# Elementary Science Learning Experience

# Integrated with Reading and Writing Instructional Resource

Grade K Example 1

*This example was adapted from a teacher submission.*

## Science Experience Overview

Anchoring Phenomenon: The weather changes over time and severe weather affects our lives and our communities.

## Driving Question: How can you prepare for changing weather over time?

****

Lesson Focus Questions:

* What is the weather like today and is it always this way?
* How might a snowstorm affect our lives and the community and how can we prepare for it?
* How might a tornado affect our lives and the community and how can we prepare for it?
* How might a thunderstorm affect our lives and the community and how can we prepare for it?

*Kentucky Academic Standards (KAS) for Science:*

* **K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.**
* **K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. \***

|  |  |  |
| --- | --- | --- |
| **Science and Engineering Practices** | **Disciplinary Core Idea** | **Crosscutting Concepts** |
| Analyzing and Interpreting Data  Asking Questions and Defining Problems  Obtaining, Evaluating and Communicating Information | ESS2.D: Weather and Climate  ESS3.B Natural Hazards  ETS1.A: Defining and Delimiting an Engineering Problem | Cause and Effect |

*Educators may have to engage with a standard multiple times throughout a year to meet the full intent of the standard. As a result, the following example may not encompass the entire scope of the standards identified*.

## Reading and Writing Connection

Vibrant student experiences in science differ from those in Reading and Writing. However, intentionally aligning the topics enhances learning in both. The following, green-rated High-Quality Instructional Resource (HQIR) is used in Reading and Writing during the same time as this Science learning experience:

HQIR: Wonders (2023)

Knowledge-Building Topic: Weather and Seasons

Grade-Level Complex Text(s): “Be Safe in Bad Weather” from *Time for Kids*

The following Reading and Writing standards and tasks, along with Interdisciplinary Literacy Practices, play a supporting role and are integrated in this vibrant Science Learning Experience:

Text-Dependent Tasks: Writing to Learn, Writing for Publication

*Kentucky Academic Standards for Reading and Writing*: RI.K.1, RI.K.3, RI.K.7, RI.K.8, RI.K.9, C.K.2, C.K.5, C.K.6, L.K.5

*Interdisciplinary Literacy Practices*: 1, 2, 3, 4, 6, 8, 9

**Overall Learning Objective**: Make observations and identify ways that weather changes over time.

Show a collage of pictures that capture different weather experiences students may have encountered in their local area. Use the pictures to encourage students to share their own firsthand experiences from the places they have lived or visited. As students share their ideas, they may also use gestures, facial expressions or act out the ideas they are trying to share. The following are questions that could support the discussion:

## Launching the Anchoring Phenomenon

**Driving Question: How can you prepare for changing weather over time?**

* When have you experienced something that you see in the picture?
* How do you describe what the weather is like where you live?
* What is the weather like when we go to recess?
* Do you have other family members or friends that experience the same or different weather than you?
* Have you traveled somewhere that had different weather than where we live?

What can we do to observe what the weather is like outside? Gather student ideas. Students may share a variety of ideas (watch a weather report on television, look outside to see if it is sunny or rainy, walk outside to feel the temperature, a family member tells me, look at pictures on the internet, etc.).

Explain to students that we are going outside to gather data about or observe what the weather conditions are like today. Observations involve looking closely at, or carefully watching, what happens. When closely observing, consider what you feel, what you see, what you smell, and what you hear. This is information that scientists use to answer their scientific questions. Explain to students that they will record their observations. Record means to write down or draw.

Go outside and make observations of what the weather is like today. Partner students up to walk and share observations with. Each person should have a clipboard, pencil, and paper to record their observations on. Have students record their observations by drawing and writing out what they notice.

When returning to the classroom, gather in a scientists circle to share their observations. Encourage students to use the following sentence stems during their discussion:

* I observed…
* I noticed…
* I felt…
* That reminds me of…
* I want to piggyback/add on to \_\_\_\_\_ idea…

As students share in the scientists circle, gather what students notice and wonder on a chart. This chart can be a place to record and return to these observations and questions. Look for patterns in the observations and wonderings (temperature, precipitation, wind, etc.). Ask, do you think the weather conditions will always be like this?

How about tomorrow? Next week? In December? In June? Why or why not?

