

Lesson 18

Preparing for Severe Weather

Prepare

In Lessons 16 and 17, students learned about different types of severe weather and explored the weather hazards related to each type. In Lesson 18, students consider the cause and effect relationship between weather hazards and their effects as they investigate solutions to reduce the impact of those hazards. Students then develop explanations for why weather hazard solutions are important to people and the communities in which they live.

Student Learning

Knowledge Statement

The impact of weather hazards can be reduced by designing and implementing solutions.

Objective

- Lesson 18: Investigate how people protect themselves from weather hazards.

Concept 3: Weather Hazards

Focus Question

How can we plan for severe weather?

Phenomenon Question

How can people reduce the impact of weather hazards?

Texas Essential Knowledge and Skills Addressed

- 3.7B Investigate rapid changes in Earth’s surface such as volcanic eruptions, earthquakes, and landslides.
- 3.9C Describe environmental changes such as floods and droughts where some organisms thrive and other perish or move to new locations. (Addressed)

English Language Proficiency Standards Addressed

- 3B Expand and internalize initial English vocabulary by learning and using high-frequency English words necessary for identifying and describing people, places, and objects, by retelling simple stories and basic information represented or supported by pictures, and by learning and using routine language needed for classroom communication.

Materials

| | | Lesson 18 |
|--------------------|---|-----------|
| Student | Science Logbook (Lesson 18 Activity Guide) | ● |
| Teacher | <i>Under the Wave off Kanagawa</i> (Lesson 18 Resource A) | ● |
| | Class severe weather chart developed in Lesson 16 | ● |
| | Anchor chart | ● |
| Preparation | Print 1 copy of each set of weather hazard solution photographs (Lesson 18 Resources B, C, D, E, and F), and tape or glue each set of photographs to a separate piece of chart paper. | ● |

Lesson 18

Objective: Investigate how people protect themselves from weather hazards.

Launch 5 minutes

Display the painting *Under the Wave off Kanagawa* by Katsushika Hokusai (Lesson 18 Resource A). Ask students to silently observe the painting for a minute, and then ask for volunteers to share what they notice. As students share, point to areas on the painting and paraphrase students' thoughts to emphasize and draw out their ideas.



Sample student responses: 

- *I see people in boats.*
- *There is a giant wave that looks like it is going to hit the boats.*
- *I think there is a mountain in the distance.*

After discussing initial observations with students, challenge them to connect the painting to their study of severe weather and weather hazards.

- ▶ **How might the wave and the people in the boats be related to a severe weather event, such as a hurricane?**
 - *Maybe the people in the boats didn't know the wave was coming just like we don't always know when severe weather is coming.*

Agenda

Launch (5 minutes)

Learn (35 minutes)

- Investigate Weather Hazard Solutions (20 minutes)
- Discuss Weather Hazard Solutions (15 minutes)

Land (5 minutes)



Teacher Note

The opening of this activity is intentionally broad and open-ended. Welcome all student responses, even if they seem far-fetched. When appropriate, note or model how students can respectfully agree or disagree with other students' ideas (3B).

- *There is nothing the people in the boats can do to stop the wave. I don't think we can stop severe weather from happening either.*
- *The wave can damage the boats like hurricanes can damage buildings.*

Acknowledge all reasonable answers as valid connections to severe weather. Draw attention to any ideas that refer to the power of nature or the idea that humans cannot prevent natural hazards. Explain that while humans cannot stop severe weather from happening, they can design solutions to protect themselves. Introduce the Phenomenon Question **How can people reduce the impact of weather hazards?** Explain that in this lesson, students will look at a variety of solutions that people have designed to protect themselves from severe weather and its hazards.

Learn 35 minutes

Investigate Weather Hazard Solutions 20 minutes

Post the photographs of solutions for each type of severe weather (Lesson 18 Resources B, C, D, E, and F) on pieces of chart paper in different areas around the classroom. Label each piece of chart paper with the type of severe weather the solutions are designed to protect against.

