

Cornell Chapter of the American Meteorological Society  
**Education Outreach Committee 2015-2016 Report**

Compiled by Ethan Burwell '16, 2015-2016 Education Outreach Chair



## Why Education Outreach?

Education Outreach, in its many forms, has the potential to serve as a key component of weather and climate-literacy; topics that have significant relevance in today's society.

*"There's one issue that will define the contours of this century more dramatically than any other, and that is the urgent and growing threat of a changing climate."* <sup>[1]</sup>

- President Barack Obama,  
U.N. Climate Change Summit;  
September 23, 2014

Founded in 1979, the Cornell Chapter of the American Meteorological Society is one of over 130 AMS local chapters throughout the United States and Puerto Rico. Per the *American Meteorological Society Chapter Officers' Handbook*, local chapters "provide an outlet for local activities in the fields served by the Society [and] provide a means of reaching the community to serve AMS goals." Meteorological literacy is a key component of these goals. <sup>[2]</sup>

*"Climate literacy in the next generation of U.S. citizens will ensure a firm foundation of knowledge and discourse as society faces decisions on how to best deal with a changing climate."* <sup>[3]</sup>

- Climate Science is Core to Science Education,  
A Policy Statement of the American Meteorological Society;  
May 23, 2013

In February 2016, the Cornell Chapter of the American Meteorological Society was recognized as a NOAA Weather-Ready Nation Ambassador. The Weather-Ready Nation initiative, launched in 2011, seeks to reduce the impacts of extreme water, weather and climate events through collaboration with communities. As Ambassadors, we serve as agents of change within our community to "inspire others to be better informed and prepared, helping to minimize or even avoid the impacts of natural disasters." <sup>[4]</sup>

*"To educate and inspire the nation to use science toward improving ocean and coastal stewardship, [and] increasing safety and resilience to environmental hazards. . ."* <sup>[5]</sup>

- National Oceanic and Atmospheric Administration,  
Mission Statement

Moving forward, it is in line with our parent organization, the American Meteorological Society, and our responsibility as a NOAA Weather-Ready Nation Ambassador, that the Cornell Chapter of the American Meteorological Society continue to develop and implement its Education Outreach program. Both organizations offer resources to help meet these goals.

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[1] <https://www.whitehouse.gov/the-press-office/2014/09/23/remarks-president-un-climate-change-summit>

[2] <https://www.ametsoc.org/ams/index.cfm/about-ams/ams-local-chapters/>

[3] <https://www.ametsoc.org/ams/index.cfm/about-ams/ams-statements/statements-of-the-ams-in-force/climate-science-is-core-to-science-education/>

[4] <http://www.nws.noaa.gov/com/weatherreadynation/ambassadors.html>

[5] <http://www.noaa.gov/education>

## Our Audience:

During the 2015-2016 academic year, the Education Outreach Committee adopted three focus groups: Campus, Community, and Children. These three focus demographics areas were determined to best encapsulate potential audiences and became the tagline of the committee.

**Campus:** refers to the Cornell Community. Cornell represents our most immediate demographic; it is the one in which our department and organization exist. With an undergraduate student body of over 14,000 individuals, there is ample opportunity to 1) engage and educate students about weather and climate, 2) collaborate with similarly oriented student organizations, and 3) Advertise the CCAMS brand to increase awareness and relevance of our organization.

**Community:** refers to the greater Ithaca public. The city has a permanent population of approximately 30,000 individuals of various demographic and educational backgrounds. By targeting the Greater Ithaca Community, CCAMS Education Outreach has the potential to interact with and provide valuable educational resources to the public. This is very much in line with our parent organizations, and with the practices that many in our organization will likely adopt as they move into the professional world.

**Children:** refers to students who have not yet completed high school. The Ithaca City School District is composed of over 5,000 K-12<sup>th</sup> grade students in eight elementary schools, two middle schools, and one high school. It is the belief of the Education Outreach committee that to build a climate and meteorologically literate society, it is best to expose individuals at a young age. By targeting grade school students, we approach them at an age where they are both receptive to and able to comprehend new information.

