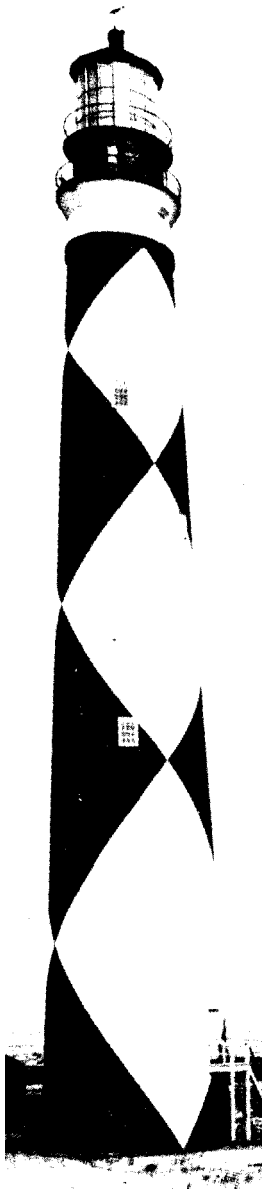
As more modern technology came about, lighthouses became automated and keepers were no longer needed. If you visit a lighthouse today, try to

imagine what it was like to work there one hundred years ago. Lighthouse keepers are an important part of our maritime history.

THE CAPE LOOKOUT LIGHTHOUSE

The lighthouses of the United States have played an important role in America's maritime history, and Cape Lookout was a big part of that history. Storms, dangerous currents, and changing shoals led to thousands of shipwrecks and gave Cape Lookout's coast the nickname "Graveyard of the Atlantic." The low-lying shoals off Cape Lookout were the reason for the construction of the Cape Lookout lighthouses.

In 1804, Congress authorized construction of a lighthouse at Cape Lookout. The first lighthouse was completed in 1812, at the cost of $20,578.54. It was a brick tower inside a wood frame building. The boarded exterior was shingled and painted with red and white horizontal stripes.



Mariners, however, found that the tower was too short and the beacon unreliable. Lieutenant H.J. Hartene, commanding a mail steamer, stated in 1851 that "*...the lights at Hatteras, Lookout, and Cape Florida, if not improved had better be dispensed with as the navigator is apt to run ashore looking for them.*" Compounded with the problem of an inadequate light was the keeper's continuing battle with sand piling up around the lighthouse, making entry into the tower difficult.

The original lighthouse used a system of parabolic reflectors and 13 Argand oil burning lamps. This system was used until 1856 when a first order **Fresnel lens** was installed. This new lens displayed a beacon that could be seen from 18 miles away in good weather.

In 1852, the establishment of the United States Lighthouse Service led to improvement in all lighthouse operations around the United States. For Cape Lookout, this would mean a new, higher tower. Construction of the second lighthouse began in 1857, and on November 1, 1859, the lighthouse began operating.

The new lighthouse erected at Cape Lookout became the prototype of all ocean lighthouses erected on the Outer Banks.

During the Civil War, retreating Confederate forces attempted to blow up the lighthouse and render it inoperable. The blast damaged some stairs and the light. In 1863, the lighthouse underwent repairs to correct the damage. The first order Fresnel lens was replaced with a smaller, third order lens. Four years later, the original first order lens was repaired and reinstalled.

The tower was painted with its distinctive black and white "diagonal checkerboard" pattern in 1873. A new keeper's quarters was constructed at the same time.

In 1933, the Cape Lookout lighthouse was electrified. An incandescent oil vapor light was installed, making the light visible from 19 miles away. In 1972, the first order Fresnel lens was removed and replaced with two airport beacons with 1000 watt lights. Each lamp produces a beam of 800,000 candlepower, visible in good weather from a distance of 20 miles. The original Fresnel lens was put in storage in Portsmouth Virginia until the early 1990's when it was put back into use in Block Island Lighthouse Southeast in Rhode Island.

OTHER LIGHTHOUSES OF NORTH CAROLINA

Cape Hatteras Lighthouse:

Towering 196 feet above the sand, Cape Hatteras Lighthouse is the tallest in the United States. It was completed in 1870. Its distinctive daymark, two black and white stripes that spiral around the tower 1 $\frac{1}{2}$ times, was applied in 1873. The Cape Hatteras light signal is provided by a duplex airport beacon that rotates every 15 seconds, giving a flash every 7 1/2 seconds.

The Cape Hatteras Lighthouse was relocated during the summer of 1999. It was moved almost 3,000 feet inland due to shoreline erosion.

Bodie Island Lighthouse:

This was the third lighthouse to be built on Bodie Island (pronounced "body"). The original lighthouse on Bodie Island was constructed in 1847. This was rebuilt in 1859, and destroyed by Confederate troops during the Civil War. The present tower, which began to operate in 1872, is 150 feet high. It has a daymark of broad, alternating black and white bands. The Bodie Island light signal is 5 seconds on, 5 seconds off, 5 seconds on, and 22.5 seconds off.

Currituck Beach Lighthouse:

This lighthouse was constructed from 1874 to 1875. It lit the last dark spot on the Carolina coast between the Cape Henry Lighthouse in Virginia and Bodie Island. The red brick lighthouse rises 158 feet above sea level. Unlike many other lighthouses that received distinctive day marks, Currituck was never painted. Its light signal is 5 seconds on and 15 seconds off. There is a Fresnel lens still working in the lighthouse that is activated from dawn to dusk.

Ocracoke Lighthouse:

Constructed in 1823, this lighthouse is the oldest still operating on the North Carolina coast. The 76 foot high tower is located in the community of Ocracoke. This harbor light is painted white. Unlike other lighthouses that are much higher, this small lighthouse was built for navigators to locate Ocracoke Inlet. It contains a Fresnel lens that displays a constant light that does not rotate or flash.

Bald Head Lighthouse:

The oldest lighthouse in North Carolina, Bald Head Lighthouse was constructed in 1817. It is 90 feet high, and is one of three towers built on Bald Head Island. Its beacon guided ships into the mouth of the Lower Cape Fear River until it was replaced by Oak Island Lighthouse. Unlike other lighthouses, "Old Baldy" is octagonal in shape. It was built of brick and the exterior was plastered to provide the tower with an off-white daymark. The

lighthouse underwent exterior and interior rehabilitation in the early 1990's. It is no longer a working lighthouse.

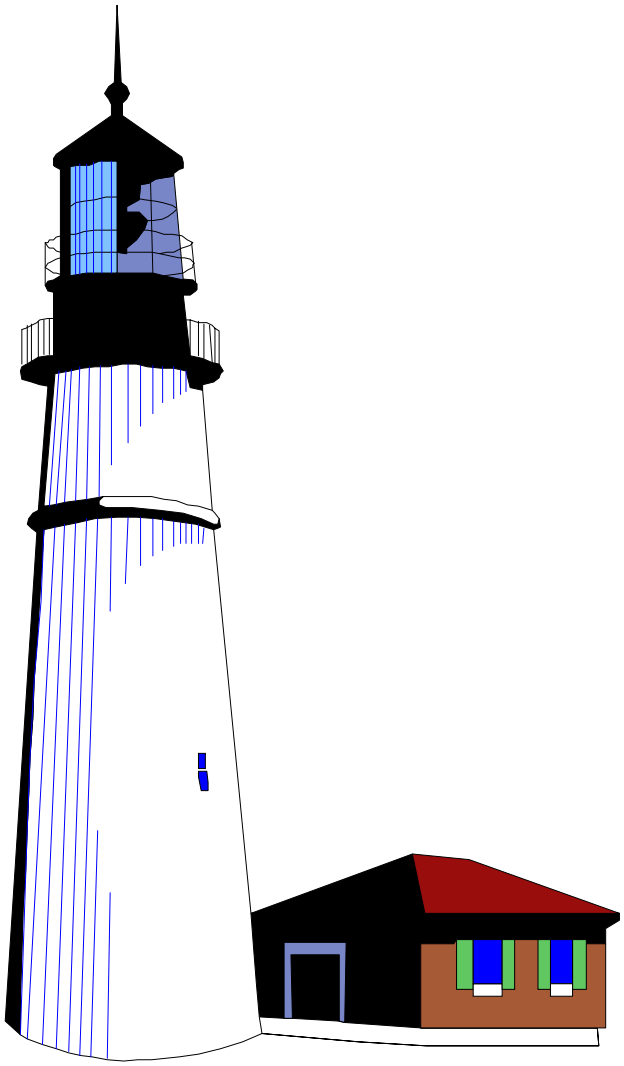
Oak Island Lighthouse:

This lighthouse went into service on May 15, 1958. The beacon in the tower is the second strongest in the world. Four flashes occur at 1 second intervals followed by 6 seconds of darkness. The light produces so much heat that workers have to wear protective clothing when working in the beacon room. The tower rises 169 feet above the water. Its daymark is black on top, white in the middle, and gray at the bottom. Unlike many lighthouses that have painted daymarks, the Oak Island Lighthouse daymarks were mixed into the cement finish.

Price's Creek Lighthouse:

This lighthouse was built in the late 1840's to help vessels navigate along the mouth of the Cape Fear River. The abandoned tower sits on the west bank of the river near Price's Creek. It was only 20 feet high, made of hard brick in a circular shape with an iron lantern on top containing 6 lights. During the Civil War, Price's Creek Lighthouse served as a Confederate signal station. Before surrendering to Union forces, the Confederates made the light inoperable. After the war, it was never repaired.