Ask students the driving question, how can we prepare for changing weather conditions over time? Record students’ initial ideas. For example, we noticed today’s weather was warm and sunny. We can prepare for today’s weather by wearing a short sleeve shirt and a hat. I can find a shade tree to sit under at recess.

**Learning Objective:** Organize daily weather data so we can analyze and identify patterns in weather over time.

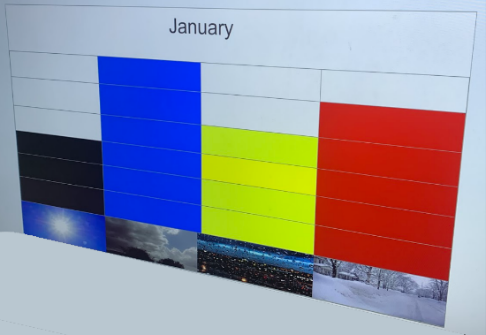
During calendar time ask students to observe the weather outside. Ask students questions such as:

## Learning Experience #1: What is the weather like today and is it always this way?

* What do you see in the sky?
* Are there clouds, or is it clear?
* Has anything fallen from the sky?
* How does it feel outside?

Set up a large weather calendar to record the daily weather on chart paper visible for all students to view. Student data will be collected on this weather calendar for the duration of the entire school year to ensure meeting the full intent of the performance expectation of “use and share observations of local weather conditions to describe patterns over time.” Discuss how the weather can change throughout the day and throughout the year in your local area. As students share, collect ideas of what data students want to collect during calendar time. Support students in coming to an agreement on weather symbols to be used to represent the weather being windy, sunny, cloudy, rainy, snowy and the temperature. Explain to students they will be collecting this data throughout the school year to look at patterns in their local weather and how they can prepare for the weather.

A useful tool to know the temperature is for them to use a thermometer. Show students what a thermometer is and allow students to use the thermometer to learn how to measure the temperature of the air. Have students practice taking the inside and outside temperature of the air and talk about how knowing this can help you better prepare to go outside, such as for recess or to get on the bus for school. The temperature will be recorded during calendar time.

Worksheet titled Monthly Weather Patterns.
Month of weather observation: October
Patterns observed in the month: Mostly sunny and part sun; Rain the least number of days; Rain days near cloudy days.
Month of weather observations: January
Patterns observed in the month: More snowy days that other days; 1 rain day; not many sunny days; 1 fog day.
Patterns observed between the months: alike: sunny days, partly sunny days, cloudy days.
different: No snow days in October, no fog days in October, more sunny days in October.Organize the data collected in the weather graph. For example, this can be done by creating a bar graph for each month that shows the number of days that are sunny, cloudy, rainy or snowy. Another way to organize the data to look for patterns is to tally the total number of days that are sunny, cloudy, rainy or snowy. Explicitly teach how to determine a pattern. Over time, discuss patterns that are present within the data. Is it sunny or cloudy most days? Has it rained or snowed? Does the outside temperature stay the same or does it change? Through the patterns that students identify determine how to use this information to prepare for having inside or outside recess. Visibly record patterns observed within each month and place those next to the weather calendar for students to use. Looking for patterns and comparing patterns, using student data, between days and months should be an ongoing process throughout the year during calendar time.

*Example from* [*The Wonder of Science*](https://static1.squarespace.com/static/59c3bad759cc68f757a465a3/t/5e4493ba9396843182996af1/1581552570412/K-ESS2-1+Monthly+Weather+Patterns+%28Teacher++Version%29.pdf)*:*

**Learning Objective:** Describe characteristics of a snowstorm, identify its effects on self and community and explain how to prepare for a snowstorm.

Tell students they are going to learn about severe weather. Severe weather includes strong storms that can change our environment like snowstorms, tornadoes, and thunderstorms. Watch the following [video](https://www.youtube.com/watch?v=lGcVzu4GOr0&t=121s) that explains what severe weather is and how it can affect us. After they have had a chance to understand what severe weather is, share that the class is going to take time to focus on three unusual types of severe weather: snowstorms, tornadoes, and thunderstorms. First, we will start with snowstorms.

