

# Lesson 27

## Severe Weather

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### Prepare

In Lesson 27, students complete a Conceptual Checkpoint in which they apply their understanding of severe weather to investigate the severe weather at Mesa Verde. Students listen to a read aloud of a Knowledge Deck poster to learn about ancient clues that archaeologists have found at Mesa Verde and consider how severe weather may have affected the Ancestral Pueblo people. In the Conceptual Checkpoint, students observe and compare data to describe patterns of severe weather in the Mesa Verde area. Students then update the anchor model to show how the cliff dwellings may have protected the Ancestral Pueblo people from certain kinds of severe weather.

### Student Learning

#### Knowledge Statement

People can predict severe weather so that communities can prepare.

### Concept 3: Severe Weather

#### Focus Question

How does severe weather affect us?

#### Phenomenon Question

How did severe weather affect people at Mesa Verde?



Objective

- Lesson 27: Describe how severe weather may have affected the Ancestral Pueblo people at Mesa Verde.

Texas Essential Knowledge and Skills Addressed

- 1.2D **Record and organize data using pictures, numbers, and words.** (Addressed)
- 1.3B **Make predictions based on observable patterns.** (Addressed)

English Language Proficiency Standards Addressed

- 2E Use visual, contextual, and linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language.

Materials

		Lesson 27
<b>Student</b>	Ancient Clues Knowledge Deck card (1)	•
	Mesa Verde Severe Weather Chart (Lesson 27 Resource A)	•
	Conceptual Checkpoint (Lesson 27 Resource B)	•
<b>Teacher</b>	Ancient Clues Knowledge Deck poster	•
	Anchor model update: anchor model, waterproof labels (3), permanent marker (1)	•
	Mesa Verde Long Ago Knowledge Deck poster	•
<b>Preparation</b>	Prepare to distribute a copy of Lesson 27 Resource A and a copy of Lesson 27 Resource B to each student.	•



# Lesson 27

**Objective:** Describe how severe weather may have affected the Ancestral Pueblo people at Mesa Verde.

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## Launch 5 minutes

Display the front of the Ancient Clues Knowledge Deck poster. Invite students to share what they notice and wonder about the photograph.

- What do you notice about the picture?
  - *It looks like a room in a cliff dwelling.*
  - *There is a ladder that looks like it goes to the outside.*
- What do you wonder about the picture?
  - *What is the room used for?*
  - *Is it underground?*

Tell students that the photograph shows a room in Spruce Tree House, a cliff dwelling at Mesa Verde. Turn the poster over and read aloud the first few sentences, stopping after, “Clues tell stories.”

- How do archaeologists learn information about the Ancestral Pueblo people?
  - *The Ancestral Pueblo people left clues!*
  - *They left behind things like cups, tools, and pictures.*

Draw students’ attention to the photograph on the front of the poster again, and ask students to Think–Pair–Share in response to the following question.

## Agenda

Launch (5 minutes)

Learn (25 minutes)

- Prepare for Conceptual Checkpoint (5 minutes)
- Conceptual Checkpoint (10 minutes)
- Debrief Conceptual Checkpoint and Update Anchor Model (10 minutes)

Land (5 minutes)

► Where do you think archaeologists would look for clues in this room?

- *Maybe there are clues in the rocks.*
- *The ladder might be a clue.*

Confirm that the rooms in cliff dwellings can have a lot of clues for archaeologists to find. Explain that one of these clues has led archaeologists to think that severe weather may have been one reason that the Ancestral Pueblo people left the cliff dwellings.

Invite students to share questions they have about severe weather at Mesa Verde.

*Sample student responses:*

- *What kinds of severe weather happen at Mesa Verde?*
- *How did the Ancestral Pueblo people know when severe weather was coming?*
- *Did they go inside the cliff dwellings every time it rained in case a storm was on the way?*
- *Did they have the same kinds of severe weather we have?*

Tell students they will use what they have learned about severe weather to explore the Phenomenon Question **How did severe weather affect people at Mesa Verde?**

## Learn 25 minutes

### Prepare for Conceptual Checkpoint (5 minutes)

Distribute one Ancient Clues Knowledge Deck card to each student. Display the photograph on the back of the poster, and encourage students to look at the same photograph on their card.