LIGHTHOUSE ACTIVITIES



Here are some activities that can be done in the classroom. Some of the activities will use the materials in the trunk, while some can be done without.

ACTIVITY 1: WHY A LIGHTHOUSE ON THE COAST?

OBJECTIVES: Students will learn why it was important to have lighthouses along the North Carolina coast.

BACKGROUND: Over a century ago, mariners travelling along the Atlantic coast encountered dangerous shoals and treacherous storms. Their guides were the beacons of light produced by lighthouses, which helped them to navigate the perilous coastline. For ships traveling along the North Carolina Coast, eight lighthouse beacons were constructed to guide them through an area known as the "Graveyard of the Atlantic." Hundreds of shipwrecks occurred due to the dangers of this area.

MATERIALS:

Ghost Fleet map (in trunk)

PROCEDURE:

1. Show the Ghost Fleet map to the class and discuss why it was so treacherous to navigate the North Carolina coast.

2. Ask the class the following questions:

- What do you think happened to these ships?
- Why did this happen?
- If there would have been a lighthouse nearby, would this have happened?
- Do shipwrecks still occur today?
- Do you think that lighthouses are still used as navigational aids today?
- What other aids to navigation are used today?

ACTIVITY 2: A VARIETY OF LIGHTHOUSES

OBJECTIVES: Students will learn about the different types of lighthouses and why they have different day marks and flash patterns.

BACKGROUND: Lighthouses come in all different shapes, colors, and sizes. Everything about a lighthouse helps a sailor identify it. At night, sailors can identify a lighthouse by its flash pattern. How often does it flash? Does it beam without flashing? What color is the light?

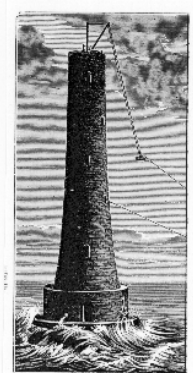
During the day, sailors can recognize a lighthouse from its daymark. How tall is it? Is it round or square? What color is it? Is it painted in an unusual way?

Tall lighthouses are normally built on low, flat beaches so that they can be seen from very far away. Most of the lighthouses along the North Carolina coast are very tall. It is often hard to see the shoreline of low barrier islands like the Core Banks where Cape Lookout Lighthouse is located. The original lighthouse at cape Lookout was 96 feet tall, and sailors complained that they could not see it.

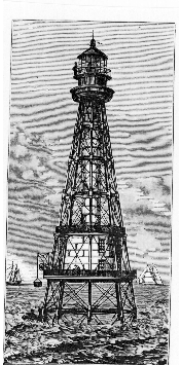
Lighthouses built on rocky cliffs can be much shorter. It is easier to see a light that is up on a high point.

Listed below are some different styles of lighthouses:

Masonry Lighthouse: This is very solid lighthouse made of brick or stone. The Cape Lookout Lighthouse is a masonry lighthouse.



Caisson Lighthouse: A caisson lighthouse is one that is built on a large concrete block or cylinder which is sunk into the ocean floor.



Screwpile Lighthouse: This style of lighthouse stands in the water on iron legs which are screwed to the ocean floor.

Housetop Lighthouse: This is a house with a light tower rising from its roof.

Skeleton Lighthouse: This style of lighthouse is made of a metal framework that lets the wind pass through.

Light ship: A light ship is a ship with a light tower attached to it. They are anchored in areas where it may be too difficult to build a lighthouse.

MATERIALS:

Guardians of the Night Video (in trunk)
Pictures of lighthouses
Paper and pencils
Colored pencils, markers, or crayons
Flashlights (in trunk)
Alarm Clocks (in trunk)

PROCEDURE:

1. Show the students the "Guardians of the Night" video.

2. Discuss with the students the different types of lighthouses. Show the students the pictures of the different types of lighthouses and talk about day marks and flash patterns.

3. Have the students design their own lighthouses. You can give them each a sheet of paper and some markers, crayons, or colored pencils. Have them think about daymarks and flash patterns. Have them think about the function of the lighthouse. Will it need to be tall or short? Where will it be located? Display the drawings on the wall and discuss the different styles of lighthouses created.

4. Divide the students up into 2 groups. Give one group a flashlight and an alarm clock. Give both groups a copy of the list of flash patterns found on the following page. Turn out the lights in the classroom. Have the group with the flashlight pick a lighthouse from the list and try to imitate its flash pattern by blinking the light. The other group should try to figure out which lighthouse is being imitated. For example, the Cape Lookout Lighthouse has a flash pattern of one flash every 15 seconds. The students will blink the light once and then wait 15 seconds and blink it again. The other group should be able to use their flash patterns chart to figure out which lighthouse it is. They can use the alarm clock to time the blinks. Have different students try using the flashlight and interpreting the signals. You may want to find additional flashlights so that the students can read their flash patterns page in the dark.

FLASH PATTERNS OF OUTER BANKS LIGHTHOUSES:

Cape Lookout Lighthouse: One flash every15 seconds

Cape Hatteras Lighthouse: One flash every 7 ½ seconds

Bodie Island Lighthouse: 5 seconds on, 5 seconds off, 5 seconds on, 22.5 seconds off

Currituck Beach Lighthouse: 5 seconds on, 15 seconds off

Ocracoke Lighthouse: Constant light; no rotation or blinking

ACTIVITY 3: LIGHTHOUSE LOCATIONS

OBJECTIVE: Students will learn the locations of North Carolina lighthouses, and become familiar with Outer Banks geology.

BACKGROUND: In the past, sailors navigating along the North Carolina coast encountered dangerous shoals and treacherous storms. Their guides were the lighthouses placed approximately every 40 miles down the coast.

MATERIALS:

Copies of the unmarked map on the following page
List of Outer Banks Lighthouses and map locations provided below
North Carolina Map
Pencils

PROCEDURE:

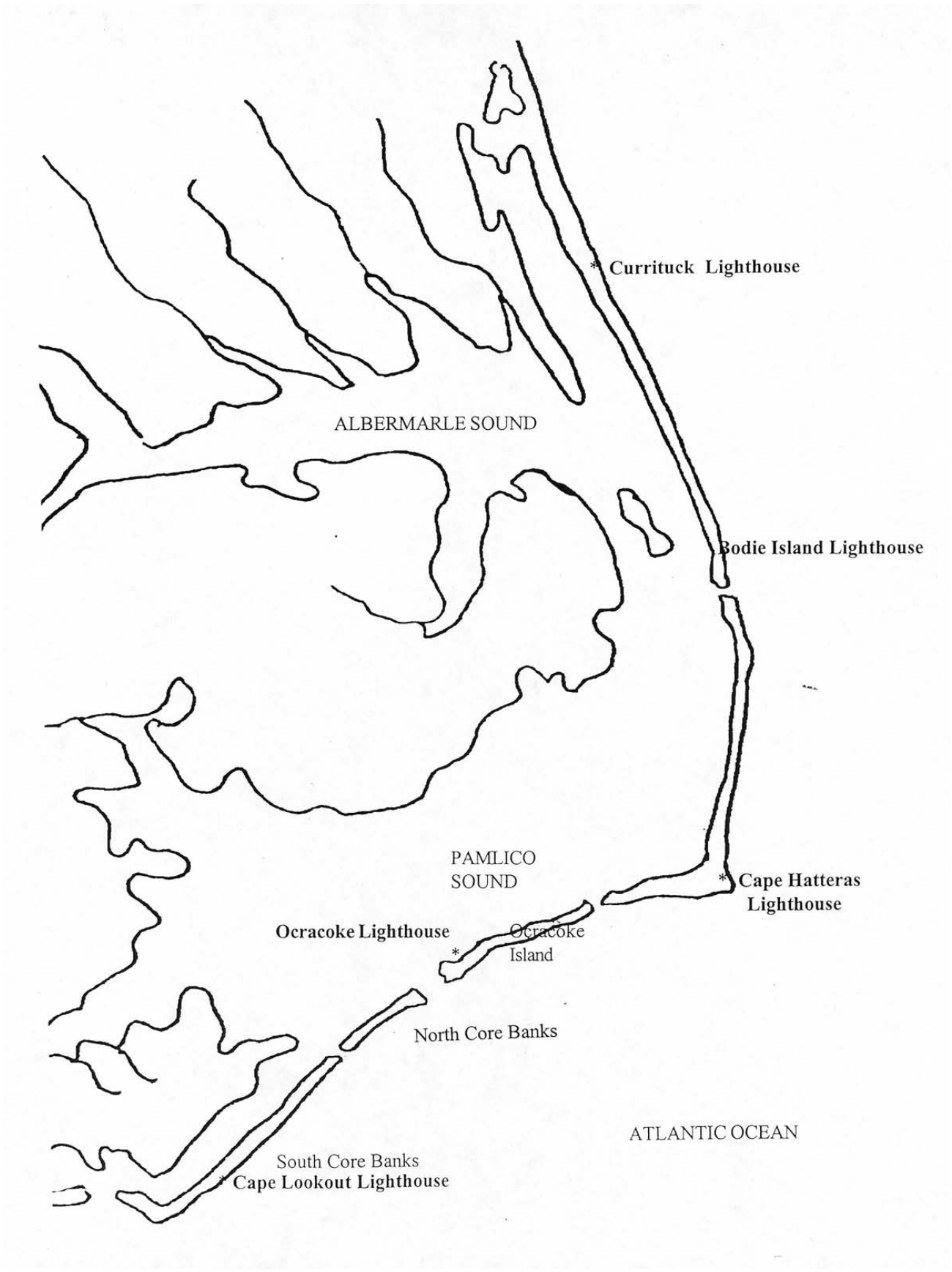
1. Distribute copies of the unmarked map to the students.