## Learning Experience #2: How does a snowstorm affect our lives and the community and how can we prepare for it?

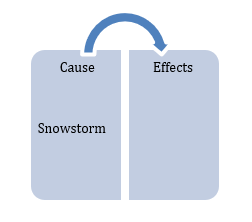
**What is a snowstorm?**

Ask students if they have ever experienced a snowstorm where they live. As students share their firsthand experiences encourage them to tell what the snowstorm was like. You might have them share how the snowstorm was alike or different than rain. A snowstorm is a storm that has a lot of snow falling in a short time. Show students the following time [lapse video](https://www.youtube.com/watch?v=jxxtOv9nxFg) of a snowstorm in Kentucky. Ask students what they see, think and wonder about the video. Record student’s answer on a classroom chart.

|  |  |  |
| --- | --- | --- |
| SEE  What did you see in the video? | THINK  What do you think is going on? | WONDER  What questions do you have? |
|  |  |  |

Prompts to use during the SEE, THINK, WONDER discussion:

* **SEE:** After asking, "What do you see?" guide them by pointing out specific elements in the video ("I see the trees are covered with snow. Do you see the wind blowing?").
* **THINK:** For "thinking," use sentence stems like: "I think the snow makes it hard to see because..." to help structure their thoughts.
* **WONDER:** For "wondering," add visuals to the chart as they answer, or let them draw pictures of what they wonder about snowstorms to make this more interactive. Encourage students to connect with the video and share their own firsthand experiences of snowstorms. What do you think the weather looks like, feels like, smells like, and sounds like when it snows?

**What effects might snowstorms have in our community?**

Start by explaining to the students what “cause and effect” means. Display the cause-and-effect graphic organizer. Ask students what might happen in our community from a snowstorm? Gather initial ideas. Organize students to work in small groups or individually to sort a set of pictures into two categories: “Happens Because of a Snowstorm” and “Doesn’t Happen Because of a Snowstorm.**”** Place the cause-and-effect graphic on the board and model how to do the card sort by placing a couple of pictures on the board using other examples not on in the card sort. For example, snowstorms may cause the roads to be unsafe (cause) so schools may need to close for the day (effect).

Prior to students engaging in the card sort create a set of picture cards showing different scenarios that snowstorms might cause, such as:

* A car stuck in snow.
* People shoveling sidewalks.
* Trees covered in snow.
* Electricity goes out.
* Kids are wearing coats and mittens.

Create a separate set of picture cards showing scenarios that do not happen because of a snowstorm such as:

* Kids wearing shorts and a t-shirt.
* People swimming in the pool.
* People riding bikes.
* Leaves falling from trees.
* Flowers bloom in the garden.

After modeling, let the students begin their own sorting. When they have finished, ask them to describe their choices for each category. With the cause and effect graphic still on the board, have a student or group bring up a picture on the organizer and explain their reasoning for it being placed in the “Happens Because of a Snowstorm” category. Students might say, “During a snowstorm, the snow covers the sidewalk (cause), so people have to shovel the snow to clear it(effect).” Repeat this process until all effects of snowstorms have been shared. The pictures the students placed under the category, “Doesn’t Happen Because of a Snowstorm” will still be at their desk for further discussion or review.

**How can I prepare for a snowstorm?**

Have students think about the snowstorm they watched and the effects they learned of a snowstorm. Brainstorm ways that we can prepare for and stay safe during a snowstorm. Create an Initial Ideas Anchor chart, titled “Ways to Prepare for Snowstorms?” Gather students’ ideas and record them on the chart as they share how to stay safe in a snowstorm.

Class created chart for how to stay safe during a snowstorm. 1) Stay at home. 2) Do school work at home. 3) Do not drive!
4) Get a generator in case the power goes out. 

Read pages 28-29 titled *Be Safe in Bad Weather and Let it Snow aloud* in an informational text found in the Wonders curriculum titled “[Be Safe in Bad Weather](https://youtu.be/cZ2SN5YF9uo).” Tell students that as we read, we will stop periodically to add new ideas to their “Ways to Prepare for Snowstorms” chart. Use icons and pictures alongside the written words on the chart to help early readers follow along. Invite students to add drawings to represent each preparation tip (drawing a blanket, snow boots, safety kits, etc.) as you list the ideas.

