

Keepin' Your Head Above Water



Middle School Lesson Plan for Science and Social Studies



Keepin' Your Head Above Water: *Know Your Flood Protection System*

MIDDLE SCHOOL LESSON PLAN FOR SCIENCE AND SOCIAL STUDIES

Easily Adapted for Lesser or Higher Grade Levels

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TOPICS: Flood Protection Structures, Storm Surge & Hurricane Preparedness

DURATION OPTIONS: 1 or 2 class periods. 1 day field trip.

Short Versions of Full Lesson Guide

BRIEF LESSON DESCRIPTION

The instructors will engage students in activities related to flood protection structures, storm surge and hurricane preparedness using interactive mapping, viewing and discussing of videos, and hands-on modeling exercises.

MATERIALS

- Projector, speakers and computer/laptop with internet connection to be provided by teacher/school
 - Model supplies will be furnished by the instructors

RESOURCES

Flood Protection Authority / Homepage / Map

<https://www.floodauthority.org/>

Flood Protection Authority / Teacher Resources Page / Videos

<https://www.floodauthority.org/education/teacher-resources/>

Earth with Maps

<https://www.google.com/maps/@29.9627165,-90.0653353,15z>

NOAA / Storm Surge Video

<https://www.youtube.com/watch?v=pvY0KldmQdM>

FEMA / Hurricane Preparedness

https://www.ready.gov/hurricanes?gclid=EAlaIqobChMIgc7x8_ah5wIVDfDACH1Ziw0MEAAYASAAEgJ2HfD_BwE

LOUISIANA STUDENT STANDARDS IN SCIENCE FOR 8TH GRADE

8-MS-ESS3-2

- Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

8-MS-ESS3-3

- Apply scientific principles to design a method for monitoring and minimizing human impact on the environment

LOUISIANA STUDENT STANDARDS IN SOCIAL STUDIES FOR 8TH GRADE

STANDARD 3

Geography Skills

Students develop spatial understanding through the study of location, distance, direction, pattern, shape, and arrangement.

8.3.1 Locate and describe the physical and political features of Louisiana

8.3.2 Use maps, charts, and diagrams to ask and answer questions about Louisiana's geographic features

STANDARD 5

Environment

Students analyze the effects of the environment on people and places in Louisiana.

8.5.1 Describe how natural phenomena impact the physical environment of Louisiana

8.5.2 Analyze and predict consequences of environment modifications of Louisiana and its inhabitants



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SPECIFIC LEARNING OUTCOMES

By the end of the lessons, the students will:

- Analyze and interpret data from maps, thereby strengthening geospatial skills;
- Discern and interpret important information from videos regarding the effects of natural hazards (storm surge from tropical cyclonic systems) on local communities;
- Discuss the topographic region in which they live, identify surrounding waterbodies and extrapolate the risks of storm surge from these waterbodies;
- Locate flood protection structures in relation to where they live and discuss how these structures protect them from storm surge;
- Build a hands-on model of a storm surge barrier following the engineering design and construction process;
- Share what they have learned about hurricane preparedness with their family and friends.

PRIOR STUDENT KNOWLEDGE

Students should have some background knowledge of the topography of the Greater New Orleans area, especially the fact that it is at or below sea-level. For this reason, their homes and neighborhoods are vulnerable to the impacts of storm surge from tropical cyclone systems.

POSSIBLE PRECONCEPTIONS/MISCONCEPTIONS

1. Many students think that maps are too complicated and that the information depicted on maps has no relevance to their lives.
2. Many students do not know that the waterbodies they live near may cause grave risks from tropical cyclone systems to their homes and neighborhoods.
3. Most students do not know what structures protect them from these flood risks.

LESSON PLAN — 5E MODEL

ENGAGE

1. The instructors will use the Flood Protection Authority's Website to provide students with a geographical orientation of the Greater New Orleans area's Hurricane and Storm Risk Reduction System's (flood protection) structures.
2. The instructors will use Google Earth to enter the school's street address zooming in and out for students to identify surrounding waterbodies and the directions from which storm surge may take to infiltrate the Greater New Orleans area
3. The instructors will show NOAA's Storm Surge video that dramatically portrays storm surge
4. The instructors will show the Flood Protection Authority's video of the Lake Borgne Storm Surge Barrier to show and discuss this world-class structure and how it protects St. Bernard, Orleans and Jefferson Parishes from storm surge due to a tropical weather systems
5. The instructors will show the Flood Authority's Video of the Permanent Canal Closures and Pumps to show and discuss how they protect Orleans and Jefferson Parishes from storm surge and street flooding



LESSON PLAN — 5E MODEL

EXPLORE

1. In small groups, students will undertake a hands-on activity to design and construct a storm surge barrier model and prove its effectiveness at protecting from storm surge
2. Field Trip Option (if school and time permits): 1 day field trip which includes: 2 hours in the morning at the Flood Protection Authority – East's Lake Borgne Storm Surge Barrier to experience this marvel of engineering which protects the Greater New Orleans area from hurricane storm surge; 2 hours in the afternoon at the University of New Orleans Center for Environmental Research Facility for hands-on experiments in wetlands, near the Surge Barrier at Chef Menteur Pass, that will teach students about the importance of wetlands.

EXPLAIN

1. The instructors will conduct Q&A and facilitate class discussion about the mapping, video and modeling activities in these lessons.

ELABORATE

1. Given all that the students have learned from these lessons, the instructors will have them offer their thoughts on the relationship between the categories of hurricanes and the flood protection structures' capacities to withstand each category
2. The guest instructor will conduct Q&A with a discussion about hurricane preparedness

EVALUATE

1. Students will compile the information they learned from these lessons to teach their family and friends about what they learned
2. Students will determine what type of outreach tool they will use to organize and prioritize information for use in a brochure, video, poster, flyer, social media posts, etc.