2. Have the students work individually or in groups to try to figure out the locations of the following places:
   - Albermarle Sound
   - Pamlico Sound
   - South Core Banks
   - North Core Banks
   - Ocracoke Island
   - Atlantic Ocean

   They can use the North Carolina map to identify these areas if they need to.

3. Next, have the students figure out the locations of the following lighthouses:
   - Bodie Island Lighthouse
   - Cape Lookout Lighthouse
   - Cape Hatteras Lighthouse
   - Ocracoke Lighthouse
   - Currituck Lighthouse

4. Use the labeled map to review the answers with the class.


Currituck Lighthouse
ALBERMARLE SOUND
Bodie Island Lighthouse
PAMLICO
SOUND
Cape Hatteras
Lighthouse
Ocracoke Lighthouse
Ocracoke
Island
North Core Banks
ATLANTIC OCEAN
South Core Banks
Cape Lookout Lighthouse

ACTIVITY 4: LIGHTHOUSE STORIES

OBJECTIVES: Students will learn about living and working at a lighthouse by reading about the adventures of 2 different children that grew up in lighthouses.

BACKGROUND: *The Lighthouse Keeper's Daughter* is based on a true story of a young girl who takes care of the lighthouse while her father went to the mainland for food and supplies. She kept the lighthouse lamps burning in spite of storms that lasted for many days. This story is based on the story of Abbie Burgess, whose father was the lighthouse keeper at Matinicus Rock, off the coast of Maine. Another version of Abbie's story can be found in *Keep the Lights Burning, Abbie*.

MATERIALS:

The Lighthouse Keeper's Daughter by Arielle North Olsen (in trunk)
Keep the Lights Burning, Abbie by Peter and Connie Roop (in trunk)
Map of the United States (in trunk)

PROCEDURE:

1. Read *The Lighthouse Keeper's Daughter* aloud with the class. You can have the students take turns reading. After reading the story discuss the following questions with the class:
   - Do you think you could have done what Miranda did?
   - Why was it so important to keep the light burning?
   - How did Miranda and her family spend their leisure time on the island? How does this differ from the way you spend your leisure time? How much time for recreation do you think Miranda and her family had?
   - Would you select a career like being a lighthouse keeper for yourself? Why or why not?

2. Read *Keep the Lights Burning, Abbie* aloud with the class and discuss the following questions:
   - Locate Matinicus Rock on a map.
   - How is this book similar to *The Lighthouse Keeper's Daughter*? How is it different?
   - How are Abbie and Miranda similar? How are they different?

3. Have the students write their own stories about what they think it would be like to live at a lighthouse.

ACTIVITY 5: LIGHTHOUSE POETRY

OBJECTIVES: Students will learn about the ways in which lighthouses are perceived by people. They will learn how to communicate through writing and poetry.

BACKGROUND: Many poems have been written about lighthouses. Poems can be an interesting way to create different images of lighthouses.

MATERIALS:

2 lighthouse poems on the following pages
Paper and pencils

PROCEDURE:

1. Make copies of the two poems on the following pages and distribute them to the class.

2. Have them read the poems individually or in small groups. Read the poems again aloud with the students; they can take turns reading.

3. Discuss the lighthouse imagery used in each poem: What images were the most dramatic? What kind of lighthouse image did the poet create? What was the poet trying to tell the reader?

4. Have the students try to write their own lighthouse poems.

The Lighthouse

Henry Wadsworth Longfellow, 1849

The rocky ledge runs far into the sea,
And on its outer point, some miles away,
The lighthouse lifts it massive masonry,
A pillar of fire by night, of cloud by day.

And as the evening darkens, lo! how bright,
Through the deep purple of the twilight air,
Beams forth the sudden radiance of its light
With strange, unearthly splendor in its glare.

Not one alone; from each projecting cape
And perilous reef along the ocean's verge,
Starts into life a dim, gigantic shape'
Holding its lantern o'er the restless surge

The seabird wheeling round it, with the din
Of wings and winds and solitary cries,
Blinded and maddened by the light within,
Dashes himself against the glare and dies.

A new Prometheus, chained upon the rock,
Still grasping in his hand the fire of Jove,
It does not hear the cry, nor heed the shock,
But hail the mariner with words of love.

"Sail on!" it says, "sail on, ye stately ships!
And with your floating bridge the ocean span;
Be mine to guard this light from all eclipse,
Be yours to bring man nearer unto man!"

Minot's Beacon

Alexander C. Corkum, 1906

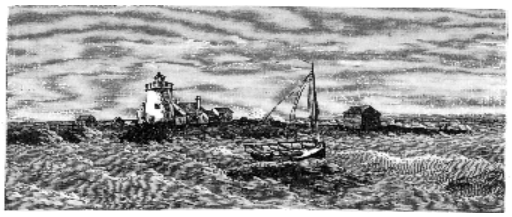
Out where the waves of the Ocean
Thunder and break in their wrath
Here on the outermost danger,
Near to the mariner's path,
Standing on treacherous footing,
Towering over the sea
Flash I my signal of warning
Of one - - four – and three.

Wrapped in a mantle of darkness,
Lashed by the wind and wave
Swaying beneath their encounters,
Often their furies I brave;
And by the years of the tempest,
Dimmed tho' my radiance be,
Still I keep flashing my warnings
Of one – four – and three.

Mist often mingles with darkness,
Pall-like upon me they close,
Hiding my treacherous neighbors,
Whom I am here to expose;
Then with my voice I'm proclaiming
Dangers the eye cannot see,
While I keep flashing my warnings
Of one – four – and three.

Winds that have fiercely assailed me
Whisper their gentle regret,
Waves that besieged me in anger
'Round me remorsefully fret,
Always impassive I greet them,
Duty is sacred to me;
So I keep flashing my warnings
Of one – four – and three.

Here thro' the varying seasons,
Gray weather-beaten I stand,
Guiding the course of the seaman,
Cautiously making the land;
And to all who pass me,
Seeing the "Land of the Free,'
Flushing a welcome warning
Of one – four – and three.



ACTIVITY 6: A LIGHTHOUSE KEEPER'S DIARY

OBJECTIVES: Students will learn about the responsibilities of a lighthouse keeper. They will learn about the characteristics of a lighthouse keeper and how these characteristics relate to careers today.

BACKGROUND: In the trunk you will find the journal of James Wilson Gillikin, lighthouse keeper at Cape Lookout. The journal spans about 1½ years at the lighthouse. The accounts in the journal reveal the dedication and responsibilities of the lighthouse keepers and their families.

MATERIALS:

Keeper Gillikin's Journal (in trunk)
Paper and pencils

PROCEDURE:

1. Pass the journal of Keeper Gillikin around the class and have the students read selections from it. You can then discuss the following questions with the class:

    - What kind of person should a lighthouse keeper be? Why? List the characteristics of a lighthouse keeper on the board.

    - Are these characteristics needed in today's workforce? Why or why not?

    - How important was the lighthouse keeper's family? Why were they or weren't they important?

    - How did the work of a lighthouse keeper benefit society?

2. Have the students list careers that they may consider in their life. Discuss these careers and their importance to society.

3. Ask the students to select a job that they might consider as a career goal. Have them write a short paper describing the job responsibilities, tasks, educational qualifications, training, etc.

ACTIVITY 7: THE LIGHTHOUSE KEEPER'S UNIFORM

OBJECTIVES: Students will be able to see what the keeper's uniform looked like. They will learn about life as a lighthouse keeper.

BACKGROUND: During working hours, lighthouse keepers wore durable workpants and shirt. When polishing the lamps they wore a protective apron over their clothing to prevent their buttons from scratching the lens of the light. When visitors came or the lighthouse inspector was due, the keepers wore the official U.S. Lighthouse Service uniform. Lighthouse keepers were very proud of their work, and many liked to be photographed in uniform. Beginning in the 1870's, the Lighthouse Service became very much like a military organization. There were ranks, regulations, and inspections. The keepers received promotions and awards, and wore their ranks on their uniforms. Female lighthouse keepers did not wear uniforms.

Historical artifacts used for this activity:

Keeper's uniform: This is a replica of the United States Lighthouse Service uniform of the 1880's. The uniform was made of blue wool or denim and consisted of a blue jacket, vest, pants, and cap.

MATERIALS:

Lighthouse Keeper's Uniform (in trunk)

PROCEDURE:

1. Have the students research what it was like to be a lighthouse keeper. Discuss the duties of being a lighthouse keeper with the class. This information can be found in the front of this book.

2. Let the students see and touch the uniform. Discuss the use of the uniform with the students. Ask the following discussion questions:
   - Does the uniform look comfortable? Do you think that you would want to wear this uniform on a hot summer day at Cape Lookout?
   - Why do you think lighthouse keepers had to wear uniforms?

