

Lessons 1–3

1900 Galveston Hurricane

Prepare

Lessons 1 through 3 build knowledge about severe weather as students learn more about weather hazards that result from natural processes. In Lesson 1, students investigate weather hazards by exploring the story of the 1900 Galveston hurricane, which leads them to make observations and ask questions about how a hurricane destroyed an entire city. These observations and questions help students think about the cause and effect relationship between weather hazards and resulting damage as in Lesson 2 they create an initial model of weather conditions during the 1900 Galveston hurricane. As students learn more about weather conditions throughout the module, they update a class anchor model to demonstrate an understanding of what caused the destruction in Galveston in 1900. In Lesson 3, students build a driving question board based on their observations and questions from previous lessons. The questions that students develop help guide their learning throughout the rest of the module.

Concept 1: Weather Conditions

Focus Question

How do we describe weather?

Phenomenon Question

What happened in Galveston, Texas, in 1900?

Student Learning

Knowledge Statement

Weather hazards pose a threat to life and property.

Objectives

- Lesson 1: Observe photographs of Galveston, Texas, before and after the 1900 hurricane and describe the damage.
- Lesson 2: Develop a class anchor model to explain what happened in Galveston, Texas, during the 1900 hurricane.
- Lesson 3: Ask questions about how a hurricane can cause a disaster such as the disaster in Galveston, Texas.

Texas Essential Knowledge and Skills Addressed

- 3.3B **Represent the natural world using models** such as volcanoes or the Sun, Earth, and Moon system and identify their limitations, including size, properties, and materials. (Introduced)
- 3.8A **Observe, measure, record, and compare day-to-day weather changes in different locations at the same time that include air temperature, wind direction, and precipitation.** (Introduced)

English Language Proficiency Standards Addressed

- 2I **Demonstrate listening comprehension of increasingly complex spoken English by following directions, retelling or summarizing spoken messages, responding to questions and requests, collaborating with peers, and taking notes commensurate with content and grade-level needs.**
- 3D **Speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency.**
- 4F **Use visual and contextual support and support from peers and teachers to read grade-appropriate content area text, enhance and confirm understanding, and develop vocabulary, grasp of language structures, and background knowledge needed to comprehend increasingly challenging language.**



Materials

		Lesson 1	Lesson 2	Lesson 3
Student	Science Logbook (Lesson 1 Activity Guide)	●		
	Science Logbook (Module Question Log)	●		●
	Science Logbook (Lesson 2 Activity Guide)		●	
Teacher	St. John’s Church Photographs (Lesson 1 Resource A)	●		
	Map of the United States	●		
	National Public Radio Broadcast Excerpt (Burnett 2017) (Lesson 1 Resource B)	●	●	
	Galveston after the Storm Photographs (Lesson 1 Resource C)	●	●	
	Wooden board or brick			●
	Class notice and wonder chart from Lesson 1			●
Preparation	None			

Lesson 3

Objective: Ask questions about how a hurricane can cause a disaster such as the disaster in Galveston, Texas.

Launch 5 minutes

Pass around a wooden board or a brick for students to observe.

- ▶ **How much strength do you think it would take to break this wooden board (or brick)?**
 - *I think that it would take a lot of strength to break it.*
 - *Bricks are very strong. I think it would be hard to break one.*
 - *I've seen people break wooden boards by hitting or kicking them.* 
- ▶ **Do you think the weather could break the wooden board (or brick)? Have we observed anything about the Galveston hurricane that helps support your answer?**
 - *Yes, it looked like a lot of the broken material in the pictures was wood.*
 - *The church looked like it was made of brick or stone, and part of the church was destroyed.*

Agree that the Galveston hurricane must have been a very strong storm to break the wood and brick of the city's buildings.

Agenda

Launch (5 minutes)

Learn (35 minutes)

- Discuss Related Phenomena (10 minutes)
- Build a Driving Question Board (25 minutes)

Land (5 minutes)



Extension

If students completed the Optional Homework for Lesson 2, this Launch can be extended to ask students to share what they learned from interviewing family members about their experiences with dangerous weather. This discussion will create a natural bridge from the previous lesson's learning to this one.



Teacher Note

Students may bring up that they have seen a person use martial arts techniques to break a wooden board. If so, remind students that although a human can be strong enough to break a single board, the hurricane had enough strength to break many boards.

Learn 35 minutes

Discuss Related Phenomena 10 minutes

To help students think more deeply about the anchor phenomenon, ask them to share any familiar phenomena they think might be related to severe weather such as the 1900 Galveston hurricane.  Use the following question to draw out student knowledge.

- ▶ Have you ever heard of or experienced any severe weather like what people in Galveston experienced in 1900? 
 - I've heard of floods damaging homes.
 - I know that a tornado can knock down big trees and buildings.
 - I've seen a mudslide make houses fall and cover up roads.
 - In the winter, blizzards can bury cars and homes in snow.
 - Lightning can strike trees, buildings, and people if they are not careful.
 - Hurricanes, like the one in Galveston, can cause an entire city to be destroyed.
 - During a bad storm, my mom's car was hit by hail, and it broke the windshield.
 - Droughts can cause plants to die.

Add student responses to the bottom of the piece of chart paper that will become the driving question board. Label the section Related Phenomena. Refer to this student-generated list of phenomena throughout the module and add to the list any time students suggest relevant related phenomena.

Build a Driving Question Board 25 minutes

Return to the class notice and wonder chart created in Lesson 1, and ask students if they have any additional questions to add to the chart. Then ask students to choose at least one question they are most interested in and to write it on a sticky note.



