

# Weather: Storms and other Weather Phenomena

---

<b>Strand</b>	Interrelationships in Earth/Space Systems	
<b>Topic</b>	Weather	
<b>Primary SOL</b>	2.6	The student will investigate and understand basic types, changes, and patterns of weather. Key concepts include a) identification of common storms and other weather phenomena.
<b>Related SOL</b>	2.6	The student will investigate and understand basic types, changes, and patterns of weather. Key concepts include b) the uses and importance of measuring, recording, and interpreting weather data; c) the uses and importance of tracking weather data over time.
	2.1	The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which h) data are collected and recorded, and bar graphs are constructed using numbered axes; k) observations and data are communicated; m) current applications are used to reinforce science concepts.

## Background Information

A storm is an extreme weather condition often with very strong wind, heavy rain or snow, and thunder and lightning. Storms include hurricanes, blizzards, tornados, northeasters, and severe thunderstorms.

A thunderstorm contains lightning and thunder and can produce hail and/or tornados. Heat from lightning causes a rapid expansion of air resulting in thunder. Thunderstorms can occur throughout the year but are most likely to happen in spring and summer. It is estimated that there are approximately 1,800 thunderstorms occurring each day.

A tornado is a violent rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of wind speeds up to 300 mph. They can destroy large buildings, uproot trees, and hurl vehicles hundreds of yards.

A hurricane is a huge storm with winds rotating in a counterclockwise direction (in the northern hemisphere) around the center of the storm. The eye of a storm (center) has light winds and fair weather. Hurricanes can be up to 600 miles across and have winds spiraling inward and upward at speeds of 75 to 200 mph. Hurricanes can last for over a week and can move 10-20 mph over the open ocean. They gain energy from warm ocean waters. When they come over land, the heavy rain, strong winds, and storm surge and large waves can cause massive damage.

Though not considered a storm, another important weather phenomenon is a heat wave. This is an extended interval of abnormally hot and often humid weather, usually lasting from a few days to over a week. Heat waves form when an air mass becomes stationary over a region. Heat

waves are dangerous because heat kills by taxing the human body beyond its abilities. Droughts, or long periods of low rainfall, like heat waves, are noteworthy as damaging and dangerous weather phenomena.

## Materials

- Stormy Weather Journals – these can be individual spiral notebooks or small books put together and decorated by the students
- Access for students to books and the Internet for research
- Copy the Activity Cards for each of the activity stations
- Balloon, piece of fur (or you can rub the balloon on hair), wall
- Clear plastic shoeboxes, red food coloring in warm water, blue food coloring in ice cubes allow to melt
- White copier paper
- scissors
- 1-liter or 2-liter plastic soda bottles, water, sand, and glitter
- Dessert-size white paper plates (three per team), large tray (cookie sheet size), black marker, other colors of marker, ice cubes (three per team)

## Vocabulary

*hurricane, snowstorm, snowflake, tornado, severe thunderstorm, lightning, thunder, air mass*

## Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

### Introduction

For this lesson, students will participate as student teams in five learning stations related to the five stormy weather phenomena: snowstorms, thunderstorms, hurricanes, tornadoes, and heat waves. Each station includes students conducting research about the five weather phenomena and completing an activity related to the particular phenomenon. Once the research and activities are completed, each team will make a presentation about one of the weather phenomenon.

Preparation: Set up the five stations.

1. Have one copy of the Research Page in each station for each student. These will be put in a book that each student will make about common storms and other weather phenomena.
2. Set up the hand-on activity in each of the stations.
3. Call students to the rug. Ask if any of them have seen a thunderstorm. Ask what they remember about the thunderstorm. How did they know it was a thunderstorm? Create a large KWL chart on a chart. Write on the chart in the “what I know about thunderstorms column” the information that the students tell you. Encourage students

to ask questions about thunderstorms to put in the “what I want to learn about thunderstorms” column.

4. Repeat the process for each of the following: tornado, hurricane, snowstorm, and heat wave.
5. Tell students about the activity centers and walk them through what they will do at each activity center. Each group will complete all five stations. (This activity should expand over several days to allow students to conduct the research and complete the activity in each station.).
6. Explain to the students that at the end of the week, each student group will prepare a report or demonstration or read a story to the class about one of the centers. At the end of the week, you will put five slips of paper in a box, each with the name of one of the weather phenomenon that they have been studying on the slip. Each group will select one of the slips of paper to find out which phenomenon they will report about to the class.

