LESSON 2: HURRICANES

Youth Preparedness Initiative

MATERIALS NEEDED:

- Medium bowl
- Water
- Spoon
- Blue food dye
- Computer
- Projector
- Modeling clay
- Construction paper
- Disposable foil tray
- Popsicle sticks
- Tape
- Floor fan
- Blue streamers
- Cups
- Water
- Scissors
- Pencils
- "Hurricane Engineering" worksheet

NOTES

"*Denotes instructor statements to class.*"

PROJECT AREA:

Disaster Preparedness

LESSON # IN BOOK:

Two out of six

TARGET AGE/GRADES:

Fourth through eighth grade

TIME LENGTH REQUIRED:

60 minutes

LESSON OBJECTIVES:

- Youth will be able to identify what a hurricane is.
- Youth will be able to construct a hurricane-proof house in groups.
- Youth will be able to experiment how strong hurricane winds are.

VOCABULARY WORDS:

- **Hurricane:** A storm with violent wind, in particular a tropical cyclone over subtropical waters.
- **Levees:** An embankment built to prevent the overflow of water.
- **Evacuate:** Move from a place of danger to a safer place.

INTRODUCTION TO LESSON:

Have supplies (bowl, water, spoon, dye) for the circular motion of a hurricane experiment out before class starts.

"To begin class, I want to show you something. Without saying anything, think about what the experiment I am doing reminds you of."

Perform the circular motion of a hurricane experiment in front of the students. Allow them to come up the table to see the bowl. (Image shown on page 2.)

Steps:

1. Fill the bowl three-quarters full of water.
2. Use the spoon to gently create swirls in the water.
3. As soon as you have a circular motion in the water, add two drops of blue dye.
4. Observe how the dye rotates.

"After talking about natural disasters, we identified a few different types. What does this experiment remind you of? A hurricane is right. This circular motion mimics how winds of a hurricane swirl around. The image of one big white swirl is what we see on the news and radar."

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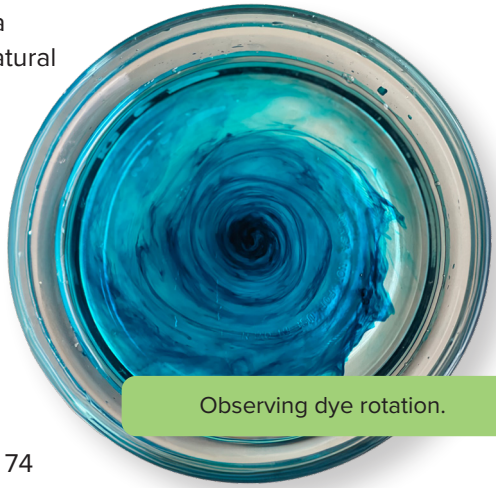
HURRICANE INTENSITY SCALE LINK:

https://www.nhc.noaa.gov/aboutsshws.php

"Today we will go into further explanation of what a hurricane is since it is one of the most common natural disasters in Louisiana."



Observing dye rotation.

EDUCATIONAL BACKGROUND:

"So, what exactly is a hurricane? A hurricane is a large rotating system of clouds, wind and rain. They form as tropical storms in the Atlantic Ocean, Caribbean Sea, Gulf of Mexico or Pacific Ocean. When the sea waters warm up, the air pressure over the area drops which causes thunderstorms, massive waves and strong winds. Once these tropical storms have winds that reach 74 mph or above, the storm is officially called a hurricane. These massive storms rotate in a clockwise rotation around the eye which is what was shown in the beginning of class. Some may think that this storm is just a little wind and rain, but this natural disaster can damage buildings and properties, as well as cause land loss and flooding. They can happen all year round, but we mostly see them during hurricane season which is June to November.

Due to its strong winds, we classify hurricanes by their wind speeds. For example, when a hurricane is forming in the sea, we look at the Saffir-Simpson Hurricane Scale to categorize it as a 1-5. A Category 1 hurricane has the lowest winds (74-95 mph), and a Category 5 has winds of 157 mph or more (Kidz World, n.d.). That is incredibly strong! Let's take a look at the scale."

Go to the link to show Hurricane Intensity Scale (Wind Damage) to students to get a better understanding. (Link is listed to the left.)

"When tropical storms begin, they get a name once the winds reach 40 mph. The names are listed in the beginning of each year starting with the letter "A" then "B" and so on. Some names used in the past were Katrina, Andrew and Sandy. In fact, Hurricane Katrina was one of the biggest impacting storms that went from a Category 1 hurricane to a Category 5. It caused severe flooding, loss of power to more than a million people and several deaths. This storm hit several states including Louisiana, Mississippi, Alabama, Georgia, Florida, Tennessee and Kentucky (Kidz World, n.d.).