Explain to students that they will participate in a Chalk Talk routine in which they will move silently around the classroom to observe the photographs on each piece of chart paper.  Students should write on the chart paper to express ideas and questions they have about how the solution in each photograph provides protection from the type of severe weather identified by the label. Remind students that severe weather events are systems made up of multiple components, or weather hazards. Students should think about the specific weather hazards related to the relevant type of severe weather as they consider each solution. Instruct students that they may also write down other ideas they have about preparing for each type of severe weather. 



Teacher Note

During the Chalk Talk routine, students engage in a silent conversation by writing down thoughts and questions they have about a specific topic. Students should build on the ideas of their peers, respond to questions, and write follow-up questions as they consider each topic. This routine fosters universal participation and helps students organize their thinking.



English Language Development

Consider providing English learners with sentence frames such as the ones below to encourage participation and help students organize their thinking (3B).

- I notice _____ in the picture.
- I think _____ because I see _____.

To begin, divide students into five groups and assign each group to a different piece of chart paper. Every 4 minutes, ask groups to move to the next piece of chart paper until all students have had a chance to observe the photographs of weather hazard solutions for all five types of severe weather.



Check for Understanding

Circulate around the room to observe how students are interpreting the purpose of each weather hazard solution.

Evidence

Look for evidence that all students

- identify the purpose of each solution and
- connect each solution's purpose to specific weather hazards and their effects.

Next Steps

Note whether students are misinterpreting solutions, and use the class discussion in the next section to help guide student thinking. Additionally, if some students do correctly identify the purpose of certain solutions, encourage those students to share their thinking during the class discussion.

Discuss Weather Hazard Solutions 15 minutes

Display the class severe weather chart from Lesson 16, and explain that the class will now update the chart by adding the solutions they observed for each type of severe weather. Direct students' attention to the blizzard photographs they observed during the Chalk Talk routine. Highlight any student responses on the chart paper that correctly identify how a solution helps reduce the impact of the weather hazards related to blizzards. If students did not recognize the purpose of a solution, help guide student thinking by asking questions such as these: Why do you think the snowplow is clearing the road? Why might snow piling up on a roof be dangerous?

As each solution is discussed, add a bullet to the class severe weather chart to summarize the solution. If students identify reasonable solutions not shown in the photographs, add those to the class severe weather chart as well. Then repeat this process for each of the other types of severe weather.

Sample class severe weather chart started in Lesson 16:

| Type of Severe Weather | Weather Hazards | Effects of Hazards | Solutions to Reduce Impact of Hazards |
|------------------------|---|--|--|
| Blizzard | <ul style="list-style-type: none"> ▪ Heavy snowfall ▪ Strong winds ▪ Cold temperatures | <ul style="list-style-type: none"> ▪ Damage to property, trees, and power lines by snow and wind ▪ People and animals at risk of getting very cold ▪ Dangerous driving conditions | <ul style="list-style-type: none"> ▪ Snowplows push snow off the roads so cars can drive on them. ▪ People keep emergency supplies, such as flashlights, water, and first aid kits, in case they get snowed in. ▪ Cranes remove snow from roofs so the roofs don't cave in. |
| Tornado | <ul style="list-style-type: none"> ▪ Very strong, twisting winds ▪ Hail | <ul style="list-style-type: none"> ▪ Damage to property, trees, and power lines from wind and hail ▪ People and animals at risk from flying objects | <ul style="list-style-type: none"> ▪ Underground cellars are places people can go to stay safe from tornado winds. ▪ Warning sirens alert people that a tornado is nearby. ▪ Tornado shelter signs let people know where to go to stay safe. |
| Drought | <ul style="list-style-type: none"> ▪ Unusually little or no precipitation over a long time | <ul style="list-style-type: none"> ▪ Less water for plants, animals, and people ▪ Bodies of water can dry up | <ul style="list-style-type: none"> ▪ Barrels gather any rain that does fall during a drought. ▪ Plants that don't need a lot of water survive better in a drought. ▪ Saving water during a drought helps make sure people have enough water to drink. |