*Procedure 1 – Stations and Research*

1. Station 1 – Thunderstorms
  - a. Conduct research on thunderstorms
  - b. Activity 1: Sticking a Balloon to the Wall
  - c. Activity 2: Lightning
2. Station 2 – Tornadoes
  - a. Conduct research on tornadoes
  - b. Tornado in a Bottle
3. Station 3 – Hurricanes
  - a. Conduct research on hurricanes
  - b. Activity 1: Naming the Storms (Make a bulletin board display with the list of name choices made by the teams.)
4. Station 4 – Snowstorms
  - a. Conduct research on snowstorms
  - b. Make a Snowflake
5. Station 5 – Heat Waves
  - a. Set up experiment first and then conduct research on heat waves
  - b. Testing The Colors to Wear

*Procedure 2 – Presentations*

1. Write each of the five weather phenomenon names on a slip of paper. Place the five slips of paper in a box.
2. Have each student team select a slip of paper to determine which weather phenomenon they will report about to the class. (If you have more than five teams, you can have multiple slips of paper with each phenomenon on it or you can divide some of the phenomena (e.g., snowstorms could be divided into blizzards, ice storms,

- winter Nor'easter, etc.),
3. Give each team the Presentation Guidelines.
  4. Give teams time to put together and practice their presentations.
  5. Have each team present. Allow other students to ask questions of the team. (Always set up "Good Presentation/Audience Guidelines" ahead of time so that students understand their responsibilities.)

## Assessment

- **Questions**
  - How can you identify a thunderstorm?
  - What is lightning? What is thunder?
  - Explain in your own words what a tornado is.
  - How can you identify a hurricane?
  - What is a snowstorm?
  - Why do some storms produce snow, while others produce rain?
  - What is a heat wave?
  - Why are heat waves dangerous?
  - What do storms need to become storms?
- **Journal/writing prompts**
  - Have you ever been in a hurricane? If you have, write about this in your journal. Have you ever been in any of the storms we have talked about? Write about this storm in your journal.
  - Tell what you would do if you were outside and could hear thunder.

## Extensions and Connections (for all students)

- Write stories including the characteristics of different storms (provide music with storm sounds).
- Compare and contrast thunderstorms and hurricanes with tornados, blizzards, and northeasters.
- Keep a "Storm Journal" throughout the year. Each time you experience a storm, write about it in your "Storm Journal."

## Strategies for Differentiation

- Read fictional children's stories about thunderstorms and hurricanes.
- Provide pictures or videos of thunderstorms and hurricanes to prompt comments.
- Find music/sound recordings of storms.
- Create posters to depict different types of storms.
- Collect supplies (umbrella, flashlight, raincoat, canned food, radio, batteries, snow shovel, etc.). Discuss/sort these items by appropriate storm.

## Station 1

# Sticking a Balloon to a Wall



### MATERIALS:

- balloon
- a piece of wool, nylon or fur
- wall

### PROCESS:

1. Blow up the balloon and tie it.
2. Rub the balloon with your piece of wool, nylon, or fur quickly.
3. Put the balloon against the wall and let go.
4. Watch what happens. It should stick to the wall.

### EXPLANATION:

Why does this happen?

When you rub the balloon, you're covering it with little negative charges. The negative charges are attracted to the positive charges that are in the wall. That's why the balloon 'sticks' to the wall.

## Station 1

# Lightning

Have you ever rubbed your feet across carpet and then touched a metal door handle? If so, then you know that you can get shocked! Lightning works in the same way.

You can use thunder to tell how far away a storm is. Next time you see a storm, count the number of seconds between when you see the lightning and hear the thunder. Every five seconds equals one mile. For example: If you counted 10 seconds between the lightning and the thunder, the lightning is 2 miles away! 1 thousand one equals about a second.

## Make a Thunderstorm

### MATERIALS:

- clear, plastic container (size of shoebox)
- red food coloring
- ice cubes made with blue food coloring



### PROCESS:

Fill the plastic container two-thirds full with lukewarm water

Let the water sit for one minute.

Place a blue ice cube at one end of the plastic container.

Add three drops of red food coloring to the water at the other end of the plastic container.

Watch what happens.

## Station 2

# Tornado in a Bottle



### MATERIALS:

- 2-liter clear plastic bottles (empty and clean with labels removed)
- water
- sand
- glitter

### PROCESS:

Fill one of the bottles two-thirds full of water.

Add glitter and food coloring to the water.