A fourth target demographic was included in the initial 2015-2015 tagline, “club ♦ campus ♦ community ♦ children”. By including the “**Club**”, i.e. CCAMS, as a focus audience, Education Outreach was attempting to acknowledge and address the belief that it is not simply enough for our members to organize and host events that educate *others*. Instead, it should be our goal to continue enhancing our own atmospheric knowledge beyond our classroom experiences. The primary initiative envisioned with the Club focus was to be article/journal readings that would have allowed members to select any literature of their choosing, and then present it to the other members of CCAMS. With a potential goal of one presentation/semester/individual, such meetings would have exposed members to relevant scholarly journals sooner than they might otherwise have been. It would have allowed them to explore new topics and to practice public speaking/presentation skills. Unfortunately, no meetings of this nature materialized over the first semester, and the Club concentration was dropped as a focus demographic in favor of concentrating committee efforts on the other three target audiences. This reference to the defunct Club focus area is intended to serve as a point of inspiration for future planning in hopes that it can one day be implemented.

## Education Outreach Events:

The following pages detail the events that CCAMS Education Outreach engaged in during the 2015-2016 academic year. A brief description of each event is included along with details of the activities engaged in and contact information for event coordinators.

- |     |                          |  |
|-----|--------------------------|--|
| 1.  | August 30                | Cornell Eco Fall Fest                        |
| 2.  | September 19             | Homecoming Tailgate                          |
| 3.  | October 4                | Ithaca Apple Festival                        |
| 4.  | Oct. 22, Nov. 17, Dec. 1 | Lansing Middle School Afterschool Program    |
| 7.  | Nov. 19 & Dec. 3         | Lansing Middle School Science Club           |
| 9.  | December 1               | Cornell NWS StormReady Certification         |
| 10. | December 11              | Caroline Elementary                          |
| 11. | December 15              | Fall Creek Elementary                        |
| 12. | January 31               | Cornell Club Festival                        |
| 13. | February 7               | WeatherReady Nation Ambassador Certification |
| 14. | February 20              | Lansing Middle School STEAM Day              |
| 15. | April 11-15              | Severe Weather Campaign                      |
| 16. | April 28                 | Cornell Bring a Child to Work Day            |
| 17. | April 30                 | Cornell Expanding Your Horizons              |
| 18. | May 4-6                  | Weather on a Stick Campaign                  |
| 19. | May 25                   | South Hill Elementary School                 |

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An electronic version of the 2015-2016 Education Outreach Committee Report and most of the documents made for/used during the events can be found online in an open Google Drive folder at: <https://drive.google.com/drive/folders/0B17JluTDyuU1dXBUTXRucFVQRHc?usp=sharing>

## CCAMS Education Outreach Event #01

**Event Name:** Cornell ECO Fall Fest

**Date:** August 30, 2015

**Description:** *On August 30, 2015, the Cornell Environmental Collaborative will host a club fair oriented exclusively toward sustainability-focused organizations, taking place on the Court-Kay-Bauer Quad from 4 P.M.-6 P.M., Cornell's first ever ECO Fall Fest will provide student clubs with an unbeatable opportunity to recruit new members before the traditional Club Fest! <http://www.sustainablecampus.cornell.edu/blogs/news/posts/db624-eco-fall-fest-on-august-30>*

**Contact:** Email received from **Cornell Environmental Collaborative** [eco.cornell@gmail.com](mailto:eco.cornell@gmail.com) on August 9<sup>th</sup> with invitation to sign up before August 13<sup>th</sup> deadline.

**Activity:** Carbon Footprint Tabling

**Activity Details:** During Spring 2015, Education Outreach created carbon-footprint poster board for Agriculture Day. The board was used again for the ECO Fall Fest to show how daily activities contribute to carbon emissions. Tabling for this event centered on carbon emission and its environmental impact. The poster was designed to provide a solid baseline for the CCAMS presenter, showing ways in which carbon is emitted and suggestions for emissions reduction. CCAMS carbon wheels were made accessible to students to calculate their personal carbon emissions.