ACTIVITY 8: BUILD YOUR OWN LIGHT

OBJECTIVES: Students will become familiar with the Fresnel lens system used to light lighthouses by creating their own lens.

BACKGROUND: Read the section in the front of this book titled "lights".

MATERIALS: (in trunk)

Turntable
Candle Light
Magnifying sheets
Aluminum Reflectors
Binder Clips
Flashlights

PROCEDURE:

1. Divide the students into 3 groups and have them construct a miniature version of a Fresnel lens. They can put the light on the turntable and then clip the magnifying sheets around the light using the binder clips. They can use the reflectors to reflect the light in the desired direction. This should give the students an idea of how the light in a lighthouse works.

2. Have the students experiment with their lights by changing the angle of the reflectors or adding additional lamps for a brighter light.

3. Have the students experiment with different flash patterns. You will need to use the flashlights for this, since they can be turned on and off easier than the candle lights. You can have different groups of students develop flash patterns and demonstrate them to the class. See if the other students can correctly guess the signal each group has developed.

4. Discuss the following questions with the students:

   - Why would each lighthouse have a different sequence of flashes?
   - What would happen if each lighthouse did not have its own flash pattern?
   - How could you make your light as bright as possible, to be seen from the greatest distance?

ACTIVITY 9: HOW TALL ARE LIGHTHOUSES?

OBJECTIVES: Students will learn about the heights of the lighthouses found along the Outer Banks. They will learn how to make and use graphs.

BACKGROUND: Lighthouses come in all shapes and sizes. Most of the lighthouses along the Outer Banks are rather tall. This is due to the location of these lighthouses. They are all built on low, sandy beaches where it is rather hard to see the shoreline from the sea. In areas where there are rocky cliffs, lighthouses can be much smaller.

MATERIALS:

Graph paper
Pencils
Green winders with strings cut to length of the lighthouses (in trunk)

PROCEDURE:

1. Discuss with the students the different shapes and sizes of lighthouses and how that relates to the setting and navigational needs. (See activity #2).

2. Make copies of the sheet of graph paper on the following page. Divide the students into groups of three or four, giving each group a sheet of graph paper. Have the students graph the heights of the lighthouses listed below. Each square on the graph paper can equal 5 feet. The height of each lighthouse is listed below. The first number is the height of the lighthouse top to bottom. The second number, in parenthesis, is the height of the focal plane of the light.

   - Cape Lookout Lighthouse 169' (156')
   - Cape Hatteras Lighthouse 196' (191')
   - Bodie Island Lighthouse 174' (156')
   - Currituck Lighthouse 168' (158')
   - Ocracoke Lighthouse 76' (75')

3. Assign each group of students one of the lighthouses above. Give each group the green winder with colored string that corresponds to their lighthouse. Have the students roll out the string to illustrate the height of their lighthouse.

ACTIVITY 10: LIFE AT A LIGHTHOUSE

OBJECTIVES: Students will learn about what life was like at a lighthouse. They will learn what children at lighthouses did for entertainment.

BACKGROUND: Many lighthouse keepers had their families with them at the lighthouse. This made it easier for the keeper to deal with the loneliness and tediousness of his job. The family lived in quarters connected to the lighthouse or located nearby. It was usually very isolated at the lighthouse, often times many miles from the mainland. Lighthouse families were often dependent on boats to bring them supplies. They had to place orders from catalogs for books, clothes, and other daily items.

Historical artifacts used for this activity:

Coffee grinder: This is a replica of a coffee grinder used in the past. Coffee was an important staple for many lighthouse keepers.

Climbing bear: This is a replica of a toy used by children in the past. Pull the two strings away from each other and make the bear "climb" up the strings.

Jacob's ladder, dominos, toy soldiers: These toys are probably very similar to toys that some of the students may have grown up with.

***The Adventures of Huckleberry Finn* book:** Lighthouse keepers and their families had lots of spare time to read. Beginning in the 1870's, the Lighthouse Service put together small portable libraries for lighthouse keepers and their families. These libraries would include about 50 books in a wooden trunk. These libraries would be left at a lighthouse for several months, then sent to another lighthouse in exchange for a new library. The books encouraged the children and adults to read. They also helped the families to deal with the loneliness and isolation of living at a lighthouse station.

MATERIALS: (in trunk)

Coffee Grinder
Coffee Pot
Dominos
Climbing bear
Handkerchief doll
Toy soldiers
Jacob's Ladder game
The Adventures of Huckleberry Finn Book
Games and Songs of American Children Book
Sears, Roebuck and Co. Catalog

PROCEDURE:

1. Discuss with the class what life was like at a lighthouse. Talk about how lonely and isolated it could be. This information can be found above and in the front of this book. Ask the students the following questions.
   - What was life like for a lighthouse keeper? What was it like for his family?
   - Do you think that you would like to live at a lighthouse? Why or why not?

2. Show the coffee grinder to the class and describe how it worked. Discuss the following questions with the class:
   - Why do you think lighthouse keepers would drink a lot of coffee?
   - How do you think lighthouse keepers could get staples like coffee if they were at a remote island station like Cape Lookout?

3. Ask the students the following questions:
   - What do you do for entertainment in your free time?
   - If you were living at a lighthouse one hundred years ago, would you do the same things?
   - What do you think children at lighthouses did for entertainment?

   Show the class the different toys that children would have played with at lighthouses (handkerchief doll, dominos, toy soldiers, Jacob's ladder climbing bear). See if the students can figure out how the climbing bear and the Jacob's ladder work. Do any of the students still play with dominos?

   See if the students can come up with any other games that children might have played at a lighthouse.

   Look at the book: *Games and Songs of American Children*. Pick out one or two games that you can play with the class.

4. Show the students the *Adventures of Huckleberry Finn* book. Talk about the need for reading materials at a lighthouse. Ask the class the following questions:
   - Why were traveling libraries so popular with lighthouse keepers and their families?
   - How many of the students like to read books? Do they think that they would read more if they were living at a remote lighthouse far from civilization, with no computers or electronic games?

5. Pass the Sears, Roebuck and Co. Catalog around to the students. Have them look through the catalog and talk about what they would need to survive at a lighthouse. Divide the students into groups of four or five. Have each group make up a list of what they think they would need to survive at a lighthouse for one month. Keep in mind that lighthouse families usually grew their own produce and kept livestock. Have the groups report to the class on what was on their lists.

ACTIVITY 11: A LIGHTHOUSE TOUR

OBJECTIVES: Students will be able to take a "tour" of lighthouses across America. They will learn about the locations and styles of different lighthouses. They will become familiar with the geography of the United States

BACKGROUND: There are hundreds of lighthouses along the seashores and lakeshores of the United States. This activity will allow us to visit a small portion of these.

MATERIALS: (in trunk)

United States Map
Lighthouse photos
Push pins
A Tour of U.S. Lighthouses tour description (following this page)

PROCEDURE:

1. Hang the map of the United States on a bulletin board in front of the class. If you have a board that you can push pins into, that will work best.

2. Find the tour description in the traveling trunk. Have a student go to the map and read the first leg of the tour (1). Have that student put a pin in the map at Cape Lookout Lighthouse.

3. Have each student read another leg of the tour until they are back at Cape Lookout. As they are reading their leg of the tour to the class, the students should try to follow the route on the map and put a pin at the lighthouse they visited. The route is highlighted on the map. As the student is reading about the lighthouse that you are visiting, pass around the picture of that lighthouse. All of the pictures are numbered to correspond to each leg of the tour.

4. After the students have completed their lighthouse tour, distribute the question sheet following the activity in this book. Have the students try to identify each lighthouse being described.

24
WASHINGTON
25
MONTANA
NORTH DAKOTA
OREGON
IDAHO
SOUTH DAKOTA
WYOMING
NEVADA
NEBRASKA
26
27
UTAH
CALIFORNIA
COLORADO
KANSAS
ARIZONA
OKLAHOMA
28
NEW MEXICO
TEXAS
ALASKA
HAWAII
29

MINNESOTA
WISCONSIN
MICHIGAN
IOWA
ILLINOIS
INDIANA
OHIO
PENNSYLVANIA
NEW YORK
VT
NH
MAINE
MASS
CONN
RI
NJ
DE
MD
WEST VIRGINIA
VIRGINIA
KENTUCKY
MISSOURI
TENNESSEE
NORTH CAROLINA
ARKANSAS
SOUTH CAROLINA
MISSISSIPPI
ALABAMA
GEORGIA
LOUISIANA
FLORIDA
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
30
31
32
33
34
35
36
37

A TOUR OF U.S. LIGHTHOUSES

(1) Today our class is going to begin a journey across America to visit many of our nation's lighthouses. We will begin our tour of United States lighthouses at Harkers Island, North Carolina. On Harkers Island we board a small boat that will take us to Cape Lookout National Seashore. The **Cape Lookout Lighthouse** can be seen as we approach the island. After a 10 minute ride, the boat lets us off in front of the lighthouse and keepers' quarters. The lighthouse stands 169 feet tall and is painted with black and white diamonds.

At the keepers' quarters we meet a National Park Service ranger who tells us about the lighthouse. He says that this is the second lighthouse to be built here. The original lighthouse, built in 1812, was too short. The lighthouse that we see here today was built in 1857 and began operation in 1859. It contained a first order Fresnel lens that was damaged during the Civil War when Confederate troops attacked it. The lens was later repaired and operated in the lighthouse until 1972, when it was replaced by two airport beacons.