How did they know the storm was coming? With hurricanes, we are able to track them and guess their path. It is not always certain which path they will take, but for the most part we can pinpoint where the storm will reach land and at what time. Tracking is done from satellites and planes. They collect data such as temperature, humidity and wind

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HURRICANE TRACKING SYSTEMS LINKS:

Link 1:
https://coast.noaa.gov/hurricanes/#map=4.59/31.99/-

Link 2:
https://www.nhc.noaa.gov/

speed. The data is compiled to create a forecast model to predict the path. This is what we see on the news. Being able to track a hurricane helps us prepare for the storm. To see an example of one, click the links to see Hurricane Katrina's path and a current view of any storm in the ocean."

Use the links listed to the left to see an example of a hurricane tracking system.

"Since we know what a hurricane is and where they mostly appear, we can tell that Louisiana is in a prime location to have hurricanes. In fact, since 2000 there were at least 28 hurricanes that affected Louisiana. They have also affected Louisiana by causing land loss. Since the 1930s, Louisiana has lost more than 2,000 square miles of land (Restore, n.d.). That is a lot of land being lost! With hurricanes making landfall and bringing in strong tidal waves, many restoration organizations have made it a priority to protect the coast because hurricanes are occurring more often. Levees and other restoration projects have also been significant in the coastal region to protect from the loss of land, homes and structures. Levees are built to prevent overflow of water. They protect the towns from storm surge. Little things like this help Louisiana and its fight against these massive natural disasters that come quite often.

Overall hurricanes are an interesting natural disaster and tend to leave a trail behind them. Many effects of the storm are severe, and it can take years to rebuild the area or resettle people back into the area. Although we never know what the damage will be like until the storm passes, we can still be warned well in advance to prepare for a great impact. Boards can be placed over windows. Sandbags are given out to place around doors. Businesses close, and the whole town goes undercover. If the storm is severe, some mayors or the governor can even make it mandated that people evacuate their homes and towns. This natural disaster is always destructive no matter the size.

In fact, to better understand how strong a hurricane is, let's experiment with a hurricane STEM challenge!"

ACTIVITY:

Hurricane STEM Challenge

Have materials distributed beforehand for each group to grab at a materials table. Only give a small amount of supplies including construction paper, popsicle sticks and tape. This makes it challenging for them. Print the "Hurricane Engineering" worksheet. Tape strips of blue streamers to the top of the floor fan and place the foil pan in front of the fan.

Have modeling clay available near the fan for Step 3 below.

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NOTES

ACTIVITY REFERENCE PICTURES

See page 6

HURRICANE ENGINEERING WORKSHEETS:

See page 7-8

“Now that we all know what a hurricane is and how destructive it can be, let’s experiment with how powerful the winds of a hurricane are. Today you will get into groups of three to create a hurricane-proof house with only the supplies I give you. Be creative and remember to work together!”

Steps:

1. **Plan:** Each group will get a “Hurricane Engineering” worksheet to sketch out and plan your hurricane-proof house design. Think about the effects of a hurricane and its characteristics to help you through the process. You will have 10 minutes to do this.
2. **Construct:** After planning out your design for the house, you will have 15 minutes to build your structure only using the materials given to you.
3. **Experiment:** Now that each group is done building, one group at a time will bring their house to the fan which will simulate a hurricane. Use modeling clay to securely place your house inside the pan. Pour one cup of water into the pan. This will simulate the flooding caused by hurricanes. Turn on the fan to simulate strong winds.
4. **Evaluate:** On the “Evaluation” portion of the “Hurricane Engineering” worksheet, answer the following questions: Did your house fall down or stay up during the storm? Did you think it would succeed or not? Why or why not? What would you do differently? What is something you learned about hurricanes?

Reference pictures for this experiment can be found on page 6.

REFERENCES:

All About Hurricanes. (2018, September 20). Retrieved From https://www.kidzworld.com/article/5949-all-about-hurricanes (accessed October 2023).

Hurricane STEM Challenge-Carly and Adam Blog. (2017, October 9). Retrieved From https://carlyandadam.com/thecarlyandadam/hurricane-stem-challenge?Format=amp (accessed October 2023).