**Future enhancements:** In the future, a laptop could be used to bring in carbon visuals. Such illustrations are accessible via NASA's YouTube videos: <https://youtu.be/x1SgmFa0r04>  
Additional resources:

<https://www.epa.gov/ghgemissions/overview-greenhouse-gases#carbon-dioxide>

<http://www.nature.org/greenliving/carboncalculator/>

Carbon for Kids: <http://climatekids.nasa.gov/menu/carbons-travels/>



Carolina Bieri '16, Shaun Howe '16, Jessica Hubbard '16, and Matthew Grieco '16

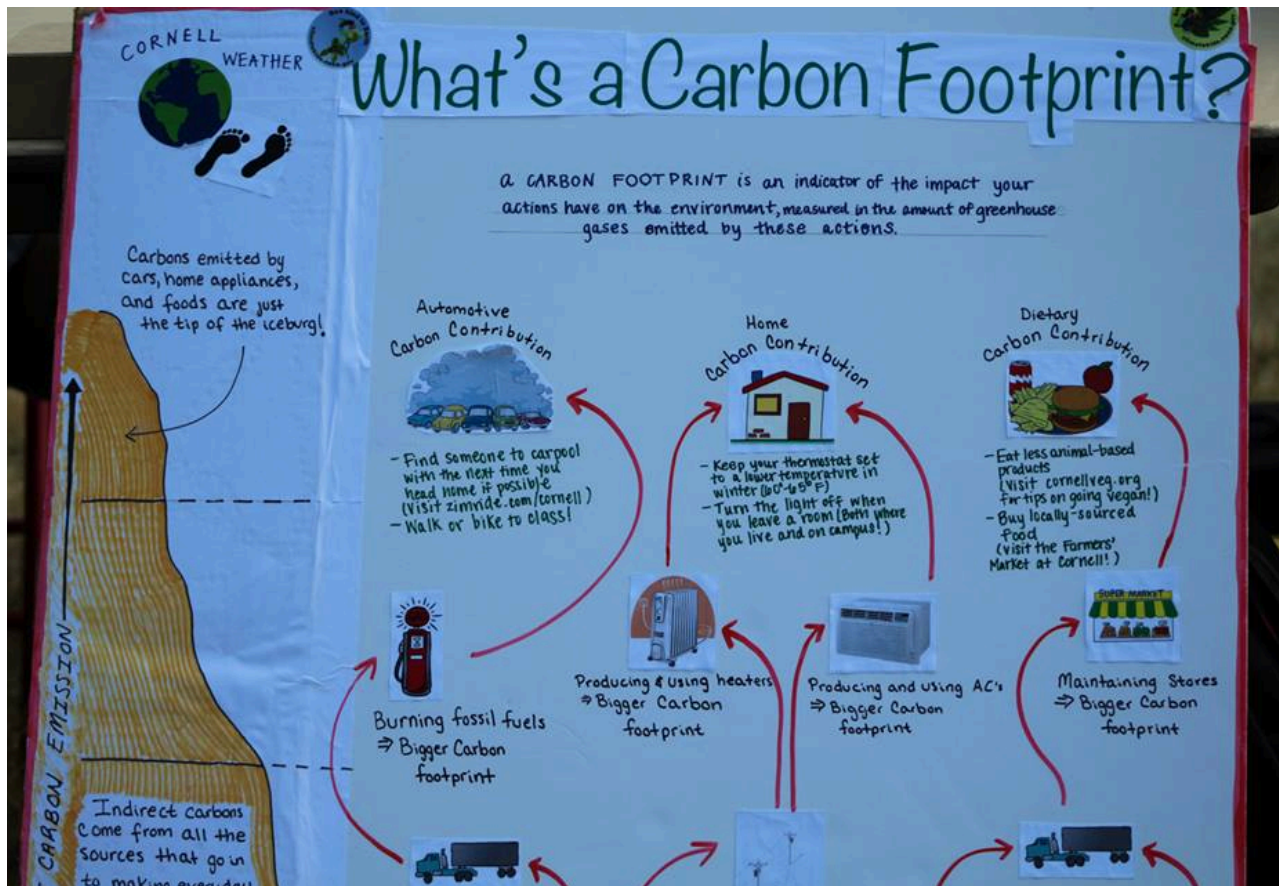
## Cornell ECO Fall Fest Photos



(Left) Interacting with a student.