Ask students to use a nonverbal signal when they think they know what the photograph shows. Read aloud the remaining text on the back of the Knowledge Deck poster, and then invite students to share their ideas about the photograph. 🌲

*Sample student responses:*

- *I think it's a log from a cliff dwelling.*
- *Scientists can use tree rings like these to figure out if it was rainy or dry.*



#### Content Area Connection: English

Consider reminding students that they are practicing the important skill of listening with understanding. Explain that before giving a nonverbal signal, students should prepare to share their thinking about the image.



Build on student responses to explain that the photograph shows tree rings similar to those found in the logs that make up the roofs of Mesa Verde cliff dwellings. Point out the thick and thin tree rings in the photograph, and emphasize that the size of the ring shows how rainy or dry the weather was that year. Explain that tree rings in logs found at Mesa Verde provide clues about what the weather was like when the Ancestral Pueblo people lived in the cliff dwellings. 

Remind students of the Phenomenon Question **How did severe weather affect people at Mesa Verde?**, and explain that students will begin answering this question by learning more about what the weather is like at Mesa Verde now.

### Conceptual Checkpoint (10 minutes)

Remind students that they have looked at severe weather data for their local area and for other cities in the United States. Tell students that they will now look at severe weather data for the Mesa Verde area.

Distribute a copy of the Mesa Verde severe weather chart (Lesson 27 Resource A) to each student. Review with the class the kind of severe weather that each symbol represents. Explain that the chart shows the number of times each kind of severe weather happened at Mesa Verde during a recent 10-year period and that each shaded box represents one time that a kind of severe weather happened. Remind students that a drought happens over a longer period of time than other kinds of severe weather, and explain that each shaded box for drought can represent many weeks or months. 

	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7



#### Teacher Note

The photograph on the back of the Knowledge Deck poster was not taken at Mesa Verde, but scientists at Mesa Verde use tree rings like these to learn more about the cliff dwellings and the people who lived in them. More information about tree ring data from Mesa Verde is available from the National Oceanic and Atmospheric Administration (<http://phdsci.link/1535>) and from the National Park Service (<http://phdsci.link/1536>) (2E).



#### Teacher Note

Severe weather data for this lesson are from the National Centers for Environmental Information Storm Events Database (<http://phdsci.link/1534>). Data show severe weather events that occurred in Montezuma County, Colorado, from 2009 through 2018, excluding the San Juan Mountain area. Data include only severe thunderstorms with wind speeds of at least 58 miles per hour or hail with a diameter of at least 1 inch. Each drought, regardless of how long it lasted, appears as a single event in the chart (2E).

Ask students to work independently to count and compare how many times each kind of severe weather happened at Mesa Verde. 🌧️ 👤👤👤 Distribute a copy of the Conceptual Checkpoint (Lesson 27 Resource B) to each student. Read aloud the following question, and ask students to circle the severe weather symbol in the first row that represents their answer.

▶ Which kind of severe weather happened the most?



Next, read aloud the second question, and ask students to circle the severe weather symbols in the second row that represent their answer. Clarify that students may circle more than one symbol.

▶ Which kinds of severe weather will probably **not** happen in the next 10 years?



**Conceptual Checkpoint**

This Conceptual Checkpoint assesses student understanding of the Concept 3 Focus Question: **How does severe weather affect us?**

Evidence	Next Steps
Students circle the drought symbol to indicate the kind of severe weather that happened the most.	If students need support identifying drought as the kind of severe weather that happened the most at Mesa Verde, revisit the Mesa Verde severe weather chart, and count with students the number of each kind of severe weather.
Students circle the blizzard and hurricane symbols to indicate the kinds of severe weather that will probably not happen in the next 10 years.	If students do not identify both blizzards and hurricanes as the kinds of severe weather that are least likely to happen, prompt student thinking with a sentence frame, such as this: There were no ____ or ____.