One way to know how to prepare for a snowstorm is by listening to meteorologists. A meteorologist is a person who studies the changes in weather on a day-to-day basis in a specific place. Explain how meteorologists use tools to help them forecast the weather. Ask, what does it mean for a meteorologist to forecast the weather conditions? Meteorologists also share how to be safe during severe weather like a snowstorm. Watch this [meteorologist](https://www.youtube.com/watch?v=Wsho9AUe1MA) or a local meteorologist give a snow forecast. Have students share what they noticed in the forecast. They may connect both to the data they are collecting in their calendar time and information the meteorologist gives about the snowstorm. The following are questions that could support the discussion:

* What did the meteorologist say about the temperature during the weather forecast?
* What did the meteorologist say about the precipitation or snow during the weather forecast?
* Did the meteorologist suggest doing anything to prepare for the snowstorm?

Possible ways to stay prepared are listed below.

* If there is a forecast of snow, plan to get what we need to stay home.
* Have extra blankets at home to stay warm.
* Wear warm clothes such as thick socks, sweaters, long pants and coats.
* Making sure our family has a safety kit.
* Follow the directions of an adult during a storm.
* Plan to stay home during any type of storm.
* If you are outside and near water do not walk on the ice.
* Do not drive on snowy roads.

Return to the driving question and collect students’ thoughts around how you can prepare for changing weather conditions over time. Record student ideas on an anchor chart. General ideas students may say are listen to the weather forecast, get to a safe place, listen to the adults give directions, stay calm, and have a plan in place. These may not all be revealed during learning experience two but may be added as the learning progresses.

**Learning Objective:** Students will describe what a tornado is, identify its effects on self and community and explain how to prepare for a tornado.

## Learning Experience #3: How might a tornado affect our lives and the community and how can we prepare for it?

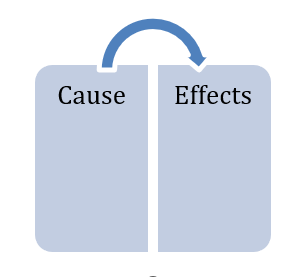
**What is a tornado?**

Ask students if they have ever seen, heard about or been in a tornado. Allow students to share firsthand experiences to begin a discussion around tornados. As students discuss, show students an [information video](https://www.youtube.com/watch?v=-s3UwOq1P1E&t=39s) about tornadoes. Ask students what they see, think and wonder about the video. Record student’s answer on a classroom chart.

|  |  |  |
| --- | --- | --- |
| SEE  What did you see in the video? | THINK  What do you think is going on? | WONDER  What questions do you have? |
|  |  |  |

Prompts to use during the SEE, THINK, WONDER discussion:

* **SEE:** Have students describe the tornado’s shape, movement, sound, and speed.
* **THINK:** Ask what they think is happening, or how it might feel to be close to a tornado.
* **Wonder:** Encourage curiosity, like, "Where do tornadoes come from?" or "What would happen to a house if a tornado came close?".

**What effects might tornadoes have in our community?**

Remind students of what “cause and effect” means. Display the cause-and-effect graphic organizer students used to learn about the effects of snowstorms. Ask students what effects tornadoes might have in our community. Gather initial ideas. Organize students to work in small groups or individually to sort a set of pictures in a cause – effect matching game. Provide students with cards showing causes (e.g., "A tornado hit a tree") and effects (e.g., "The tree fell down"). They can match the cards to understand the concept of cause and effect. Place the cause-and-effect graphic on the board and model how to do the card matching game using other examples not on in the card set. For example, A tornado hit a tree (cause), and the tree fell down (effect).

Prior to students completing the card sort create the set of picture cards students will be matching together such as:

* A tornado hits a house (cause). The roof gets damaged (effect).
* Heavy winds knock over trees (cause). Roads are blocked (effect).
* Tornado knocks out a power line (cause). People use flashlights(effect).
* Tornado warning is given (cause). People go to the basement for safety (effect).

After modeling, let the students begin their own matching game. When they have finished, ask them to describe their choices for each category. With the cause and effect graphic still on the board, have a student or group bring up a picture on the organizer and explain their reasoning for each match. Repeat this process until all matches have been discussed.

**How can I prepare for the tornadoes?**

Have students think about the information they learned about tornadoes. Brainstorm ways that we can prepare for and stay safe during a tornado. Create an Initial Ideas Anchor chart, titled “Ways to Prepare for Tornadoes?” Gather students’ ideas and record them on the chart as they share how to stay safe in a tornado.