(Right) Carbon Footprint calculator and Cornell Weather pencils



Education Outreach Carbon Emissions poster board

## CCAMS Education Outreach Event #02

**Event Name:** Cornell Homecoming

**Date:** September 19, 2015

**Description:** *Each year at Homecoming, CALS hosts a "CALS Zone" in the tailgate area where we showcase student groups who are affiliated with CALS. Each group is asked to host a booth where they can talk to alumni, other students, children, and others attending Homecoming about their organization.*

**Contact:** Email received from **Jennifer L. Benson**, [jl478@cornell.edu](mailto:jl478@cornell.edu), Associate Director of Engagement and Participation, CALS Alumni Affairs and Development office on August 27<sup>th</sup> with invitation to participate.

**Activity:** Hurricane Hunter Bean Bag Toss

**Activity Details:** September marks the peak of the Atlantic Hurricane Season. Even here in New York we can be affected by tropical storms and hurricanes... Lee, Irene, and Sandy are the names of just a few recent examples! CCAMS has a wooden bin that has holes that people can try to throw bean bags in. The holes are numbered so people will toss a bean bag trying to get the most numbers or "points". Each hole number will correspond to a hurricane trivia question -- they throw it in the hole, then you ask them the corresponding trivia question. If they get it right they get all the points, if not, they try again. A basic score board will be set up so people can see how other people did throughout the event. Prizes include CCAMS stickers, pencils, bookmarks, social media card, and candy!



Shaun Howe '16, Brett Wiley '16, Malcolm Wilson '19, Malcolm's twin '19

## Cornell Homecoming Photos



Tyler Leicht '18 and Carolina Bieri '16 running the booth.



CCAMS at the Homecoming Game after tabling.  
Peter Biedenweg '15, Ethan Burwell '16, Shaun Howe '16, Matthew Grieco '16, Tyler Leicht '18  
Carolina Bieri '16, Bret Wiely '16, Jessica Hubbard '16

## CCAMS Education Outreach Event #03

**Event Name:** Ithaca Apple Festival

**Date:** October 4, 2015

**Description:** Annual Apple Festival in Ithaca. *The Downtown Ithaca Alliance encourages nonprofit organizations to set up information tables at Apple Harvest Festival. \$20 per non-profit booth.*

**Contact:** CCAMS completed online form and mailed payment by the September 2<sup>nd</sup> deadline.

**Tatiana Sy** [tatiana@downtownithaca.com](mailto:tatiana@downtownithaca.com) was emailed on September 23<sup>rd</sup> requesting information and confirmation; no response was received. Confirmation was received on September 28<sup>th</sup> from **Ben Lawrence**, Downtown Ithaca Alliance [benjaminadam4@gmail.com](mailto:benjaminadam4@gmail.com). Link to Form:

<https://docs.google.com/forms/d/e/1FAIpQLSdrFcZVbVzmfu5NN5UvsaHMPMu1byyltWDZqTcNBjZyjG2jA/viewform>

**Activity:** Assorted bean bag trivia from Hurricane Questions, Carbon Footprint, and Flood Awareness presentations

**Activity Details:** All previously existing CCAMS poster presentations were utilized in the activity. They were set up so that all could be seen by the public. The hook was a bean bag toss into the CCAMS wooden crate. Different holes in the crate were worth different points. Participants were asked various questions related to any of the posters and received the points if they answered correctly. If incorrect questions were given, they tried again. Candy, weather stickers, and CCAMS bookmark prizes were given out. Effort should be made to incorporate more “Apple” weather/climate in the future.



Carolina Bieri '16 and Ethan Burwell '16 Tabling at Apple Festival

## Apple Festival Photos



Two children inspect a weather poster.