| Type of Severe Weather | Weather Hazards | Effects of Hazards | Solutions to Reduce Impact of Hazards |
|------------------------|--|--|---|
| Severe Thunderstorm | <ul style="list-style-type: none"> ▪ Heavy rainfall ▪ Strong winds ▪ Lightning ▪ Hail | <ul style="list-style-type: none"> ▪ Damage to property, trees, and power lines from wind, hail, and lightning ▪ Houses and cars can get flooded ▪ People and animals at risk of drowning | <ul style="list-style-type: none"> ▪ Sandbags stop floodwater from getting into buildings. ▪ Lightning rods keep buildings from being struck by lightning. ▪ Nets protect crops from hail. |
| Hurricane | <ul style="list-style-type: none"> ▪ Heavy rainfall ▪ Very strong winds ▪ Powerful waves ▪ Storm surge | <ul style="list-style-type: none"> ▪ Damage to property, trees, and power lines from wind and waves ▪ People and animals at risk of drowning ▪ People and animals at risk from flying objects | <ul style="list-style-type: none"> ▪ Signs let people know where to go to get away from a hurricane. ▪ Water sensors tell people when the water level is rising. ▪ Seawalls help protect cities from storm surge. ▪ Houses on stilts are higher off the ground and don't flood as easily. |

At the end of the discussion, remind students that people cannot prevent severe weather from happening. Then direct students' attention back to the solutions described on the class severe weather chart and ask students to Jot-Pair-Share in their Science Logbooks (Lesson 18 Activity Guide) in response to the following question.

- ▶ Why do people design weather hazard solutions if the solutions cannot stop severe weather from happening?
 - Weather hazard solutions can keep people safe during severe weather.
 - People use weather hazard solutions to protect their homes and families.
 - Some of the solutions warn people about severe weather so that they know to leave.

Summarize student responses and ensure students understand that while severe weather cannot be prevented, solutions that reduce the impact of weather hazards are very important for people and the communities in which they live.

Land 5 minutes

Display the anchor chart and remind students of the Phenomenon Question **How can people reduce the impact of weather hazards?** Ask students to answer this question based on what they have learned, and summarize student responses to add a statement to the anchor chart.

Sample anchor chart:

| Weather and Climate |
|---|
| <p>Weather Conditions</p> <ul style="list-style-type: none"> • Weather is a description of the conditions in a certain place at a given time. Weather conditions include temperature, wind speed and direction, cloud cover, and amount of precipitation. • Seasons (winter, spring, summer, fall) are periods of a year defined by similar weather conditions. |
| <p>Climate</p> <ul style="list-style-type: none"> • Climate is a description of the pattern of typical weather conditions in a location over time. Climate remains mostly stable, or the same, year after year. • Knowing a location's climate can help people predict the types of weather conditions that may occur in that location during different times of year. |
| <p>Weather Hazards</p> <ul style="list-style-type: none"> • Different types of severe weather are made up of different weather hazards (e.g., strong winds, heavy rain) that pose a threat to life and property. • While severe weather cannot be prevented, people can design and implement solutions to reduce the impact of the related weather hazards. |

Then ask students to consider whether all locations need to prepare for the same kinds of weather hazards.

- ▶ **How do people know what kinds of weather hazard solutions they need to design and implement based on where they live?**
 - *Maybe some kinds of severe weather are more common in certain places.*
 - *If you live in an area where it snows a lot, then you know you need to be ready for a blizzard.*

Highlight student responses that relate to certain types of severe weather being more common in some locations than others. Explain that students will investigate patterns in when and where severe weather occurs in the next lesson.

Optional Homework

Have students look for local weather hazard solutions in their community. Students should sketch or describe any solutions they identify and explain how the solutions help reduce the impact of specific weather hazards.