Put the top on the bottle. Swirl the bottle in a circular motion. Most tornadoes form counterclockwise in the Northern Hemisphere. A tornado will form in the bottle

### EXPLANATION:

The swirling motion you give the bottle forms a vortex and is a easy way to create your own tornado.

### Station 3

## Hurricanes

Each hurricane is given a name just like a person. The United States Weather Service is responsible for choosing the names.

The names are in alphabetical order. The first name used starts with A, the second name starts with B, and so forth. They do NOT use the letters Q, U, and Z.

If a hurricane does a lot of damage, they “retire” that storm’s name. For example, they will never use the name Katrina again.

PRETEND that the U.S. National Weather Service has asked you to make the list of hurricanes for next summer. Please put together a list of names following these rules:

1. You must have one name for each letter (A-Z).  
*REMEMBER: Don’t use the letters Q, U, and Z.*
2. Make sure the names are in alphabetical order.
3. The first name that starts with A should be a girl’s name. The second name which starts with B should be a boy’s name. The third name which starts with C should be a girl’s name. Continue this pattern.



## Station 4

# Snowstorms

One of the major types of precipitation that we see in the winter is snow. Snowflakes are made of ice crystals and form in clouds where the temperature is below freezing.

Snowflakes have six sides and every snowflake is different.

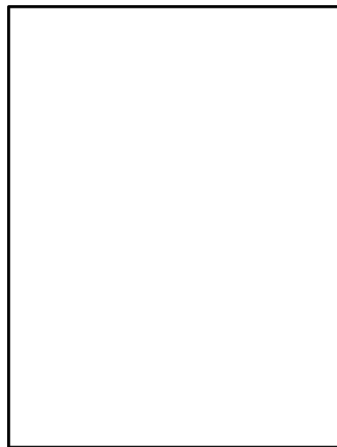
You are going to make a snowflake out of paper that has six sides.

### MATERIALS:

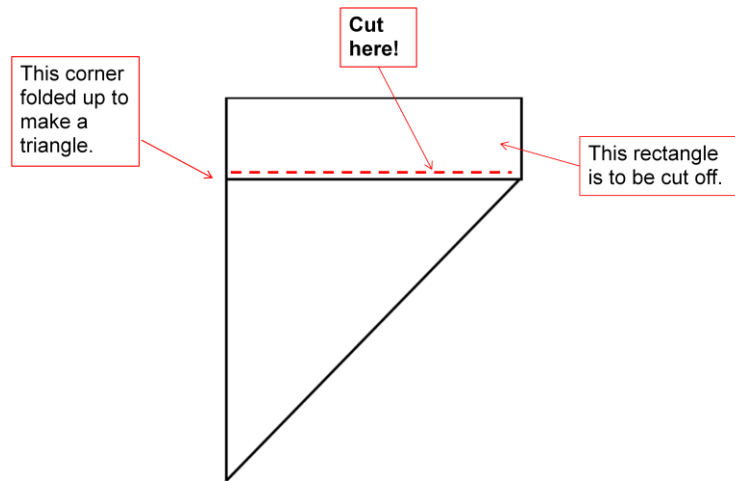
- 1 sheet of white typing paper
- scissors

### PROCESS:

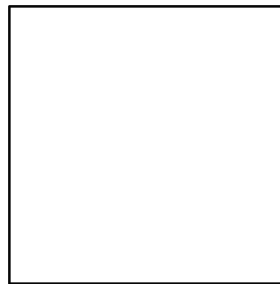
1. Lay your piece of white paper in front of you so that the shorter sides are at the top and bottom.



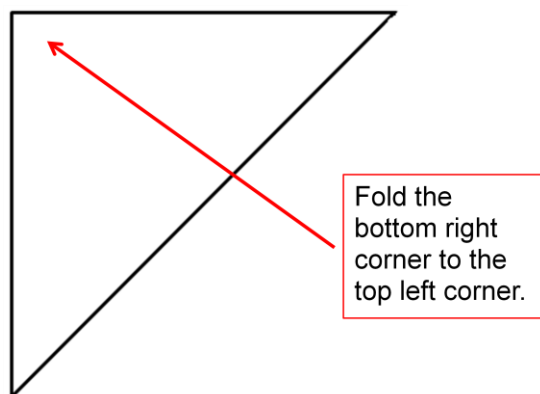
2. Fold the lower right corner across to the left side to make a triangle.