(Left) Carolina oversees the bean bag toss.



(Right) Ethan interacts with young children.



*"Toss a bag, win a prize!"* The bean bag toss is ready to go!

## CCAMS Education Outreach Event #04, #05 and #06

**Event Name:** Lansing Middle School Afterschool Program

**Date:** October 22, 2015; November 17, 2015; December 3, 2015

**Description:** Lansing Middle School runs an afterschool program for its 5<sup>th</sup> through 8<sup>th</sup> grade students. The students engage in various recreational and academic activities during the program.

**Contact:** Cornell Associate Director of Service-Learning and Partnership, **Amy Somchanhmavong** [ayk3@cornell.edu](mailto:ayk3@cornell.edu) served as the initial contact with the afterschool program. She assessed the feasibility of working with Lansing, and then introduced **Katie Turner** [ktturner@lcsd.k12.ny.us](mailto:ktturner@lcsd.k12.ny.us), who was the primary coordinator. Katie worked as the Lansing Youth Services Program Manager & Lansing Youth Employment Coordinator.

**Activity:** October – Cloud Formation, November – Why Weather Happens, December – Weather Instruments

**Activity Background:** Roughly twenty-five 5<sup>th</sup> through 8<sup>th</sup> grade students participated in each of the three afterschool events. The first event took place in the cafeteria, and the second two took place in the library. Some students were present for multiple events, others were not. All worksheets were made specifically for these visits.



## **Lesson Plan: Lansing Middle School Afterschool Program – 1**

### **Topic: Cloud Formation**

<u><b>Activity Type</b></u>	<u><b>Target Ages</b></u>	<u><b>Estimated Activity Time</b></u>
Interactive Session	Grade 5 through 8	50 - 60 minutes

#### **Essential Question:**

How do clouds form?

#### **Activity Background:**

This activity is intended to introduce the content of how clouds form within the context of the water cycle. The targeted age range increases the probability that students have been exposed to the water cycle previously, and it is recommended that the instructor present the content in a way that allows the students to contribute what they know before the information is presented to them. Because clouds happen outside, the lesson incorporates the outside so that students can investigate the processes of the water cycle as they actually occur.

#### **Lesson Objectives:**

1. Understand the steps of the water cycle
2. Understand cloud formation within context of the water cycle
3. Understand factors that influence the steps of the water cycle

#### **Required Resources:**

Sky Clouds Worksheet and pencils

Whiteboard, Bowls of water

Cloud identification chart with altitude

Bean bags and a bean bag toss bin

Weather stickers

A safe outside area with a sidewalk

**Note:** Possible elaboration related to this lesson for future activities could be the exploration of orthographic cloud formation via some sort of ramp and bowling activity to illustrate air motion over a mountain system.