Read page 30-31 titled *Let it Blow and Stormy Weather* in the informational text found in the Wonders curriculum titled “[Be Safe in Bad Weather](https://youtu.be/cZ2SN5YF9uo).” Remind students that as we read, we will stop periodically to add new ideas to their “Ways to Prepare for Tornadoes” chart. Use icons and pictures alongside the written words on the chart to help early readers follow along. Invite students to add drawings to represent each preparation tip as you list the ideas.

Watch a [meteorologist](https://www.youtube.com/watch?v=7YRmcDpHcMk) telling how to be safe in a tornado. Have students share what they noticed in the video and add new ideas to their chart. Ask students, "What should we do if we hear there’s a tornado coming?" and “Where is a safe place to go during a tornado?" Role-play how to stay safe at school. Set up a small pretend “safe zone” in the classroom, such as an indoor fort or space under a sturdy table. Let students practice what they would do if they heard a tornado warning which is going to the safe zone and covering their heads. Create a simple **song or chant** that walks through the steps of tornado safety.

Example of a tornado safety song.

"Find a safe spot, get down low,  
Cover your head and don’t let go,  
Tornado’s coming, but we’re okay,  
We'll stay safe, until it’s gone away!"

Possible ways to stay prepared are listed below.

* Be able to recognize loud sirens and know what they mean.
* Practice where to go in case of a tornado at school and at home (basement, storm shelter, interior room away from window).
* Have a tornado safety kit with items like flashlights, snacks, and blankets.
* Stay calm and listen to adults during a tornado to give you directions.
* Find a safe spot to get down low and cover your head until the tornado is over.
* Bring pets inside.
* Move to a safe space indoors.

Return to the driving question and collect new students’ thoughts around how you can prepare for changing weather conditions over time. Continue to add ideas to the anchor chart. General ideas students may say are listen to the weather forecast, get to a safe place, listen to directions from adults, stay calm, and have a plan in place. These may not all be revealed during this learning experience but may be added as the learning progresses.

**Learning Objective:** Students will describe what a thunderstorm is, identify its effects on self and community and explain how to prepare for a thunderstorm.

## Learning Experience #4: How might a thunderstorm affect our lives and the community and how can we prepare for it?

**What is a thunderstorm?**

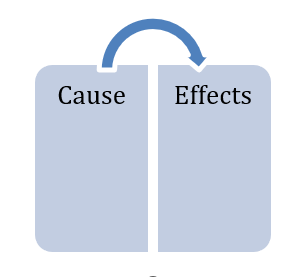
Gather students on the carpet. Briefly explain that they will be watching a special video of a thunderstorm happening overtime. Encourage them to pay close attention to what they notice. Show students the following time [lapse video](https://www.youtube.com/watch?v=ev6mGkcFSq4) of a thunderstorm. Ask students what they see, think and wonder about the video. Record student’s answer on a classroom chart.

|  |  |  |
| --- | --- | --- |
| SEE  What did you see in the video? | THINK  What do you think is going on? | WONDER  What questions do you have? |
|  |  |  |

Prompts to use during the SEE, THINK, WONDER discussion:

* **SEE:** What colors did you see? Did the clouds change? What happened to the sky? Did you notice any movement?
* **THINK:** What do you think was happening to the weather? Why do you think the clouds were moving that way?
* **Wonder:** What do you wonder about thunderstorms? What causes lightning? Why do the clouds move? Why does it get darker during a thunderstorm?

**What effects might thunderstorms have in our community?**

Review the last two cause and effect activities students have done with snowstorms and tornados. Have students share their current understanding of what “cause and effect” means. Display the cause-and-effect graphic organizer. Ask students what effects thunderstorms might have in our community. Gather initial ideas. Organize students to work in small groups or individually to sort a set of pictures into two categories: “Happens Because of Thunderstorms” and “Doesn’t Happen Because of a Thunderstorms.**”** Place the cause-and-effect graphic on the board and model how to do the card sort by placing a couple of pictures on the board using other examples not on in the card sort. For example, it rains during stormy weather and makes the ground wet.

Prior to students engaging in the card sort, create a set of picture cards showing scenarios that thunderstorms might cause, such as:

* A tree branch fell from the strong wings.
* A house gets struck by lightning.
* People use umbrellas and raincoats.
* Large puddles are on the roads.
* The power is out, and people are using flashlights.