**Content Area Connection: Mathematics**

Students use matching and counting strategies to determine whether the number of colored squares in one row is greater than, less than, or equal to the number of colored squares in another row.



**Differentiation**

Some students may benefit from a tactile aid for counting. Distribute math manipulatives, such as linking cubes, beads, or blocks. Have students count aloud as they place one manipulative on each shaded box to determine the total number of times each kind of severe weather occurred.

## Debrief Conceptual Checkpoint and Update Anchor Model (10 minutes)

After all students finish the Conceptual Checkpoint, bring the class back together. Return students' attention to the Mesa Verde severe weather chart (Lesson 27 Resource A). As a class, count aloud the number of times each kind of severe weather happened.

- What kind of severe weather happened the most? How do you know?
  - *Drought happened the most because there were 7 colored-in boxes.*
  - *There were 7 droughts, 6 thunderstorms, and 1 tornado, but there were no blizzards or hurricanes.*
- What kinds of severe weather do you think will not happen at Mesa Verde in the next 10 years? Why do you think that?
  - *I don't think there will be any hurricanes because there weren't any before.*
  - *There weren't blizzards either, so I don't think there will be a blizzard.*

Explain to students that although Mesa Verde does sometimes have snow, the area rarely experiences blizzards, which have heavy snow and strong winds. Confirm that hurricanes are also unlikely to happen at Mesa Verde.

Next, explain to students that the severe weather that happens at Mesa Verde now is similar to the severe weather that might have happened when the Ancestral Pueblo people lived there. Tell students that the Ancestral Pueblo people probably used clues in nature, like dark clouds or rumbling thunder, to predict when severe weather was coming so that they could prepare and protect themselves.

- If you were playing outside and you knew a thunderstorm or a tornado was coming, what would you do to stay safe?
  - *I would go inside my house.*
  - *I would find my family and bring them inside with me.*
- What do you think an Ancestral Pueblo child at Mesa Verde would do if they knew a thunderstorm or a tornado was coming?
  - *I think they would go into a room in a cliff dwelling.*
  - *They would stay off the mesa and go down to a cliff dwelling.*



Ask students to look at the anchor model and identify the parts of a cliff dwelling that would have protected the Ancestral Pueblo people from a thunderstorm or a tornado.

*Sample student responses:*

- *If there was a tornado, I think they would go to the room.*
- *I think the walls and the roof would help protect people during a thunderstorm or a tornado.*

Add labels with the symbols for a thunderstorm and a tornado to the parts of the anchor model that students identify as offering protection. Then work with students to update the summary posted near the anchor model.

*Sample anchor model:*



### Mesa Verde Cliff Dwellings

The cliff dwellings at Mesa Verde protected the Ancestral Pueblo people from the weather. The top and sides of the cliff dwellings protected people from sunlight, wind, and rain. The rooms inside blocked the wind. The cliff dwellings also helped people stay cool during hot days and warm during cold nights. *The cliff dwellings may have protected the Ancestral Pueblo people from some kinds of severe weather.*

Have students return to the Mesa Verde severe weather chart (Lesson 27 Resource A).

► What other kind of severe weather happened at Mesa Verde?

- *There were a lot of droughts.*

Show students the front of the Mesa Verde Long Ago Knowledge Deck poster. Ask students to Think–Pair–Share as they generate ideas about how a drought, or lack of water, would have affected the Ancestral Pueblo people at Mesa Verde. 



#### Teacher Note

Consider intentional partnering based on students' English proficiency level. Model Think–Pair–Share with a student to demonstrate the routine.

*Sample student responses:*

- *The people wouldn't have enough water to drink.*
- *Their plants might dry up.*
- *The ground would be really dry.*

Reveal to students that archaeologists have evidence, including evidence from tree ring data, that drought may have been one of the reasons that the Ancestral Pueblo people left Mesa Verde (Alley, Blumsack, and Bice, n.d.). 🐙 Update the anchor model summary with this information.