<u><b>Class Component</b></u>	<u><b>Time</b></u>	<u><b>Purpose</b></u>
<p align="center"><b>Welcome and Introduction!</b></p> <ul style="list-style-type: none"> <li>Hello! We're here to talk about weather!</li> <li>Raise your hand if you think you like weather.</li> <li>Stand if you like: warm/cold – cloudy/sunny – rain/snow – snowdays – lightning. Stand if you know how clouds form – what we're going to investigate today.</li> </ul>	<5 minutes	<p><b>Engage</b> with them.</p> <p><b>Assess</b> their background.</p> <p><b>Provide</b> a sense of direction.</p>
<p align="center"><b>1. How Clouds Form</b></p> <p>-Ask who has an idea of how clouds form</p> <p>- Introduce the worksheet; clouds form in the water cycle</p> <p>Using a whiteboard, go through the water cycle steps: Evaporation, condensation, and precipitation.</p> <p>Draw the steps for everyone to see, and for each step, have students tell what they know. Ask them how many precipitation types they can name.</p> <p>Go through the step/definition matching on the worksheet as a class, and have them draw their water cycle in the space.</p>	15 minutes	<p><b>Allow</b> thought sharing.</p> <p><b>Introduce</b> content.</p> <p><b>Assess</b> student baseline knowledge</p> <p><b>Engage</b> the students.</p> <p><b>Allow</b> creativity.</p>
<p align="center"><b>2. Let's Look Outside!</b></p> <p>--take the class outside to a sidewalk--</p> <p><b>Evaporation-</b> divide the class into small groups, and provide each group with a bowl of water. Have each student “finger paint” on the sidewalk with the water. Then, engage in a discussion about factors that affect rate of evaporation while everyone waits for their paintings to begin evaporating.</p> <p><b>Condensation-</b> provide a cloud chart to the students. Have them identify any current clouds and then tell them about that type of cloud. Introduce concept of high, middle, and low clouds; ask them to identify some examples. Ask what they think of the other cloud pictures; what do they make them think of? Have them fill in the reverse side of their sheets.</p> <p><b>Precipitation</b> – Are today's clouds likely to produce rain?</p>	25-30 minutes	<p><b>Explore</b> content.</p> <p><b>Get</b> them thinking.</p> <p><b>Engage</b> physically.</p> <p><b>Engage</b> mentally.</p>
<p align="center"><b>Review Contest: Bean Bag Toss</b></p> <p>Have the students for two teams – one round of Rock-Paper-Scissors to determine which team goes first.</p> <p>Rules: one person gets to throw the bean bag. If they get it in the hole, the instructor asks them a question based on the lesson. If they get it right, they get points. If the student misses the hole, then the other team gets to throw. Instructor can modify these rules as needed. Weather stickers as prizes for everyone.</p>	10 minutes	<p><b>Assess</b> retention.</p> <p><b>Reinforce</b> content.</p> <p><b>Engage</b> physically.</p>

## Cloud Formation Worksheet – Front

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

Grade: \_\_\_\_\_

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



### Clouds form in the Water Cycle

Match the words with their meaning:

Evaporation

Water falls from clouds

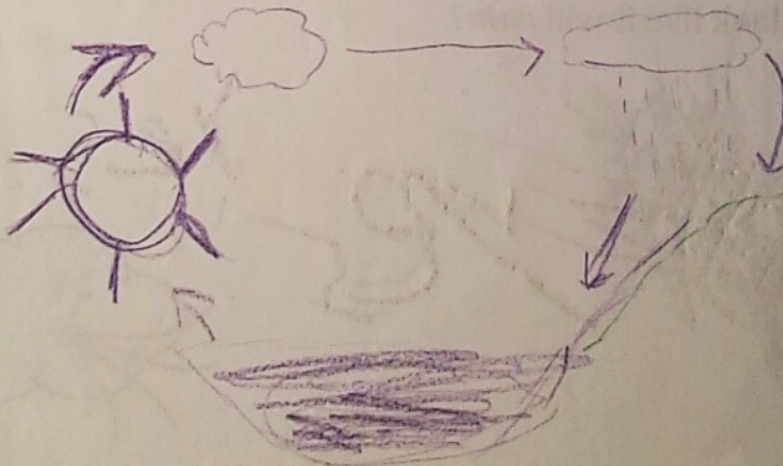
Condensation

"Drying up" of surface water

Precipitation

Formation of clouds

**Draw** a picture of the water cycle



Cloud Formation Worksheet - Back

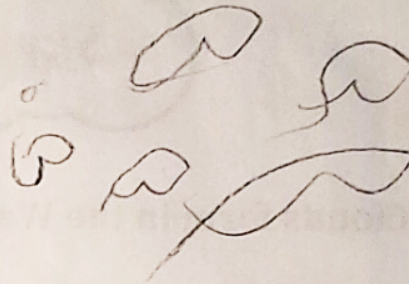
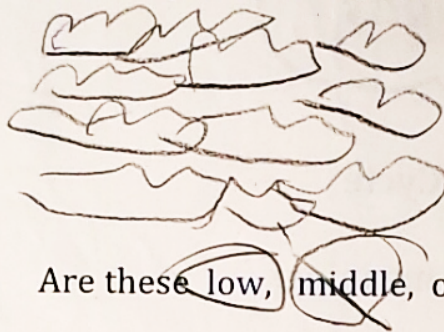


