



LOCAL HAZARD RESOURCE

Thunderstorm and Lightning Preparedness

Learning Objectives

- Students will be able to explain what causes lightning and what happens during thunderstorms.
- Students will be able to explain what to do during a thunderstorm WATCH and a thunderstorm WARNING.
- Students will learn the best ways to stay safe during a thunderstorm.

Key Facts for Presenters

- A thunderstorm is a rain shower during which you hear thunder. Since thunder is caused only by lightning, all thunderstorms have lightning.
- Thunderstorms can happen anywhere and any time conditions are right, but they are most likely in the spring and summer, during the afternoon and evening. There are more than 100,000 thunderstorms in the U.S. each year.
- Thunderstorms form when a cumulus cloud starts to pile up as it fills with warm, moist air. When the cloud has grown to about 8 miles high, the air at the top cools and the moisture in the air condenses into water droplets that accumulate and fall as rain or hail. As it falls, the rain or hail pulls air from the cloud down with it, creating wind that drives the rain or hail toward the ground.
- Thunderstorms bring heavy rains that may cause flash floods, strong winds, hail, and the possibility of a tornado, but their most common threat is lightning, which can electrocute or severely burn a person and can also cause fires.
- Lightning is a gigantic spark of electricity that connects the thundercloud to the ground.
- Lightning is so hot that it causes the air to “explode;” that is the sound we call thunder. Thunder travels more slowly than the light from a lightning bolt, which is why we usually hear thunder a few seconds after we see lightning.
- If you hear thunder, lightning is close enough to strike, and you should immediately seek safe shelter in a sturdy building or metal-topped vehicle.
- Weather forecasters issue a thunderstorm WATCH when they think a thunderstorm might be forming. They issue a thunderstorm WARNING when a thunderstorm has been spotted or seen on radar.
- During a thunderstorm WATCH, listen for news about the storm and be prepared to take shelter. During a thunderstorm WARNING, take shelter immediately – **when the thunder roars, go indoors** – and stay there until 30 minutes after you hear the last sound of thunder.
- To stay safe inside during a thunderstorm, avoid using a phone or computer that is plugged in, because lightning can travel through electrical wiring. Avoid faucets, sinks, and bathtubs, because lightning has been known to come inside through home plumbing. Stay away from windows to avoid being hurt by breaking glass.
- If you hear thunder when you are swimming or wading, get out of the water immediately, and go inside. If you are in an open outdoor space, like a football field, quickly find a place to go inside. If you are in a car during a thunderstorm, stay inside it with your hands in your lap, so you do not touch anything metal. Wherever you are, **when the thunder roars, go indoors!**



PRESENTER NOTES	SCRIPT
<p>If you are presenting in an area where thunderstorms cause severe flash flooding, adapt your presentation to emphasize that flash floods can be as dangerous as lightning.</p>	<p>Ask students:</p> <p>→ <i>Does anyone know what causes the thunder in a thunderstorm?</i></p> <p>Call on 1-2 students for a response.</p> <p>Explain the relationship between thunder and lightning:</p> <p>→ <i>That's right! Thunder is caused by lightning. It's the sound of the air "exploding" when a super-hot bolt of lightning shoots down from the sky.</i></p> <p>→ <i>Lightning is a gigantic spark of electricity that connects a thundercloud to the ground.</i></p> <p>→ <i>Lightning is very powerful and very dangerous – it can electrocute people, cause painful burns, and start home fires and wildfires.</i></p> <p>→ <i>Anytime you hear thunder, you know there is lightning close by, so you need to know how to stay safe.</i></p> <p>Ask students:</p> <p>→ <i>Besides lightning, what else can happen during a thunderstorm?</i></p> <p>Call on 1-2 students for a response.</p> <p>Explain the hazards associated with thunderstorms:</p> <p>→ <i>That's right! Thunderstorms bring heavy rains that can cause flash floods. They also bring strong winds and hail that can damage buildings and vehicles. They can even cause tornadoes. But the most dangerous part of a thunderstorm is usually lightning.</i></p> <p>→ <i>Thunderstorms can happen anywhere at any time – there are more than 100,000 thunderstorms in the U.S. each year (that's an average of one almost every five minutes!). But thunderstorms are most likely in the spring and summer, during the afternoon and evening.</i></p>
	<p>Ask students:</p> <p>→ <i>Did you ever notice that you always hear thunder after you see a flash of lightning? Can anyone explain why that happens?</i></p> <p>Call on 1-2 students for a response.</p> <p>Tell students how to calculate their distance from a lightning strike:</p> <p>→ <i>You're right! It's because light travels much faster than sound – about a million times faster! It only takes about five-millionths of a second for light to travel one mile, but it takes the sound of thunder five seconds to travel a mile. So when you see a flash of lightning, you can count how many seconds it takes for you to hear the thunder, and use your math skills to divide by 5 to figure out how far away the lightning is.</i></p>
	<p>Ask students:</p> <p>→ <i>So, how do we stay safe from lightning during a thunderstorm?</i></p> <p>Call on 1-2 students for a response.</p>