*Sample anchor model:*

### Mesa Verde Cliff Dwellings

The cliff dwellings at Mesa Verde protected the Ancestral Pueblo people from the weather. The top and sides of the cliff dwellings protected people from sunlight, wind, and rain. The rooms inside blocked the wind. The cliff dwellings also helped people stay cool during hot days and warm during cold nights. The cliff dwellings may have protected the Ancestral Pueblo people from some kinds of severe weather. **Drought** may be one reason that the Ancestral Pueblo people moved away from Mesa Verde.

## Land 5 minutes

Display the driving question board. The first and second columns contain the questions students have already answered, and the last column contains unanswered questions. Read aloud the unanswered questions on each sticky note in the last column. Have students use a nonverbal signal to show whether they can now answer each question. As students respond, keep the newly answerable questions in the last column, and place the questions that still cannot be answered in an open space next to the driving question board. 📄 Continue this process until all questions have been sorted.



### Extension

As an extension, show students the video about dendrochronology, or tree-ring dating, on this National Park Service web page: <http://phdsci.link/1563>.



### Teacher Note

The end-of-module lessons will address the unanswered questions in the space next to the driving question board.

Draw students' attention to the last column of questions.

- What do you notice about the questions in the last column?
  - They are about severe weather.
  - Some questions are about what we should do if there is severe weather.

Use student responses to develop the Concept 3 Focus Question: **How does severe weather affect us?**  
 Add the Focus Question at the top of the last column.

Sample driving question board:

**Essential Question: How did the cliff dwellings at Mesa Verde protect people from the weather?**

<p><b>What is weather?</b></p> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid lightblue; padding: 5px; width: 45%;">How can it be cool even when it is sunny?</div> <div style="border: 1px solid orange; padding: 5px; width: 45%;">Why did my partner say it was warm, but I said it was cold?</div> </div> <div style="border: 1px solid purple; padding: 5px; width: 45%; margin-top: 10px;">Why didn't my partner and I draw the same number of clouds?</div>	<p><b>What does weather data reveal?</b></p> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid lightgreen; padding: 5px; width: 45%;">How do people know what tomorrow's weather will be like?</div> <div style="border: 1px solid purple; padding: 5px; width: 45%;">Why does it feel cool outside today, but yesterday it felt warm?</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid lightblue; padding: 5px; width: 45%;">Is it always warmest in the afternoon, even on cold days?</div> <div style="border: 1px solid orange; padding: 5px; width: 45%;">Would it be warmer in the afternoon even if it's cloudy outside?</div> </div>	<p><b>How does severe weather affect us?</b></p> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid lightblue; padding: 5px; width: 45%;">Is a thunderstorm part of the weather?</div> <div style="border: 1px solid purple; padding: 5px; width: 45%;">Could the weather where we live make branches fall?</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="border: 1px solid lightgreen; padding: 5px; width: 45%;">What do I do if there is a tornado?</div> <div style="border: 1px solid orange; padding: 5px; width: 45%;">What kinds of severe weather might happen here?</div> </div>
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**Related Phenomena:**

The roof over the park picnic tables protects me from rain.

Our school keeps us cool when it is warm outside.

Tents and yurts protect from sunlight.

Our school can protect us from severe weather.

Emergency shelters can protect us when there is severe weather.

Allow students a minute to look back at their Science Logbook pages from the past few lessons.

► Think about what we have learned about severe weather. What do we know about how severe weather affects us?

- *Severe weather can be dangerous.*
- *Severe weather can damage trees and buildings.*
- *We can prepare for severe weather in our area because we know what kinds of severe weather could happen here.*

Explain that in the next lessons, students will summarize their understanding and apply their new knowledge to address the Essential Question: **How did the cliff dwellings at Mesa Verde protect people from the weather?**