Full-STEAM ahead:

The connections from mainland to barrier islands

STEAM / PBL lesson-launches using the Port Light Project

The Port Light Project evolved from passionate researchers that wanted to preserve and share the rich history of mailboats, freight and buy-boats along the sounds and rivers of North Carolina. The online resource is a collection of primary sources, such as images, audio of oral histories, and text that reveals the economic, cultural, and social impacts on coastal and mainland North Carolina thanks to these vessels. Eighth-grade students will consider relevant standards in both the North Carolina social studies curriculum and the Common Core State Standards.

There are two comprehensive lessons for the NC essential standards using the Port Light Project, but the scenarios listed below are to be considered as a launch pad for teachers looking to do STEAM (science, technology, engineering, art, math) activities and/or PBL (project-based learning) in the classroom. Each scenario is a suggestion - use it as it is presented, or adapt to your students and needs. These launch ideas can be used as a whole-class, small-group or individual activities. Use it for an intensive study over several days, or keep students engaged with scenarios that apply to your curriculum and critical-thinking skills.

Coastal North Carolina needs researchers, analysts and creative problem solvers!

A major storm has swept over the Outer Banks region and the bridges are no longer passable. There are visitors stuck on various islands, locals stuck on the mainland who need to return home to access clean up, and the need for goods to be delivered to help with disaster relief and sustainability. Below are some ways that you can help solve the many issues that arise when natural disasters strike isolated communities.

**Are you an expert in…**

***Math/Engineering:***

With bridges closed and no ferries available, the locals and visitors will need to rely on old workboats to transport goods and people from the islands to and from the mainland. Explore the boat webpages and note which types of boats would be most efficient for crossing the sound. For example,

*“The Missouri only drew three feet of water when fully loaded. These boats were workboats, not speed boats, and probably only ran five to seven knots with a good wind,” Loran O’Neal’s son, L.P., said.*

* Is speed or cargo space a more important factor?

Another factor to consider will be routes between the coast and mainland ports. Review the interactive map and consider why certain areas were more frequent stop than others (Rodanthe versus Ocracoke; Engelhard versus Elizabeth City). Using charts from the NOAA website, determine which route your ideal workboat would take.

* Is it circuitous or linear?
* How many stops would be included? Which towns?
* What is the estimated distance between stops?
* If access to printed charts and a compass, what is the total mileage per trip?
	+ What information do you need to determine the amount of time it would take to make this route?
	+ If you can, calculate an estimated time needed to travel from each point and round-trip.

Once you have selected your workboat and route, create a flyer - either on paper or digitally - that advertises your service to those who need to cross the sound or deliver goods.

[Cape Hatteras](http://www.charts.noaa.gov/PDFs/11555.pdf) (NOAA)

[Currituck Beach Light to Wimble Shoals](http://www.charts.noaa.gov/PDFs/12204.pdf) (NOAA)

[Ocracoke Inlet and part of Core Sound](http://www.charts.noaa.gov/PDFs/11550.pdf) (NOAA)

***Art/Engineering*** :

Due to the loss of reliable boats, you need to come up with a newly designed boat. To start, study the various types of boats featured on the Port Light Project.

* How can you distinguish a “buy-boat” from a “freight boat” and a “mail boat?”

Create a diagram that includes each type of boat you discover on the website and clearly label the key features that make them the resourceful work-boat they needed to be before bridges and passenger ferries. Consider why some boats had smaller cabins, flatter bottoms, tall bows, and other unique construction for the job it required.

Finally, determine the best design for a modern boat that would need to haul people and supplies to and from the coast after a catastrophic event like a hurricane that closes bridges.

* What features would it require to be efficient?

Design and draw the ideal boat and label with justification for select features.

**Science/Technology:**

Hurricane forecasting has made significant advancements, but it’s far from perfect. When a storm is brewing, Meteorologists analyze measurements and influencing factors, such as fronts, as well as use information from past storms for historical reference. As seen in October 2016, the expected track and impact of Hurricane Matthew was wrongly forecasted, leaving people in coastal North Carolina with minimal time to prepare. We rely heavily on technology and computer models, but they are fallible.

Investigate how the National Weather Service, NOAA, and other forecasters evaluate storm information and create their warning models. Take special note of Hurricane Matthew’s track from the southern Caribbean (October 4, 2016) and it’s projected path on that date, and where it ended up through October 10, 2016.

* What do you already know about the factors that influence the direction of a storm? What factors are you surprised to discover can affect the route of a storm?
* What do people near, but not directly in the path, need to be informed of regarding a hurricane?
* Evaluating multiple warning systems for various storms, which entity would you suggest residents and visitors pay closest attention to? Why?

Finally, until recent years, coastal residents had no access to advanced warning for hurricanes like we do in modern day. What evidence can you uncover about how coastal dwellers gather clues from the ocean, sounds, wildlife, weather, etc. to predict when a storm could be headed their way.

Make an infographic using Google Slides, Prezi, or another digital tool to share with peers the various ways to predict and forecast an imminent storm.

***Technology/Math*** :

* How will this storm impact future visitors and those wishing to relocate to coastal North Carolina?

Investigate the change in population of locations in Florida and the Gulf Coast around the timeframe of major hurricanes, as well as the cost of these storms in terms of destruction.

* What can these counties do to ensure visitors and potential newcomers that it is worth the risk to visit or move to their area?

In your proposal (Google Slideshow, Prezi, YouTube ad, etc), be sure to include important factors such as advantages to living in that area, disaster recovery assistance, and how you plan to attract people to the coast via sources of communication.

Did you discover solutions to help coastal NC in the event of a major storm? Did you determine the best route to transport people and goods? Design a new boat to be used for the unique demands post-storm? Propose to future visitors and residents how to prepare for a storm? Please share your work at:

<http://www.coresound.com/saltwaterconnections/portlight/for-teachers>

**Resources**:

Cape Hatteras. NOAA. <http://www.charts.noaa.gov/PDFs/11555.pdf>

Currituck Beach Light to Wimble Shoals. NOAA. <http://www.charts.noaa.gov/PDFs/12204.pdf>

Ocracoke Inlet and part of Core Sound. NOAA. <http://www.charts.noaa.gov/PDFs/11550.pdf>