PRESENTER NOTES	SCRIPT
<p>Remind students who have pets to bring their pets inside, too.</p>	<p>Explain how to stay safe during a thunderstorm:</p> <ul style="list-style-type: none"> ➔ <i>Good answers! And here's a good way to remember the most important rule for staying safe – When the thunder roars, go indoors! Remember, anytime you hear thunder, that means there is lightning nearby, and the best way to stay safe from lightning is to stay inside.</i> ➔ <i>Weather forecasters are always on the lookout for thunderstorms. They put out a thunderstorm WATCH when they think a thunderstorm might be forming. That's when you should listen for news about the storm and get ready to go inside.</i> ➔ <i>Weather forecasters issue a thunderstorm WARNING when a thunderstorm has been spotted or seen on radar. That's your signal to go indoors immediately and stay indoors until the storm has passed.</i> ➔ <i>So, during a thunderstorm WATCH, listen for news about the storm and be prepared to take shelter. During a thunderstorm WARNING, take shelter immediately – when the thunder roars, go indoors – and stay there until 30 minutes after you hear the last sound of thunder.</i>
<p>You may want to clarify that while lightning can travel into the home over phone wires, it does not travel over phone lines to other places (like a relative's home).</p>	<p>Provide students with tips for staying safe from lightning while indoors:</p> <ul style="list-style-type: none"> • Do not use a phone or computer that is plugged in, because the electricity in lightning can travel into the home through the electrical wiring. • Stay away from faucets, sinks, and bathtubs, because lightning has been known to come inside through home plumbing. • Stay away from windows and glass doors in case they break.
<p>You may also want to reinforce that they should stay away from tree, fences, power lines, and things made of metal.</p>	<p>Tell students how to stay safe from lightning in special situations:</p> <ul style="list-style-type: none"> ➔ <i>So we've talked about the normal situation, where you can get home when there's a thunderstorm. But remember, thunderstorms can happen anywhere at any time, so you always need to be prepared for special situations where you might not be able to get back home.</i> ➔ <i>For instance, suppose you're at the swimming pool or at the beach or fishing – if you hear thunder, get out of the water immediately, and go indoors! Electricity can travel through water, so you could get electrocuted by a lightning strike somewhere else on the water if you don't get out fast.</i> ➔ <i>Here's another one: suppose you hear thunder when you are in an open space outdoors, like a ball field or a picnic ground? Get out of there as fast as you can! Find someplace to get inside, and not just a dugout or rain shelter. You need to be in a sturdy building to be safe from lightning.</i> ➔ <i>Last one – suppose your family is driving in the car when you hear thunder? This time, you should stay where you are. The metal car roof can actually help protect you from lightning. BUT keep your hands in your lap so that you don't touch any metal parts of the car while you are inside!</i>

PRESENTER NOTES	SCRIPT
	<p>Lead students in one of the Practice Activities below.</p> <p>→ So let's practice what we've learned about staying safe in a thunderstorm.</p>
	<p>Lead students in one of the Sharing Activities below.</p> <p>→ Now let's share what we've learned.</p>
	<p>Wrap-up with a review:</p> <p>→ What does it always mean when you hear thunder?</p> <p>→ A: There is lightning somewhere close by.</p> <p>→ What do we do when the thunder roars?</p> <p>→ A: Go indoors!</p> <p>→ And how long do we stay indoors after the last sound of thunder?</p> <p>→ A: 30 minutes.</p> <p>Transition:</p> <p>→ So, now you're better prepared for thunderstorms. But remember, you need to share what you've learned to help everyone be prepared. So later today, tell someone our "When the thunder roars" rule. Even better, when you go home, share what you've learned and make a plan to stay safe during thunderstorms!</p>

THUNDERSTORM PRACTICE ACTIVITIES

• Practice Dash

Divide students into teams of 5-6 for a takeoff on “Jeopardy.” Explain that you will read an answer and that the student teams will compete by having one team member race toward you for the chance to give the correct question. The first student to arrive gives the question and wins a point for his/her team if correct, or loses a point if incorrect. Encourage the students to figure out the correct question as a team before sending their runner toward you. Example answers and questions:

1. The sound of lightning “exploding” the air	What is thunder?
2. One mile in 5 seconds	How fast does the sound of thunder travel?
3. Flash flood	What else besides lightning can happen during a thunderstorm?
4. More than 100,000	How many thunderstorms happen in the U.S. each year?
5. 30 minutes	How long should you stay inside after you hear the last sound of thunder?
6. Go indoors!	What should you do when the thunder roars?

