

Unit Opening

Will there be more frequent and more intense severe storms in the future?

Performance Expectations
HS-ESS3-5

Anchor Phenomenon

It has felt like storms are getting worse. Does the data support that feeling, and will it continue?

Time

1-2 days

In this unit, students figure out the processes that cause weather phenomena, and they make qualitative claims about how climate change can affect storm frequency and intensity. To do this, they use a variety of physical and computer models related to these weather phenomena to explore the cause and effect relationships among variables such as temperature, water vapor, and air pressure; analyze and interpret national and global weather and climate data to find spatial and temporal patterns; construct explanations about what causes these types of storms; and engage in argument based on evidence from models and the data about what might happen in the future.

Anchor Phenomenon

It felt like hurricanes and blizzards were really bad this past year. What does the data show? Will this continue?

Students use observations from videos and analyses of maps that show data about recent winter storms and tropical cyclones to look for patterns.

Performance Task

Will there be more frequent and more intense severe storms in the future?

Students develop initial predictions about storms.

Driving Question Board

Will there be more frequent and more intense severe storms in the future?

Students ask questions that would help investigate these weather phenomena to improve their predictions.

Science & Engineering Practices

Disciplinary Core Ideas

Crosscutting Concepts

Anchor Phenomenon

It felt like hurricanes and blizzards were really bad this past year. What does the data show? Will this continue?

Students use observations from videos and analyses of maps that show data about recent winter storms and tropical cyclones to look for patterns.

Preparation

Student Grouping

- ☐ Groups of 3-4 students

Routines

- ☐ Tell the Story

Literacy Strategies

None

Materials

Handouts

- ☐ Tell the Story: Blizzards
- ☐ Tell the Story: Tropical Storms

Lab Supplies

None

Other Resources

- ☐ Chart paper
- ☐ [Island of Puerto Rico destroyed by Hurricane Maria](#)
- ☐ [A Deadly Winter Storm Heads to the East Coast](#)

[assessment-matrix]		
Dimension	Element Code	Assessment Opportunities
DCI	ESS3.D(1)	Tell the Story: Blizzards, Tell the Story: Tropical Storms
CCC	CCC7(2)	Tell the Story: Blizzards, Tell the Story: Tropical Storms
CCC	CCC1(1)	Tell the Story: Blizzards, Tell the Story: Tropical Storms

Introduce the Phenomenon

1. Show at least one video clip about **hurricanes** and **blizzards**. Students record observations and discuss the characteristics as a class (wind, visibility, snow, rain, flooding).

Analyze Visuals

1. Provide each student in each group with a visual about either hurricanes or blizzards. Have students complete the visual text analysis independently, then discuss in “expert” groups or pairs.

Share Analysis

1. In small groups, students share analyses of Visual Texts #1 and #2 and take notes on one another’s points. Students should describe the phenomenon: *Ex. over the past two years, the trend shows that while there are more tropical storms/hurricanes, there has not been an increase in the number of winter storms, however the winter storms did have a lot more snow.*
2. Make a CHART - list what the class comes up with to describe what they are seeing. This chart will be the summary of the anchor phenomena, and can be referred back to during the Performance Task Launch and throughout the Unit.

Performance Task

Will there be more frequent and more intense severe storms in the future?

Students develop initial predictions about storms.

Preparation

Student Grouping

None

Routines

None

Literacy Strategies

None

Materials

Handouts

- ☐ Introduction to the Performance Task and Initial Ideas

Lab Supplies

None

Other Resources

Introduce the Performance Task

1. Provide students with the handout Introduction to the Performance Task and Initial Ideas. Introduce the task by asking students to read the **student task**. Since the final task is an argument in which students are making predictions based on evidence and their modeling, it may be beneficial to discuss with students how predictions are different from but related to explanations, and/or how arguments are different from explanations.

Initial Predictions

Ask students to individually brainstorm ideas and predictions in response to the prompts

- Will hurricanes happen more often in the future?

- Will hurricanes be more intense in the future?
- Will blizzards happen more often in the future?
- Will blizzards be more intense in the future?

Allow them to exchange their best ideas, prompting them to discuss what they are basing their prediction on.

Driving Question Board

Will there be more frequent and more intense severe storms in the future?

Students ask questions that would help investigate these weather phenomena to improve their predictions.

Preparation

Student Grouping

☐ None

Routines

☐ Driving Question Board

Literacy Strategies

None

Materials

Handouts

None

Lab Supplies

None

Other Resources

- ☐ Post-it notes
- ☐ Optional: Teacher-provided questions for sorting; teacher could distribute
- ☐ and ask more advanced students to come up with their own questions.

Ask Questions

1. Prompt students to think like scientists to generate HOW or WHY questions that would help them be able to make *better* predictions about weather and the anchor phenomenon (see chart from anchor phenomena launch). Ask, *What do you need to know more about, to better understand the phenomenon? What variables do you want to investigate? What might be affecting the weather?* Students should individually generate at least 3 questions on post-its. If you have a crosscutting concept chart in the classroom, prompt students to try to use various concepts to help them generate questions if they are stuck.

Develop a Driving Question Board

1. Invite students to share out their questions, one at a time. Create clusters of questions that are similar or related. Facilitate a discussion about the categories that emerge across students' questions (for example, one category might be **weather variables**, based on questions such as *why are the winds so strong?* Another category might be **location and path of storms**, based on questions such as *where do these storms come from and why do they hit the Caribbean?*). In an ideal situation, students would bring up global warming as a potential cause for the anchor phenomenon, however it is not necessary that they do so.

Standards in Unit Opening

Performance Expectations

HS-ESS3-5

Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.

Clarification Statement: Examples of evidence, for both data and climate model outputs, are for climate changes (such as precipitation and temperature) and their associated impacts (such as on sea level, glacial ice volumes, or atmosphere and ocean composition).

Assessment Boundary: Assessment is limited to one example of a climate change and its associated impacts.

In NYS the clarification statement has been edited as follows: Examples of evidence could include both data and climate model outputs that are used to describe climate changes...

Aspects of Three-Dimensional Learning

Science and Engineering Practices

Disciplinary Core Ideas

Crosscutting Concepts

ESS3.D Global Climate Change

- Though the magnitudes of human impacts are greater than they have ever been, so too are human abilities to model, predict, and manage current and future impacts.

ESS3.D(1)

Stability and Change

- Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. CCC7(2)

Assessment Matrix

	Anchor Phenomenon	Driving Question Board	Performance Task
ESS3.D Global Climate Change	Introduction to the Performance Task and Initial Ideas		
Stability and Change	Introduction to the Performance Task and Initial Ideas		

Common Core State Standards Connections

	Anchor Phenomenon	Driving Question Board	Performance Task
Mathematics			
ELA/Literacy			