(2) We all pile back into the boat and return to Harkers Island. There, we board our school bus and drive to route 70, which we follow to Cedar Island and the North Carolina State Ferry. We take the ferry to Ocracoke Island, which takes about 2 ½ hours. At Ocracoke Island we visit the **Ocracoke Lighthouse**. This is the second lighthouse still operating on the North Carolina coast, constructed in 1823. It is painted white and stands 76 feet tall. Its Fresnel lens displays a constant light that does not rotate or blink.

(3) We leave Ocracoke Lighthouse and drive to the north end of Ocracoke Island, where we take another ferry to Hatteras Village. We then drive up Highway 12 and enter into Cape Hatteras National Seashore. We continue to Buxton, where we stop to visit the **Cape Hatteras Lighthouse**, the tallest lighthouse in North America. A National Park Service ranger is there to tell us about the lighthouse. The ranger tells us that the Cape Hatteras Lighthouse was completed in 1870. During the summer of 1999 it was moved almost 3,000 feet inland to protect it from shoreline erosion. The lighthouse has a distinctive daymark; two black and two white stripes that spiral around the tower 1 ½ times.

(4) After visiting the Cape Hatteras Lighthouse, we board the bus again and continue up Route 12 to Bodie Island (pronounced "body"). There we visit the **Bodie Island Lighthouse**, which is 150 feet tall with alternating black and white bands. This is the third lighthouse built here. The original lighthouse was built in 1847. It was rebuilt in 1859, then destroyed by Confederate troops during the Civil War. The present lighthouse was built in 1872.

(5) From Bodie Island we continue north on Highway 12 to Kitty Hawk. We make a short detour to **Currituck Beach Lighthouse**. This lighthouse is 150 feet tall and made of red brick. It was constructed from 1874 to 1875.

(6) We now return down Highway 12 to Kitty Hawk, where we turn right on Highway 158. We follow Route 158 to Route 168 into Virginia, north to Norfolk. We then head east on Route 44 to Virginia Beach to visit the **Cape Henry Lighthouses**. Cape Henry is located at the entrance to the Chesapeake Bay. There are actually 2 lighthouses here. The first tower was constructed in 1792. We can climb 72 feet to the top of this tower to get a view of the second lighthouse, which was constructed in 1881. The new tower is 165 feet tall.

(7) From Cape Henry we drive back towards Norfolk, where we turn north and cross the Chesapeake Bay Bridge and Tunnel. Just across the bridge we pass by Smith Island and the **Cape Charles Lighthouse**. We can't get to the lighthouse since it is located on an island, but we can view it from the bridge. The tower is composed of a cast iron octagonal skeleton with a central column. It is the tallest skeletal lighthouse in the United States. The current tower is 191 feet tall and was completed in 1895. The original Cape Charles Lighthouse was built in 1828 and was destroyed during the Civil War.

(8) We continue from the Chesapeake Bay Bridge north on Route 13 to Maryland's "Eastern Shore." We take Route 13 to Route 50 north to Easton, where we turn right on Route 33 to St. Michaels. In the town of St. Michaels we visit **Hooper Strait Lighthouse**. This lighthouse is not in its original home, and it is a different type of lighthouse. The Hooper Strait Lighthouse has been moved from its original home in the Chesapeake Bay to its current home at the Chesapeake Marine Museum. This lighthouse is called a "screw-pile." It is a small house built on a metal frame and screwed into the floor of the bay. It was built in 1879 after the original Hooper Strait Lighthouse was carried away by ice.

(9) From St. Michaels, we will drive east to Lewes, Delaware, where we will board the ferry to Cape May, New Jersey. In Cape May we will make a brief stop at the **Cape May Lighthouse**, which helps guide ships into the Delaware Bay. The original lighthouse here at the north side of the entrance into the Delaware Bay was built in 1823. It was rebuilt in 1847 and again in 1859.

(10) From Cape May, we continue north on the Garden State Parkway to State Highway 36, which we follow to Twin Lights Lighthouse State Historic Site. The **Twin Lights Lighthouse** looks almost like a castle. There are two lights in the house, one located at each end. The light towers are 64 feet high and 320 feet apart. The original towers were built in 1828. In 1841, Twin Lights became the first lighthouse in the United States to use a Fresnel lens. The original lighthouse eventually fell into disrepair and had to be replaced. The current lighthouse, also known as Navesink Light, began operation in 1862 and was decommissioned in 1949.

(11) Just north of Twin Lights is the **Sandy Hook Lighthouse**, the oldest operating light tower in the United States. It was built in 1764, and is now part of Gateway National Recreation Area, a unit of the National Park Service.

(12) From Sandy Hook we will be heading to **Fire Island Lighthouse**. This lighthouse is located within Fire Island National Seashore, another National Park Service site. To get there we will need to drive west on Route 36 back to the Garden State Parkway, which we will take to Route 95. We will then head east on 95 into New York City. We will have to navigate through New York City to the south side of Long Island and Fire Island National Seashore.

When we reach Fire Island, we can see the lighthouse in the distance. The lighthouse is 150 feet tall and painted with black and white bands. A park ranger is there to tell us that the current tower was built in 1857 and 1858. It replaced a smaller tower built in 1826.

(13) To get to our next lighthouse we must navigate back through New York City to Interstate 95. We head north on I-95 to New London, Connecticut, where we stop to visit the **New London Ledge Lighthouse**. This lighthouse looks very different from most that we have seen so far. It is a stately red brick building with a light on top, sitting on the Thames River at the entrance to New London Harbor. This lighthouse was constructed from 1906 to 1909. It was needed because the nearby New London Light was not sufficient to guide vessels around the dangerous ledges at the entrance of the harbor.

(14) From New London, we board a ferry that will take us to Block Island, Rhode Island. There we will visit the **Block Island Southeast Lighthouse**. Block Island is about 7 miles long and 3 miles across. It is surrounded by dangerous shoals and ledges, and was sometimes called the "stumbling block" of the New England coast. After the sinking of several dozen vessels, the U.S. Lighthouse Service decided to build two lighthouses here, the North Light in 1829 and the South Light in 1875. The Southeast lighthouse had a 2 ½ story keeper's quarters attached to the tower. This lighthouse has a unique connection to Cape Lookout. In 1994, the original Fresnel lens from Cape Lookout Lighthouse was installed in Block Island Southeast.

(15) From Block Island we will board the Point Judith–Block Island ferry, which will take us back to the mainland. From there we will follow Route 1 north to Route 138 east to Conanicut Island. There we will visit **Beaver Tail Lighthouse**. The current tower is a square granite tower that was built in 1856 to 1857. It replaced a tower built in 1749.

(16) From the Beaver Tail Lighthouse we will backtrack to Route 1, where we will head north to Interstate 95. We will follow I-95 to Boston, Massachusetts, where we will visit the **Boston Harbor Lighthouse**. From Boston Harbor we board a boat that takes us to Little Brewster Island, location of the Boston Light. The 98-foot high, white tower is the last remaining lighthouse that has not been automated. The original Boston Light was built in 1716, the first lighthouse in North America. It was destroyed twice during the Revolutionary War and rebuilt in 1783.

(17) After leaving Little Brewster Island, we get back to I-95 and head north to Maine where we visit 5 lighthouses along the Kennebec River. Not all lighthouses were built along oceans and lakes. The Kennebec River Lighthouses were built to help guide ships

up the river. To get a closer look at these lighthouses we drive up route 127, which parallels the Kennebec River. There are 5 lighthouses in all: **Perkins Lighthouse, Squirrel Point Lighthouse, Doubling Point Range Lights** (2 lighthouses), and **Doubling Point Lighthouse**.

(18) We now get back onto I-95 North and follow it to Augusta, where we turn east on Route 3. We follow Route 3 to Mt. Desert Island and Acadia National Park, where we visit **Bass Harbor Lighthouse**. The lighthouse consists of a white tower attached to a dwelling. It was built in 1858 to assist vessels to get into the harbor. It presently uses a fourth order Fresnel lens that was installed in 1902.

(19) We now drive from Mt. Desert Island to Dunkirk, New York. To do this we will trace our route back to I-95, which we will follow south to I-90 in Massachusetts. We follow I-90 west across Massachusetts and New York State until we reach Dunkirk, just southwest of Buffalo, on the shore of Lake Erie. There we will visit the **Dunkirk Lighthouse**. The tower is attached to a house, and not quite as large as the lights on the Atlantic coast. When construction began on this lighthouse, it was intended to be a circular tower, but during construction the plans changed and the tower ended up square. This lighthouse still has an active Fresnel lens that can be seen for 17 miles.

(20) From Dunkirk, we will continue west on I-90 to Toledo, Ohio. There we will visit the **Toledo Harbor Lighthouse**. This is a harbor light, used to guide ships into the Toledo Harbor from Lake Erie. Harbor lights were often built like houses with the light tower connected to the roof. In these lighthouses, the keepers did not have to make long trips up and down a high tower to keep the light operating.