• Lightning Countdown

Lead students in calculating their distance from a lightning strike using the “5 seconds per mile” speed of the sound of thunder. Tell students to count the seconds after you say “Flash!” until you say “Boom!” Say “Flash!” and mouth counting to 5, then say “Boom!” Ask students, “Did you count to 5? And how much is 5 divided by 5?” Prompt students to answer “One!” Tell students, “That’s right! The lightning is one mile away, and that’s way too close for safety!” As time permits, lengthen the time between “Flash!” and “Boom!” to 30 seconds. Then remind students that anytime they can hear thunder, they should immediately go inside, no matter how far away they think the lightning might be. When the thunder roars, go indoors!

• Thunderstorm Improv

Review protective actions with this improv-style activity. Students act out different things they might be doing prior to a thunderstorm until the class shouts “the thunder roars!” The performing student(s) must then show what they would do to stay safe. Some scenarios with appropriate protective actions:

- You’re in a pickup truck. (Stay in the truck with hands in lap.)
- You’re in a boat. (Row/motor to shore and get inside a sturdy building.)
- You’re walking your dog. (Go indoors with your dog.)
- You’re washing your hands. (Stop washing and step away from the faucet.)
- You’re doing homework on the computer. (Stop typing and step away from the computer.)
- You’re talking on a cell phone. (Keep talking; a cell phone is not connected to the electrical wiring.)
- You’re cleaning a window. (Step away from the window.)
- You’re playing basketball. (Stop playing and go indoors.)

THUNDERSTORM SHARING ACTIVITIES

Divide students into small groups, and appoint a spokesperson for each group. Have all groups discuss one of the scenarios below and come up with ideas for what to do in that situation. Have the spokesperson report on each group's ideas, then lead a whole group discussion to decide on the best way to handle the situation.

• I Don't Like Thunder

Steve was scared of thunder. Sometimes when there was a thunderstorm at night, he would lie in bed with his eyes open, afraid that he might have bad dreams if he fell asleep. That's what happened when he was sleeping over with his cousin, Calvin. Luckily, Calvin had learned a lot about thunderstorms and lightning from The Pillowcase Project. "We even talked about feeling scared" he told Steve. "Lots of people feel worried or scared when they think about what might happen in an emergency situation, even grownups. But there are ways to handle those feelings – they're called *coping skills* – and you can figure out good coping skills BEFORE an emergency happens!"

What could Calvin teach Steve to help him cope with his thoughts and feelings about thunder and what might happen during a thunderstorm?

Answer:

Encourage students to come up with their own ideas for helping Steve cope with his fear of thunder. Use the list below and/or the Coping Skills poster to generate discussion. Note: Some students may suggest "giving thanks" as a coping skill (e.g., Be thankful that you are OK), but this reaction can sometimes inhibit successful coping by masking the real impact of an emergency. Acknowledge this suggestion, but do not push students in this direction.

- Taking slow breaths to calm down when you feel worried or scared.
- Sticking with a buddy so you don't feel alone.
- Singing a favorite song or picturing a favorite story, so you don't think so much about feeling scared.
- Reminding yourself how sticking together helps everyone get through a tough situation.
- Reminding yourself of what you have done to get through tough situations in the past.
- Remembering that you've learned how stay safe during a thunderstorm by going indoors and staying there until the storm has passed.
- Listening to grownups for other ways to help each other feel safe.

• A Shopping Trip Emergency

Phuong and her mom were on the way to the mall when it started raining really hard. As they pulled into the parking lot, they heard hail rattling on the roof of their car. Then, BOOM! A huge clap of thunder. Phuong looked around while her mom pulled into a parking space. She saw a giant thunderbolt in the sky behind the mall. Then, BOOM! Another huge clap of thunder. Phuong and her mom were parked close to the mall, and the hail had stopped.

What should Phuong and her mom do to stay safe in this thunderstorm?

Answer:

Phuong and her mom would be safest inside the car, with their hands in their laps so that they do not touch anything metal. They should stay there for 30 minutes after the last sound of thunder. The lightning is too close for them to step outside the car and try to run for the mall. Also, Phuong's mom might touch something metal in the car if she tries to drive away.



REPRODUCIBLE MASTER

Thunderstorm Preparedness

Sharing Activities

Read the activity assigned to your group. Then talk with the members of your group to come up with ideas for that situation. Help the spokesperson for your group take notes on the group's ideas. After your spokesperson shares your group's ideas, join in the discussion to decide on the best ideas for the situation.

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