

**Unit Name: Lighthouse Design Challenge**

**Time Frame: 1-2 class periods**

**Author: Egg Harbor Township STEM Committee**

## UNIT

Subject: **Science/LAL/Math**

Country: USA

Course/Grade: 5<sup>th</sup> Grade

State/Group: NJ

School: Egg Harbor Township School District

### **Materials:**

Each group would need:

**20 spaghetti sticks, 1 yard of string, 1 large marshmallow & 1 yard of masking tape**

### **UNIT SUMMARY:**

This would be a great ending to the Light Unit or Forces in Science, United States unit for Social Studies, or for an Expository essay anticipatory set.

The students will work in groups of 5-6 and create a freestanding lighthouse (or cellular tower.) The goal is to make the highest lighthouse using only the materials given. Their design will need to hold a large marshmallow at the top.

### **UNIT RESOURCES:**

5<sup>th</sup> Grade Science Textbook (Light Unit or Forces Unit)

Worksheets attached

Lighthouse Research Project

### **Internet Resource Links:**

[http://en.wikipedia.org/wiki/List\\_of\\_lighthouses\\_in\\_the\\_United\\_States](http://en.wikipedia.org/wiki/List_of_lighthouses_in_the_United_States)

## STAGE ONE

### **GOALS AND STANDARDS:**

SCIENCE:

5-PS2 Motion & Stability: Forces and Interactions

5-PS2-1 Gravitational Force exerted by Earth on objects is directed down.

3-5-ETS1 Engineering

SOCIAL STUDIES:

United States 6.2 Geography World Studies

LAL:

CCSS.ELA-Literacy.W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

CCSS.ELA-Literacy.W.5.1b Provide logically ordered reasons that are supported by facts and details.

**ENDURING UNDERSTANDINGS:**

Students will understand how to work cooperatively to design the highest freestanding lighthouse using spaghetti sticks, tape and yarn. Their lighthouse will have to hold their light (aka marshmallow.) They will understand that when designing a building, the architect needs to consider gravity and weight and climate.

**ESSENTIAL QUESTIONS:**

Why do we use a lighthouse? What challenges do you face when trying to design a high structure?

**KNOWLEDGE AND SKILLS:**

Students will learn how to work with others and consider other ideas when working together.

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**PERFORMANCE TASKS**

**LAL Component (Optional to complete prior to design lesson):**

You will write an expository piece about a United States lighthouse. You will research a specific US Lighthouse and tell us about it in your own words in essay form.

- Include when it was built, what it was used for, where it is located and if it is still be used. Include a cover sheet with a picture of the lighthouse, either drawn or printed out.

**Optional Design Lesson with LAL:** You may create a replica of the lighthouse using household items, such as cups. Decorate and present to the class.

**LAL: STEM Challenge Reflection Questions to be completed after Design Challenge.**

Grade \_\_\_\_\_/5

**Directions:** Answer each question on a separate piece of paper in **paragraph** form.

1. What did you like best about the Lighthouse STEM design project?

2. What was the biggest challenge your group faced during this challenge? How did you overcome this obstacle?
3. If you were going to do this again, what would you do differently to improve your structure?
4. If you were the teacher, how would you change this challenge to make it better?
5. Explain what you know about lighthouses.

## STAGE THREE

### LEARNING PLAN:

#### Vignette:

Your Miller School Lighthouse Association (MSLA) has just been contracted by the US Coast Guard as a finalist for a \$1 Million contract for their new lighthouse program. In the final phase of the selection process, there will be a design challenge. MSLA has selected your team of designers to participate in this challenge. Your team will only have 18 minutes to design the tallest FREESTANDING structure to hold up a marshmallow, using only 20 spaghetti sticks, a yard of tape and a yard of string. The winning team is the one that has the tallest structure measured from the tabletop surface to the top of the marshmallow. You may use as much or as little of the spaghetti, string or tape. You are free to cut or break anything other than the marshmallow. Cutting or eating part of the marshmallow disqualifies the team. After the 18 minute time period, touching or supporting the tower with anything other than the allowed materials will disqualify the team.