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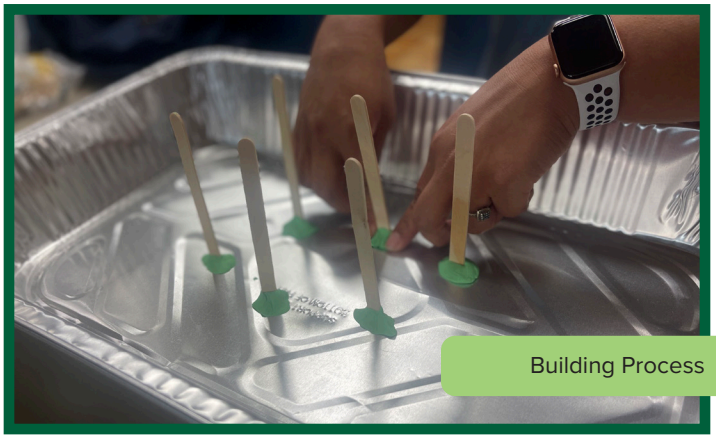
NOTES

REFLECTION AND EVALUATION:

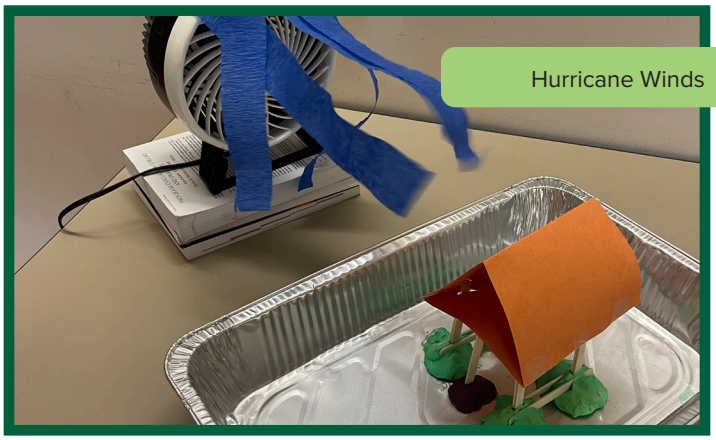
Go over the questions that the students answered on the “Hurricane Engineering” worksheet. Have the students discuss their answers and answer any additional questions.

ACTIVITY REFERENCE PICTURES:

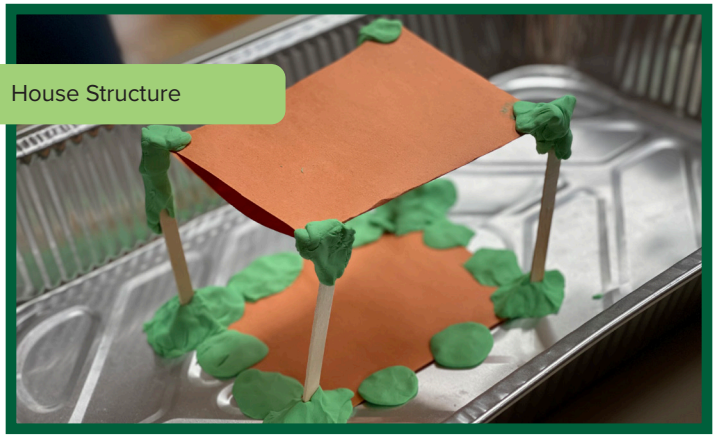
Materials Distributed



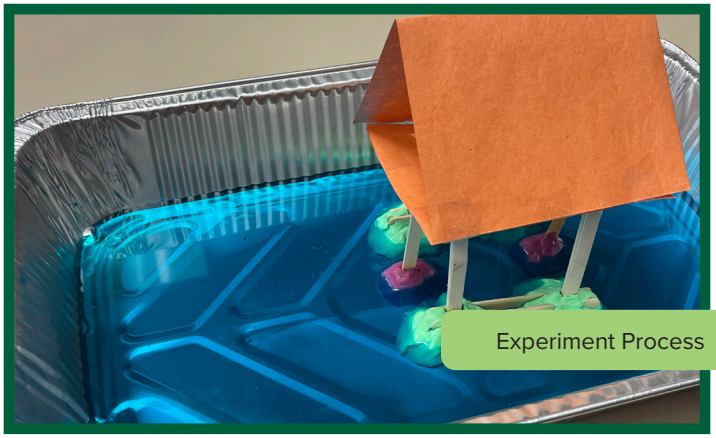
Building Process



Hurricane Winds



House Structure



Experiment Process

HURRICANE ENGINEERING

GROUP DESIGN:

NAME: _____

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EVALUATION

NAME: _____

1. Did your house fall down or stay up during the storm? _____

2. Did you think it was going to succeed or not? Why or why not? _____

3. What would you do differently? _____

4. What is something you learned about hurricanes? _____

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NOTES

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