Create a separate set of picture cards showing scenarios that do not happen because of a thunderstorm such as:

* Kids playing on a sunny day on the playground.
* People swimming in the pool.
* Kids building snowmen.
* People having a picnic in the park.
* Cars covered in snow.

After modeling, let the students begin their own sorting. When they have finished, ask them to describe their choices for each category. With the cause and effect graphic still on the board, have a student or group bring up a picture on the organizer and explain their reasoning for the “Happens Because of a Thunderstorm” category. Repeat this process until all effects of thunderstorms have been shared. The pictures the students placed under the category, “Doesn’t Happen Because of a Thunderstorm” will still be at their desk for further discussion or review.

**How can I prepare for a thunderstorm?**

Students will listen to the story “[Waiting Out the Storm](https://www.youtube.com/watch?v=VejF9JYaNFQ&t=62s)” by JoAnn Early Macken. Students will think about how a thunderstorm might make them feel and how they can stay safe. Ask, how was the girl and her mother affected by severe weather in the story (a thunderstorm)? In the story, the animals prepared for the thunderstorm in various ways. For example, the chipmunks snuggled together deep in their burrows to stay warm and dry. The mother and child prepared for the thunderstorm by going home so that they could stay warm and dry, too.

Allow students to connect with the story and share their own firsthand experiences for staying safe in a thunderstorm both at school and at home. Create a class chart titled “Thunderstorms” to add student ideas on how to stay prepared and safe during a thunderstorm. Watch a meteorologist and Elmo talk about thunder and lightning forms on The Weather Channel – [How to Talk to Youngsters About Thunder and Lightning](https://weather.com/storms/severe/video/how-to-talk-to-youngsters-about-thunder-and-lightning). Talk to students about “when thunder roars go indoors.”

Thunderstorm
We can stay safe by...
stay inside
stay with your family
close doors and windows
bring pets inside
bring items inside

Possible ways to stay prepared:

* Go inside during the thunderstorm.
* Follow the directions of an adult during a storm.
* Stay away from trees during a thunderstorm.
* Plan to stay home during any type of storm.
* Knowing your phone number and address in case of emergencies.
* Make a family safety kit.
* Wear rain boots and a rain jacket if you must go outside.
* Bring pets indoors.

Return to the driving question Read page 32 titled *Be Save in Bad Weather* in the informational text found in the Wonders curriculum titled “[Be Safe in Bad Weather](https://youtu.be/cZ2SN5YF9uo).” Take time to discuss the importance of knowing your phone number, street address, town and state. Create a card with this information for each child and take time to routinely practice. Encourage caregivers to practice saying these at home with their child as well. Consider building a safety kit together for the classroom. The safety kit could include a flashlight, batteries, first aid kit, whistle, and a blanket. Send information home about what students have learned about being safe in severe weather.

## Culminating Task:

Begin by showing students a timelapse video of a snowstorm: [Snowstorm Video](https://thewonderofscience.com/phenomenon/2018/4/29/timelapse-of-a-blizzard). After watching, explain to the class: "A meteorologist has reported that a snowstorm is coming. We’ve learned that a snowstorm may cause power outages." Ask students to think about how they can prepare for the severe weather. Guide them to write a sentence and draw a picture that shows how they would get ready for a snowstorm. For example, they might pack blankets, use flashlights, or stay indoors. After students complete their work, gather for a class discussion or a gallery walk where students can share their pictures and sentences. Encourage students to ask one another:

* What did you draw, and why is it important to prepare in that way?
* What did you learn about how to get ready for a snowstorm?

## Student Work Samples:

*Please note that the following are samples of students’ work and should not be interpreted as exemplars.*

**The student drew a picture of a house with snow around it. 
Writing: To prepare for a snowstorm, I can: "I can stay safe by staying home and brining my animals in"
Note that spelling and grammar has been corrected for the screen reader.Student 1**

**Student 2**

**The student drew a picture of people standing on a hill. There is a small house by the hill with a sun above. 
Writing: To prepare for a snowstorm, I can "go to a different place"
Note that spelling and grammar has been corrected for the screen reader.**

**Student 3**

**The student drew2 triangles with people inside them. 
Writing: To prepare for a snowstorm, I can "I can stay safe by making a plan to get a generator"
Note that spelling and grammar has been corrected for the screen reader.**