(21) After departing from Toledo, we will travel to Port Huron, Michigan, to see the **Huron Lightship**. We will need to follow I-75 from Toledo to Detroit, then I-94 to Port Huron. On the way, your teacher tells you a little bit about lightships: Ships sometimes served as lighthouses. Lightships were anchored off the coast in places where it was too difficult to build a lighthouse. Although there were once hundreds of lightships, there are only 18 left today. Most of these are floating museums like the Huron Lightship. The Huron Lightship was the last lightship on the Great Lakes, retiring in 1970. The ship was acquired by the City of Port Huron and now serves as a museum and National Historic Landmark.

(22) From Port Huron, we will be traveling to Apostle Islands National Lakeshore in Wisconsin to visit **Outer Island Lighthouse**. Apostle Islands National Lakeshore is another unit of the National Park Service. It has the largest collection of lighthouses in any National Park Service site. To get to the lighthouse we will follow Interstate 69 West to I-75 North. We will follow I-75 all the way to Michigan's Upper Peninsula, where we head west on Route 2. We follow Route 2 to Ashland, then go north on Route 13 to Apostle Islands National Lakeshore. Upon arriving at the visitor center, a park ranger tells us that we need to take a ferry to the lighthouse. We board the ferry and take a short trip to the Outer Island Lighthouse. As the ferry nears the island, we can see the lighthouse sitting on a high bluff 40 feet above Lake Superior. There is a tramway to the

lighthouse that was used to send supplies up to it from the dock. The light operates year round on solar power, and has a supply of eight bulbs so the Coast Guard only has to check it once a year.

(23) After returning on the ferry from Apostle Islands, we will be traveling to **Split Rock Lighthouse** in Minnesota. To get there we will travel back to Route 2 and follow it west to Duluth. From Duluth, we will travel northeast on Route 61 along the shore of Lake Superior until we arrive at Split Rock Lighthouse State Park. This is one of the most picturesque lighthouses on the Great Lakes. It stands out on a high cliff overlooking the rocky Lake Superior shoreline. The lighthouse tower and keeper's house was built in 1910. We can climb up the tower and see a rotating third order Fresnel lens, and observe the weight driven mechanism being rewound.

(24) From Split Rock Lighthouse we will drive all the way to the Washington coast. We will need to go back to Duluth and take I-35 south to Minneapolis. We then travel on I-94 and I-90 all the way to Seattle. Along the way we will pass through Minnesota, North Dakota, Montana, Idaho, and finally Washington. The first lighthouse we will visit in Washington will be **Admiralty Head Lighthouse**. To get there we will drive north from Seattle on I-5 to Mount Vernon, where we head west on Route 20. The lighthouse is located 3 miles south of Coupeville off highway 20. Admiralty Head Lighthouse was the first constructed on the Strait of Jaun de Fuca to guide ships into the Puget Sound. The tower has a forth order Fresnel lens designed for river and sound use.

(25) From Admiralty Head Lighthouse, we will travel back to Seattle, and then go south on I-5 to Portland, Oregon. From Portland we take Route 6 to Rout 101. We will visit the **Cape Meares Lighthouse**, located off highway 101 seven miles west of Tillamook in Cape Meares State Park. The lighthouse has a white, 38-foot tall octagonal tower and a first order Fresnel lens that was constructed in Paris in 1887.

(26) Heading south from Cape Meares Lighthouse we pass by another Cape Lookout at Cape Lookout State Park. From here, we will be heading to Point Reyes National Seashore in California, another National Park Service area. We will follow Route 1 down the coast of Oregon and Northern California to Point Reyes Station. Here we head west onto the Point Reyes Peninsula. The **Point Reyes Lighthouse** is located at the westernmost tip of the park, at one of the windiest and foggiest locations on the Pacific Coast. To get to the lighthouse we have to walk for about a half mile along cliffs overlooking the Pacific Ocean. At the end of the road we meet a park ranger that will lead us down over 300 steps to the lighthouse. The lighthouse was built in 1870. It is no longer in operation today; however, there is still a working first order Fresnel lens inside.

(27) After climbing all the way back up the stairs, we drive out of Point Reyes National Seashore and continue south down Highway 101 to San Francisco. In San Francisco we will take a ferry to Alcatraz Island to see the **Alcatraz Island Lighthouse**. Alcatraz Island is located within Golden Gate National Recreation Area, another unit of the National Park Service. Alcatraz is best known for the old maximum security prison

there. The original Alcatraz Island Lighthouse was the first lighthouse built on the West Coast. It was destroyed in 1909 to make way for the prison. The current lighthouse was built that same year. It stands 84 feet tall and is located next to the cell house.

(28) After the ferry ride back to San Francisco, we continue south along the coast on Highway 101 all the way to San Diego. Here we will go to another national park site; Cabrillo National Monument. We are here to visit the **Old Point Loma Lighthouse**, one of the first 8 lighthouses built on the West Coast. It is a Cape Cod style lighthouse; a house with a cylindrical tower rising from its middle. It was built in 1854 and used until 1891. In the 1980's it was restored by the National Park Service and the beacon reactivated.

(29) From San Diego we will be driving all the way to Texas to visit the **Matagorda Island Lighthouse**. We will need to travel east on I-8 through Arizona to I-10, which will take us through New Mexico and Texas. In San Antonio we will head southeast on I-37 and follow it to Corpus Christi. The lighthouse is located in a state park on Matagorda Island, just northeast of Corpus Christi. The Matagorda Island Lighthouse has a rather unusual daymark; it is painted entirely black. The original tower was constructed in the late 1840's to mark the entrance to Cavallo Pass. It was painted with red, white, and black stripes. In 1873 the current tower was constructed. Like Cape Lookout, Matagorda is still an active lighthouse operated and maintained by the U.S. Coast Guard.

(30) From Matagorda Island we will travel to **New Canal Lighthouse** in New Orleans, Louisiana. To get there we take I-35 to Houston, then get back on I-10 and head east. Interstate 10 will take us right into the city. We then need to locate the lighthouse on Lakeshore Drive. New Canal Lighthouse was built in the 1890's and first lit in 1901. The 32-foot high tower is still used to guide boats into Lake Pontchartrain.

(31) From New Orleans we will take I-10 to Biloxi, Mississippi to visit the **Biloxi Lighthouse**. The lighthouse is located in the middle of the median strip between the lanes of Highway 90. The Biloxi Lighthouse was lit in 1848. In 1867 the tower almost fell over due to erosion. Workmen righted the tower and dug away dirt on the other side to balance it again. The lighthouse is still active today.

(32) After visiting the Biloxi Lighthouse we will travel along I-10 to Mobile, Alabama, where we will take a boat to the middle of Mobile Bay. Here we find the **Middle Bay Lighthouse**. It is a screwpile lighthouse similar to the Hooper Strait Lighthouse that we visited in Maryland. It was first lit in 1885, and is still used today as a daymark.

(33) From Mobile we will be heading to South Florida to visit **Sanibel Island Lighthouse**. To get there we will take I-10 East to I-75 South. At Fort Myers we head west to Sanibel Island. The lighthouse is a 102-foot high skeleton tower. This is an open metal framework with no exterior walls or masonry. This lighthouse once had a third order Fresnel lens. Today there is a plastic lens in the tower. It is still an active working lighthouse.

(34) After we finish our visit to Sanibel Island we will be heading towards St. Augustine, Florida to visit the **St. Augustine Lighthouse**. To get there we will continue down I-75 through Big Cypress National Preserve to Fort Lauderdale. Here we will head north on I-95 to St. Augustine. Upon arriving at the lighthouse we notice that it looks very familiar. It has the same daymark as Cape Hatteras Lighthouse; black and white spiral bands, but with a red lantern. The St. Augustine Lighthouse was constructed in the early 1870's to replace an earlier tower that was being threatened by erosion.

(35) From St. Augustine we will be traveling north up I-95 to Savannah, Georgia. There we will head east on Route 80 to Tybee Island to visit the **Tybee Island Lighthouse**. The current 154-foot tall tower at Tybee Island was built after the previous lighthouse was burned in the Civil War. The first lighthouse here dates back to 1736 when a 90-foot high wooden tower was built to aid in navigation. This was the tallest lighthouse in America at the time.

(36) Next we will be visiting two lighthouses along the South Carolina coast; **Old Charleston Lighthouse** and **New Charleston Lighthouse**. To get to these lighthouses we will drive north on I-95 to I-26, which we will follow to Charleston. These lighthouses are a good example of the evolution of lighthouses. Old Charleston Lighthouse once had land around it and a keeper's quarters. Today it is completely surrounded by water, and it is thought that it will not last much longer before the waters will cause it to fall. This is one of the oldest lighthouses in America. The first tower here was built 1767. That was replaced by a new tower in 1837, which was destroyed in the Civil War and replaced with this current tower in 1876. It went out of service in 1962 when it was replaced by the New Charleston Lighthouse.

We now will need to get out to Sullivans Island to see the New Charleston Lighthouse. This is the only lighthouse in the United States that has an elevator to the top. It was built in 1962 and stands 161 feet tall.

(37) It is now time to head back to North Carolina. From Charleston, we will be traveling along the coast on Route 17. Before driving back to Cape Lookout, we will make one last detour to visit **Oak Island Lighthouse** and **Bald Head Lighthouse**. To get to these lighthouses we will take Route 211 and Route 133 to Caswell Beach. The Oak Island Lighthouse went into service in 1858. The beacon in its tower is the second strongest in the world. The light produces so much heat that workers have to wear protective clothing when working in the beacon room. Its daymark is black on top, white in the middle, and gray on the bottom. Unlike many lighthouses that have painted daymarks, the Oak Island daymark was mixed into the cement finish. The Bald Head Lighthouse is just across the Cape Fear River on Smith Island. Although it has been inactive for years, it is still the oldest lighthouse in North Carolina, built in 1817.

