

Hurricane Devastation

Lesson Plan for Grades: High School Length of Lesson: 60 minutes
Authored by: UT Environmental Science Institute
Subject area/course: <ul style="list-style-type: none">• Natural Science: Meteorology• Social Sciences: Economics and Sociology
Materials: <ul style="list-style-type: none">• Student handouts•
TEKS/SEs: <p>Highschool Environmental Systems: (9) Science concepts. The student knows that environments change naturally. Student is expected to:</p> <p>(A) analyze and describe how natural events such as tectonic movement, volcanic events, fires, tornadoes, hurricanes, flooding, and tsunamis affect natural populations;</p> <p>(C) describe how temperature inversions have short-term and long-term effects, including El Niño and La Niña oscillations, ice cap and glacial melting, and changes in ocean surface temperatures</p>
Lesson objective(s): <ul style="list-style-type: none">• Students will analyze how the dangers presented by a hurricane can be either mitigated or exasperated by our laws, policies, infrastructure and economies.• Students will evaluate various precautions taken by society to lesson the impact of hurricanes
Differentiation strategies to meet diverse learner needs: <ul style="list-style-type: none">• The teacher provides multiple ways of interacting with content: read, watch videos, take notes.• ELL students and students with learning disabilities should have multiple forms of instruction including visual and written instruction sheets as well as a verbal instruction and demonstration.
ENGAGEMENT (20 minutes) <ul style="list-style-type: none">• Teacher begins the lesson by asking the students to define a hurricane and answer the following questions. Students should discuss this in small groups before a short class discussion on the topic.<ul style="list-style-type: none">o What is a hurricane?o How are they formed?o What makes a hurricane dangerous?o Where are hurricanes most dangerous• Present slides 1-5 on the google slideshow (Hurricane Devastation Slides High School)• Students discuss in groups what parts of a hurricane should be considered when classifying hurricanes.• After this discussion the teacher should introduce students to the idea that our current precautions against hurricanes are not necessarily the best possible ones (slide 7).

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EXPLORATION (40 minutes)

- Every student should be given the city planning student handout (should be printed double sided)
- Class discussion about the different actions a city can take to reduce the harms done by a hurricane
- After the discussion, the teacher goes through the slides stopping at slide 11 to introduce different possible classifications for the precautions that cities can take.
- Students create a city that is as safe from hurricanes as possible (15 min)
 - Guiding questions for this activity
 - What issues are societies most likely to face when issuing evacuation orders?
 - How might you address these issues?
 - What part of the hurricane is the most important to take precautions against?
 - How would your city pay for your precautions?
- Student should leave their city planning sheet on their table and participate in a gallery walk (10 minutes)
 - Each student should leave at least 3 comments across the entire gallery
 - something positive, something that could be improved, a question
 - After the gallery walk the students should fill out the questions below the gallery walk table
- Class discussion about the gallery walk. Possible probing questions:
 - What type of measures did you see most often in the gallery walk? Why do you think that was?
 - Were there any common drawbacks? What is a possible solution?

EXPLANATION (15 minutes)

- Students reflect on:
 - What complaints might people have about many common precautions taken to protect against hurricanes
- Teacher introduces slide 12 to class to explain that many precautions will have negative effects or difficulties.
- Teacher proposes the following precautions and asks the students how they think people would respond to it.
 - A city spends 5 years constructing a stone wall across the beach to protect from storm surges
 - A city raises taxes in order to fund an emergency response program in the case of a hurricane
 - A city installs various sirens that they regularly test once a month
 - A city creates a stockpile of resources
- Class reflects: Why it is so difficult for people to agree on what precautions should be taken?

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ELABORATION 20 minutes)

- Each table group is given another city planning sheet
- Each group to make a city taking into account what they learned (15 min). Probing questions:
 - Why did you end up making that change?
 - What did you keep the same? Why?
 - Do you think any of these precautions would be unpopular? Why?
- Optional: After the new cities are made, the lead a short class discussion about how cities on the coast must weigh the issues caused by the displeasure of their citizens with the benefits brought by taking precautions against hurricanes

EVALUATION (throughout entire lesson)

- There will be 2-3 methods of evaluation throughout this lesson
 - The teacher will be observing and aiding students whenever they are within small groups.
 - The sheets that the students will be given during the explanation and exploration section of this lesson plan will be turned in as an exit ticket at the end of class

SOURCES AND RESOURCES

- *Earth's forecast: Hurricanes and climate change*. Exhibits. (n.d.).
<https://www.floridamuseum.ufl.edu/exhibits/online/hurricanes-climate-change/>
- Heaslip, E. (n.d.). *What is a storm surge and what causes it?*. Sofar Ocean - Connecting the World's Oceans.
<https://www.sofaroccean.com/posts/what-is-a-storm-surge-and-what-causes-it#:~:text=Flooding%20from%20hurricanes%20and%20tropical,caused%20by%20the%20storm%20surge.>
- *Here's what's wrong with the way we measure hurricanes - and how we could do better*. StormGeo. (2020, October 13).
<https://www.stormgeo.com/weather/articles/heres-whats-wrong-with-the-way-we-measure-hurricanes-and-how-we-could-do-better/>
- Resnick, B. (2018, September 14). *Why some people never evacuate during a hurricane, according to a psychologist*. Vox.
<https://www.vox.com/science-and-health/2017/8/25/16202296/hurricane-florence-2018-evacuation-psychology>
- Doctor Kerry Emanuel *Hot Science – Cool Talks*, “Hurricane Destructiveness in the 21st Century,
<https://www.youtube.com/watch?v=jT-jsVTzQFI>

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Box for city drawing



Use the below space to explain why you chose these particular precautions:

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Gallery walk feedback

Measure that work well together:	Potential drawbacks:	Possible Improvements:

Post gallery walk questions:

1. Are there any precautions you saw in the gallery walk that may work well in your city?
2. Were there any drawbacks that were common in the gallery walk? Why?
3. What measures were most common between the cities? Why?

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RUBRIC FOR ASSESSMENT

Strand	1	2	3	4
A: Participation	The student did not participate in class or small group discussion	The student only participates in class or small group discussion when called upon	The student provides limited insight in class and small group discussion	The student provides significant insight in class and small group discussion
B: Planning	Student did not complete handout to satisfaction	Student included at least 3 precautions Student provided did not reflect in the questions	Student Included at least 4 precautions: 1 of which was not mentioned on the slides Student had some basic reflection on the post gallery walk questions	Student Included at least 5 precautions: 2 of which was not mentioned on the slides Student had advanced reflection on the post gallery walk questions