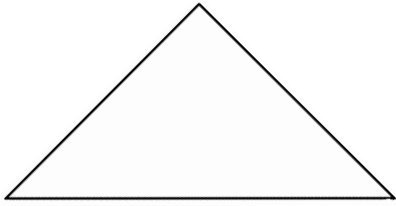
3. Cut off the rectangle at the top of your page. When you open your triangle, you now have a square piece of paper.



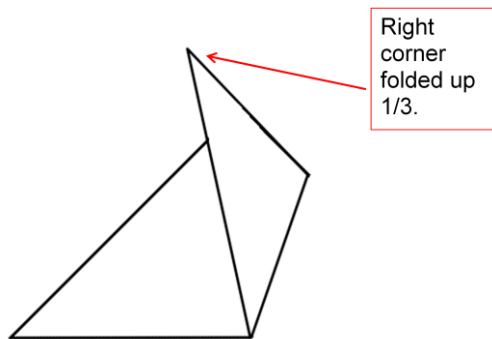
4. Fold the bottom left corner up to the top right corner to make a triangle.



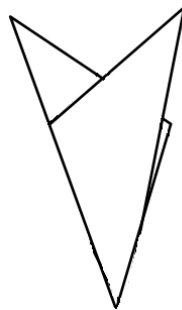
5. Put your triangle in front of you like this:

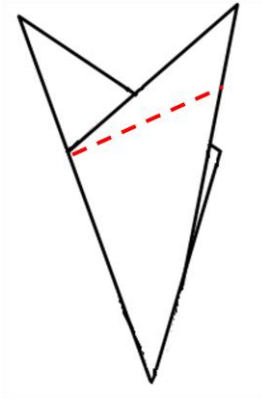


6. Pretend that you are dividing your triangle into three sections. Take the lower right corner and fold it up 1/3 like this.

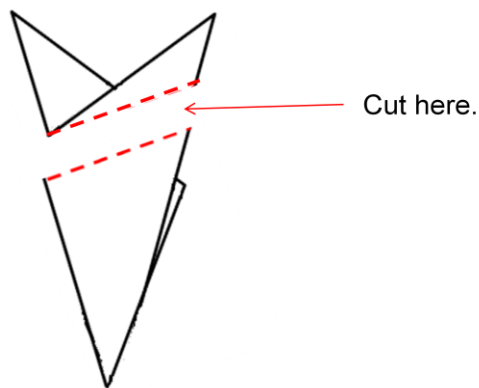


7. Now fold the bottom left hand corner over 1/3. Your paper should look like this.





8. Cut the top off of your triangle like this.



9. You can now cut shapes out of your remaining triangle.

10. When you are done, unfold it to see your snowflake. Your snowflake should have six points and should not be like anyone else's snowflake.

## Station 5

# Heat Waves

A heat wave is a very long period of very hot and humid weather.

We try to wear certain colors of clothes to help us deal with the heat.

You are going to test how different colors might help us deal with the heat.

### **SET UP YOUR EXPERIMENT BEFORE YOU DO YOUR RESEARCH!**

#### MATERIALS:

- 3 small white paper plates
- 1 tray to set the plates on
- Black marker and a second marker of your choice of color
- 3 ice cubes (all the same size)

#### PROCESS:

1. Color the entire top of one of your paper plates with the black marker. Try not to leave any white.
2. Pick a second color of your choice. Color the second paper plate with that color.
3. Leave the third paper plate white.
4. Put all three paper plates on the tray.
5. Put one ice cube on each plate.

6. Put your tray in a classroom window or in the sunshine coming in from a classroom window.
7. Leave your tray while you do your research on heat waves.
8. When you are done with your research, get your tray and bring it back to your table.
9. Answer these questions in your Storm Weather Journal.
10. Are the ice cubes the same size or did one melt more than another? \_\_\_\_\_
11. If the ice cubes are different sizes, do you think the color of the paper plates made a difference? Why or why not. \_\_\_\_\_
12. Do you think the color of your clothes would make a difference in a heat wave? \_\_\_\_\_

# Weather Research

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**(Use this page to conduct your research about each type of weather.)**

1. The weather I am researching is \_\_\_\_\_.

2. Write a sentence that tells what a \_\_\_\_\_ is.  
(the weather kind)

---

---

---

3. How does this kind of weather form? \_\_\_\_\_

---

---

---

4. Tell three scientific facts about this kind of weather.

---

---

---

---

---

---

5. Tell three facts about the history of this kind of weather.

---

---

---

---

---

---

---

6. Tell how you stay safe in this kind of weather.

---

---

---

---

7. Find and print three pictures of this kind of weather.