After visiting the last two lighthouses on our journey we will return to Cape Lookout via Route 17 and Route 24 to Morehead City. Route 70 will take us back to Harkers Island Road and the Cape Lookout National Seashore visitor center.

ACTIVITY 11: STUDENT QUESTION PAGE

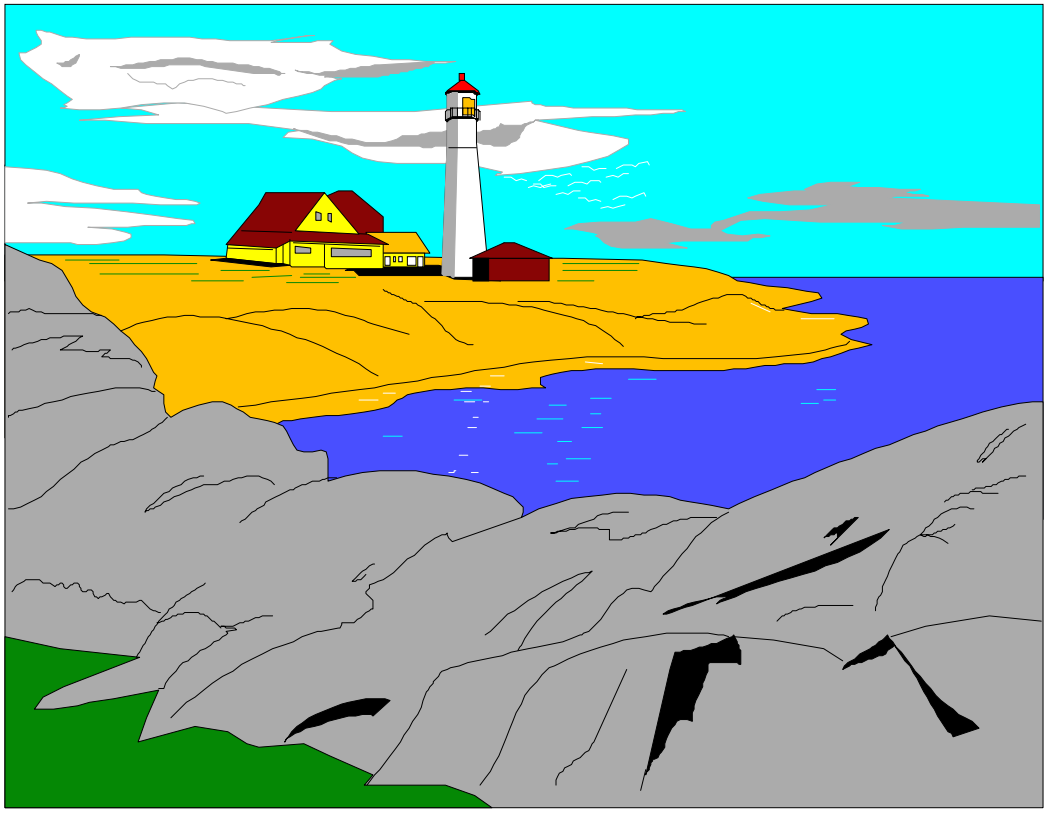
Try to identify each of the lighthouses that we visited:

1. The oldest operating light tower in the United States is the _____.
2. The first lighthouse in North America was the _____.
3. The original Fresnel lens of the Cape Lookout Lighthouse was moved to _____.
4. The oldest lighthouse in North Carolina is the _____.
5. The only lighthouse in the U.S. with an elevator in it is the _____.
6. The lighthouse that has the same daymark as Cape Hatteras is the _____.
7. The lighthouse with the second strongest beacon in the world is the _____.
8. The first lighthouse built on the Pacific Coast was the _____.
9. The lighthouse that was located between the lanes of Highway 90 in Mississippi was the _____.
10. The last lightship on the Great Lakes was the _____.
11. The lighthouse that we visited at Apostle Islands National Lakeshore was the _____.
12. The tallest lighthouse in North America is the _____.
13. The first lighthouse in the United States to use a Fresnel lens was the _____.
14. The lighthouse that was moved to the Chesapeake Marine Museum was the _____.
15. The tallest skeletal lighthouse in the United States is the _____.

ANSWERS FOR ACTIVITY 11

1. Sandy Hook Lighthouse
2. Boston Harbor Lighthouse
3. Block Island Southeast Lighthouse
4. Bald Head Lighthouse
5. New Charleston Lighthouse
6. St. Augustine Lighthouse
7. Oak Island Lighthouse
8. Alcatraz Island Lighthouse
9. Biloxi Lighthouse
10. Huron Lightship
11. Outer Island Lighthouse
12. Cape Hatteras Lighthouse
13. Twin Lights Lighthouse
14. Hooper Strait Lighthouse
15. Cape Charles Lighthouse

STUDENT ACTIVITY PAGES



These activity pages can be given to the students to work on in class or at home.

LIGHTHOUSE WORD SEARCH

See if you can find all of the words listed below that have to do with lighthouses. They can be positioned forwards, backwards, up, down, or diagonally.

Beacon
Clockworks
Daymark
Fresnel
Keeper
Lamp
Lens
Lighthouse
Navigate
Oil shed
Reflector
Shoal
Tower

R	E	E	S	U	O	H	T	H	G	I	L	A
Y	E	D	C	W	F	E	L	G	N	B	M	E
K	A	F	A	G	K	K	E	E	P	E	R	R
E	S	R	L	Y	U	P	N	E	V	A	D	H
E	H	E	U	E	M	M	S	L	F	C	T	D
P	O	N	D	G	C	A	E	Y	E	O	O	E
R	A	E	W	O	T	L	R	D	V	N	W	H
E	L	U	Q	A	N	I	F	K	F	A	S	S
P	E	L	E	N	A	V	I	G	A	T	E	L
E	R	O	T	C	E	L	F	E	R	I	R	I
E	Y	J	E	E	R	L	H	D	G	P	E	O
R	S	K	R	O	W	K	C	O	L	C	D	Z
H	B	S	C	I	B	N	R	E	W	O	T	C

LIGHTHOUSE QUIZ

1. The tallest lighthouse on the Outer banks is _____.

2. The first lighthouse to be built in the United States was _____.

3. The size, shape, and exterior markings of a lighthouse are known as _____.

4. In 1822 Auguste' Fresnel invented the _____.

5. _____ was the first lighthouse in the United States to be electrified.

6. The shortest of the Outer Banks lighthouses is _____.

7. Early lights were rotated by a device called the _____.

8. The dangerous shoals off the Outer Banks gave this section of the Atlantic the nickname _____.

9. The _____ was established in 1852.

LIGHTHOUSE QUIZ ANSWER SHEET

1. Cape Hatteras Lighthouse
2. The Boston Light
3. Daymarks
4. Fresnel lens
5. The Statue of Liberty
6. Ocracoke Lighthouse
7. Clockworks
8. Graveyard of the Atlantic
9. U.S. Lighthouse Service

GLOSSARY:

Argand lamp	A lamp that was developed about 1874; used hollow wicks that allowed oxygen to flow through and around the wicks in glass chimneys, producing an intense light with little smoke
Clockworks	The mechanism in a lighthouse that was used to rotate the lamp
Daymark	The size, shape, height, and color patterns of a lighthouse; used to identify the lighthouse during the day
Drop tube	A long tube in which the weight of the clockworks was dropped to rotate the lamp in a lighthouse
Fresnel lens	A lens invented by Augustin Fresnel that used prisms to increase the intensity of the light; consisted of 7 orders or sizes
Kerosene	A type of fuel used in lighthouse lamps; it replaced oil in the late 1870's.
Oil shed	A structure, usually made of brick, that was used to store flammable fuels away from the lighthouse
Range	The distance a light shows out to sea
Shoal	A shallow area such as a sandbar or rock formation

RESOURCES:

America's Lighthouses; Cobblestone; June 1981, Volume 2 Number 6.

Clifford, Mary Louise and J, Candace; *Women who Kept the Lights*; Cypress Communications; Williamsburg VA; 1993.

Corey, Cindy; *Exploring the Lighthouses of North Carolina*; The Provincial Press; Chapel Hill NC; 1982.

De Wire, Elinor; *Guardians of the Lights: Stories of U.S. Lighthouse Keepers*; Pineapple Press Inc.; Sarasota, FL; 1995.

DeWire, Elinor; *The Lighthouse: Activity Book*; Sentinel Publications; Gales Ferry Connecticut; 1995.

Educational Resource Guide; Great Lakes Lighthouse Keepers Association; 1993.

Holland Jr., Francis Ross, *America's Lighthouses: An Illustrated History*; Dover Publications Inc.; New York; 1972.

Instructions to the Light-Keepers; Great Lakes Lighthouse Keepers Association; 1989.

Noble, Dennis L.; *Lighthouses and Keepers*; Naval Institute Press; Annapolis MD; 1997.

Olson, Arielle, North; *The Lighthouse Keeper's Daughter*; Little, Brown and Company; Boston; 1987.