Differentiation

Sharing related phenomena allows students with diverse backgrounds and experiences to engage with the anchor phenomenon (4F).



Teacher Note

Students will most likely share experiences related to severe weather that is common where they live. It is reasonable to expect that some students may not have personal experience with blizzards, hurricanes, or other types of severe weather. A variety of other types of severe weather and related weather hazards will be explored later in the module.



Check for Understanding

As students generate additional questions, look for evidence of a beginning understanding of severe weather and weather hazards.

Evidence

Look for evidence that all students

- understand how severe weather and weather hazards are related, and
- understand that severe weather and weather hazards pose a threat to life and property.

Next Steps

Some students may have little to no understanding about severe weather and weather hazards, whereas others may have firsthand experience. Some students may also reveal understanding of emergency preparedness and engineering solutions, such as building stronger structures and flood walls to help protect communities from weather hazards. Informally note students' existing understandings to monitor how they develop throughout the module. Use these notes to help gauge student growth.

Tell students they will now use their questions to develop a driving question board. Explain that they will refer to this driving question board throughout the module as they seek to answer their questions about the 1900 Galveston hurricane.

Lead a class discussion in which students share the questions from their sticky notes. After one student reads a question and places it on the driving question board, invite students who think they have a related question to read theirs and place it next to that question on the driving question board. Throughout the discussion, ask students follow-up questions or make suggestions to help students group their related questions. Guide students toward grouping their questions into the three categories listed below. After students have finished posting their questions, work together to develop and post the Focus Question for each category on the driving question board.

Concept 1 Focus Question: **How do we describe weather?**

Related student questions may include the following:

- *Was there a lot of wind?*
- *How much rain fell during the storm?*
- *What did it look like during the hurricane?*



Teacher Note

Students may need guidance to develop and choose questions for the driving question board. Keep the Essential and Focus Questions in mind while guiding students to select questions.

As students share and group their questions on the driving question board, some guidance will still be necessary. Keep the Focus Questions available for reference. As students post their questions, offer occasional guidance to ensure that groups of questions can later be summarized under each Focus Question.



Differentiation

Consider pairing English learners and striving writers with another student to practice reading their questions aloud in a smaller group. When students are comfortable sharing, have them add their questions to the driving question board (3D).



Teacher Note

To encourage students to place the Focus Questions on the driving question board, think aloud with students about the patterns in their questions. Use this discussion to come to a summary that the Focus Question can represent.



English Language Development

The Essential Question, Focus Questions, and Phenomenon Questions throughout this module use words such as *describe*, *predict*, *plan*, *prevent*, and *protect*. Consider introducing these terms explicitly. Sharing the Spanish cognates for *describe* (*describir*), *predict* (*predecir*), *plan* (*plantificar*), and *protect* (*proteger*) may be useful.

Concept 2 Focus Question: How do people know what weather to expect?

Related student questions may include the following:

- *What is the weather in Galveston normally like?*
- *Had this ever happened before?*
- *Why didn't people know a hurricane was coming?*

Concept 3 Focus Question: How can we plan for severe weather?

Related student questions may include the following:

- *Can a hurricane like the one in Galveston happen here?*
- *How big was the storm that caused all this damage?*
- *Did they have any warning systems?*

After posting the Focus Questions, summarize the theme in all the students' questions to develop the Essential Question: **How can we prevent a storm from becoming a disaster?** Post this question across the top of the driving question board, and have students record it in the Module Question Log of their Science Logbooks.

Post the driving question board in a public place that makes it easy to update and revisit throughout the module. It may also help to allow space to post associated sample student products along the way.

Sample driving question board:

Essential Question: How can we prevent a storm from becoming a disaster?

<p>How do we describe weather?</p> <p>Was there a lot of wind?</p> <p>How much rain fell during the storm?</p> <p>What did it look like during the hurricane?</p>	<p>How do people know what weather to expect?</p> <p>What is the weather in Galveston normally like?</p> <p>Had this ever happened before?</p> <p>Why didn't people know a hurricane was coming?</p>	<p>How can we plan for severe weather?</p> <p>Can a hurricane like the one in Galveston happen here?</p> <p>How big was the storm that caused all this damage?</p> <p>Did they have any warning systems?</p>		
<p>Related Phenomena:</p>	<p>Floods can damage homes.</p>	<p>Tornadoes can knock down trees and buildings.</p>	<p>Mudslides can cause houses to fall.</p>	<p>Blizzards can bury cars and homes in snow.</p>
	<p>Lightning can strike trees, buildings, and people.</p>	<p>Hurricanes can destroy entire cities.</p>	<p>Hail during storms can damage cars.</p>	<p>Droughts can cause plants to die.</p>

The class will revisit the driving question board periodically throughout the module to discuss questions that have been answered and to add new questions.

Land

5 minutes

Draw students' attention to the driving question board, and ask them to consider which category is the best place to begin answering the Essential Question: **How can we prevent a storm from becoming a disaster?** As needed, use a prompt such as this: Which of the Focus Questions must we answer first before we can answer the other questions?

Through discussion, guide students to choose the Concept 1 Focus Question: **How do we describe weather?** Ask students to think about ways they can begin to answer this question.

Sample student responses:

- *Maybe we can think about the ways we describe weather where we live.*
- *I think we need to find out how scientists describe weather.*
- *I already know how to describe some weather, but maybe we need to find out more about other types of weather.*

Agree that learning more about how to describe weather may help students understand how people can prevent a storm like the one that occurred in Galveston from becoming a disaster.