Roop, Peter and Connie; *Keep the Lights Burning, Abbie*; Carolrhoda Books; Minneapolis, Minnesota; 1985.

Stick, David; *North Carolina Lighthouses*; North Carolina Division of Archives and History; 1980.

CURRICULUM INDEX:

This index shows which goals of the 1999 North Carolina Standard Course of Study can be met by each of the activities in this traveling trunk.

ACTIVITY 1: WHY A LIGHTHOUSE ON THE COAST?

- Social Studies Grade 4: #3: Geography
  - 3.1 Describe the absolute and relative location of the state and places within the state.
  - 3.2 Locate in absolute and relative terms the major landforms, bodies of water, and natural resources in North Carolina.

ACTIVITY 2: A VARIETY OF LIGHTHOUSES

- Science Grade 4: #4: Understanding of Technological Designs
  - 4.1 Assess the invention of tools and techniques to solve problems.
  - 4.3 Determine how people use simple machines to solve problems.

ACTIVITY 3: LIGHTHOUSE LOCATIONS

- Social Studies Grade 4: #3: Geography
  - 3.2 Locate in absolute and relative terms major landforms, bodies of water, and natural resources in North Carolina.
- English Language Arts Grade 3: #3: Reading Comprehension
  - 3.12 Understands and interprets maps, charts, diagrams, and other visual representations.

ACTIVITY 4: LIGHTHOUSE STORIES

- Social Studies Grade 3: #2: Anthropology/Psychology/Sociology
  - 2.1 Distinguish similarities and differences among children at different times and in different places.
- English Language Arts Grade 3: #1: Characteristics of the Reader
  - 1.2 Reads materials on a variety of topics.
  - 1.3 Reads for a variety of purposes such as for pleasure, to gain information, or to support an opinion.
- English Language Arts Grade 3: #3: Reading Comprehension
  - 3.1 Reads literary, informational, and practical text.
  - 3.4 Compares traits of characters as evidenced in the text.
  - 3.5 Compares and contrasts characters, events, episodes, and/or stories.
  - 3.6 Compares and contrasts poems, informational selections, or other literary selections.
- English Language Arts Grade 3: #6: Composing Products
  - 6.1 Writes using characters, setting, problem, and solution.
  - 6.2 Writes a variety of poetry and prose including fairy tales and personal narratives.
- English Language Arts Grade 4: #1: Characteristics of the Reader

1.2 Describes personal reactions to narratives, biographies, and autobiographies.

- English Language Arts Grade 4: #2: Reading Strategies
  2.4 Formulates questions and finds relevant information from reading materials.
  2.5 Summarizes information from literary and informational materials.
- English Language Arts Grade 4: #3: Reading Comprehension
  3.1 Reads literary, informational, and practical text.
  3.2 Reads materials on a variety of topics beyond personal experiences.
  3.3 Recognizes the characteristics of a narrative text.
  3.6 Recognizes motives of characters as evidenced in the text.
  3.8 Make inferences and draw conclusions from informational texts and stories beyond personal experiences.
  3.10 Recognizes that authors and illustrators have individual voices and styles.
- English Language Arts Grade 4: #6: Composing Products
  6.1 Writes literary, information, and practical compositions with teacher support.
  6.3 Writes imaginative and personal narratives to develop a logical sequence of events experienced, read, or heard about.
  6.4 Writes imaginative and personal narratives that have a coherent, logical, and organized structure.
  6.6 Writes personal narratives with sufficient, related detail that recount events experienced, read, or heard about.
- English Language Arts Grade 5: #1: Characteristics of the Reader
  1.1 Reads literary, informational, and practical materials beyond personal experience.
  1.3 Makes comments and expresses feelings about characters beyond own experiences.
- English Language Arts Grade 5: #3: Reading Comprehension
  3.1 Reads literary, informational, and practical text.
  3.4 Recognizes relatedness and sufficiency of details in descriptive text.
  3.7 Discusses implied motives of characters as evidenced in the text.
  3.15 Describes links between personal experiences and arguments and ideas in text.
- English Language Arts Grade 6: #1: Characteristics of the Reader
  1.2 Responds to novels, biographies, and informational books through oral, artistic, and dramatic projects.
  1.3 Questions and reflects on issues encountered in texts.
- English Language Arts Grade 6: #3: Reading Comprehension
  3.3 Reads materials from a variety of genres, subjects, authors, and styles.

ACTIVITY 5: LIGHTHOUSE POETRY

- English Language Arts Grade 3: #1 Characteristics of the Reader
  1.2 Reads materials on a variety of topics.
  1.3 Reads for a variety of purposes such as for pleasure, to gain information, or to support an opinion.
  1.4 Describes personal reactions to poetry, informational, practical, and texts.
- English Language Arts Grade 3: #3: Reading Comprehension

3.1 Reads literary, informational, and practical text.
3.2 Interprets poetry and recognizes stanza and rhyme as characteristics of poetry.
3.6 Compares and contrasts poems, informational selections, or other literary selections.

- English Language Arts Grade 3: #6 Composing Products
  6.2 Writes a variety of poetry and prose including fairy tales and personal narratives.
- English Language Arts Grade 4: #1: Characteristics of the Reader
  1.2 Describes personal reactions to narratives, biographies, and autobiographies.
  1.3 Offers reasons for the feelings provoked by a text.
- English Language Arts Grade 4: #3: Reading Comprehension
  3.1 Reads literary, informational, and practical text.
  3.2 Reads materials on a variety of topics beyond personal experiences.
  3.10 Recognizes that authors and illustrators have individual voices and styles.

ACTIVITY 6: A LIGHTHOUSE KEEPER'S DIARY

- Social Studies Grade 4: #1: Anthropology/Psychology/Sociology
  1.3 Analyze similarities and differences among North Carolina's people, past and present.
- English Language Arts Grade 3: #1 Characteristics of the Reader
  1.2 Reads materials on a variety of topics.
  1.3 Reads for a variety of purposes such as for pleasure, to gain information, or to support an opinion.
- English Language Arts Grade 4: #1: Characteristics of the Reader
  1.2 Describes personal reactions to narratives, biographies, and autobiographies.

ACTIVITY 7: THE LIGHTHOUSE KEEPER'S UNIFORM

- Social Studies Grade 4: #1: Anthropology/Psychology/Sociology
  1.3 Analyze similarities and differences among North Carolina's people, past and present
- Social Studies Grade 4: #11 History
  11.1 Identify and describe changes which have occurred in ways of living in North Carolina.

ACTIVITY 8: BUILD YOUR OWN LIGHT

- Mathematics Grade 4: #2: Spatial Sense, Measurement, and Geometry
  2.6 Use designs, models, and computer graphics to illustrate reflections, rotations, and translations of plane figures and record observations.
- Science Grade 3: #4: Light and Heat Concepts
  4.1 Analyze the reflection of light.
- Science Grade 4: #4: Understanding of Technological Designs
  4.1 Assess the invention of tools and techniques to solve problems.
  4.3 Determine how people use simple machines to solve problems.
  4.4 Evaluate the attributes of simple machines that can be manipulated or combined to affect outcomes.

ACTIVITY 9: HOW HIGH ARE LIGHTHOUSES?

- Mathematics Grade 3: #2: Spatial Sense, Measurement, and Geometry
  2.6 Estimate and measure length, weight, and capacity using appropriate tools.
- Mathematics Grade 3: #4: Data, Probability, and Statistics
  4.2 Display Data on charts and graphs
  4.3 Construct graphs where symbols or scales represent different units.
  4.4 Read and interpret graphs and charts as sources of information; identify main idea, draw conclusions, and make predictions.
- Mathematics Grade 4: #4: Data, Probability, and Statistics
  4.4 Interpret information orally and in writing from charts, tables, tallies, and graphs.
- Mathematics Grade 5: #4: Data, Probability, and Statistics
  4.1 Interpret and construct line graphs.
- Mathematics Grade 6: #4: Data, Probability, and Statistics
  4.1 Create and evaluate graphic representations of data.

ACTIVITY 10: LIFE AT A LIGHTHOUSE

- Social Studies Grade 3: #2: Anthropology/Psychology/Sociology
  2.1 Distinguish similarities and differences among children at different times and in different places.
  2.2 Analyze similarities and differences among families in different times and in different places.
- Social Studies Grade 3: #3 Anthropology/Psychology/Sociology
  3.2 Describe roles performed by children and adults in communities studied
- Social Studies Grade 4: #1: Anthropology/Psychology/Sociology.
  1.3 Analyze similarities and differences among North Carolina's people, past and present.
- Social Studies Grade 4: #11 History
  11.1 Identify and describe changes which have occurred in ways of living in North Carolina.
  11.3 Evaluate the effects of change on the lives of the people of North Carolina.

ACTIVITY 11: A U.S. LIGHTHOUSE TOUR

- Social Studies Grade 4; #3: Geography
  3.1 Describe the absolute and relative location of the state and places within the state.
  3.2 Locate in absolute and relative terms major landforms, bodies of water, and natural resources in North Carolina.
- Social Studies Grade 5: #3: Geography
  3.1 Describe the absolute and relative location of major landforms, bodies of water, and natural resources in the United States.
- English Language Arts Grade 3: #3: Reading Comprehension
  3.12 Understands and interprets maps, charts, diagrams, and other visual representations.