What kind of clouds do you see?

acumulus

stratus

**Draw** a picture of them!



Are these low, middle, or high clouds? (circle one)

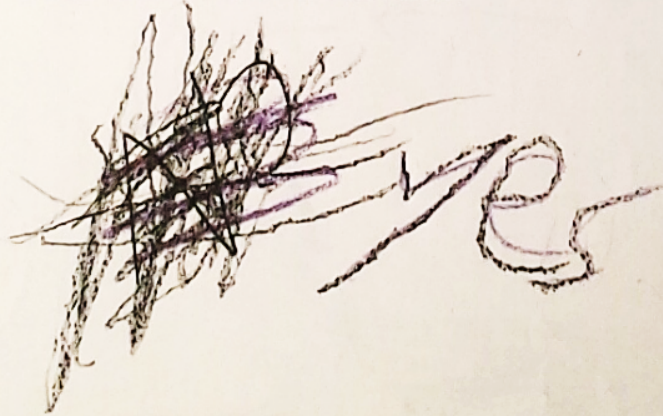
What is your **favorite** cloud type?

ALTOCUMULUS

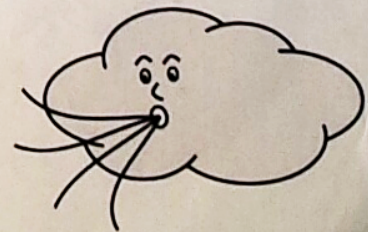


Cirrus

Does it look like it will **rain**?



yes



## **Lesson Plan: Lansing Middle School Afterschool Program – 2**

Topic: **Why Weather Happens**

<u>Activity Type</u>	<u>Target Ages</u>	<u>Estimated Activity Time</u>
Interactive Session	Grade 5 through 8	45 minutes

### **Essential Question:**

Why does weather happen?

### **Activity Background:**

This lesson simplifies weather's causes to differences in air density related to temperature differences. Substances with different densities behave in different ways. Temperature is a significant factor of the density of a substance, and cold substances are more dense than warm substances. The relative motions of warm and cold air play a significant role in driving the basic weather that we observe.

### **Lesson Objectives:**

1. Understand that objects have different densities at different temperatures
2. The motion of water and air is caused by their temperature/density differences
3. Air motion causes weather: rising = clouds, sinking = clear

### **Required Resources:**

Exploring Storms worksheet

IR satellite map, Frontal Weather Map

Tank of water, Ice, Food coloring

Tornado Machine

Whiteboard

**Note:** As is, this lesson does not explicitly touch on the concepts of heat transfer - radiative, convective, and conductive. Possible modification could be to address convective heat processes directly. This lesson strictly addresses density-related processes; adiabatic influences are not addressed at this level.

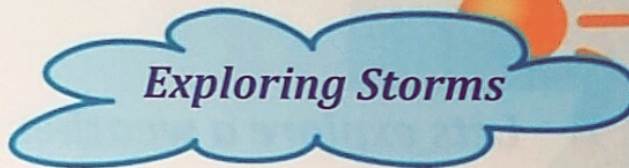
<b><u>Class Component</u></b>	<b><u>Time</u></b>	<b><u>Purpose</u></b>
<p align="center"><b>Welcome and Introduction!</b></p> <p>Hello! Going to explore why weather happens.  - Have someone read the density statement on the worksheet.  Different air temperatures have different densities, and this causes weather. Have them tell what they know about density.</p>	5 minutes	<p><b>Provide</b> a sense of direction.</p> <p><b>Engage</b> with them.</p> <p><b>Assess</b> their background.</p>
<p align="center"><b>1. Density of Water</b></p> <p>Density – how compact a substance is. We’re going to use water to illustrate density. Water has density. What are some factors that influence density – heat. What do you all think is more dense: warm or cold? Set up a clear tub of warm water in a central location. Add ice to one end. Put drops of food coloring in the warm open water and over the ice water. Ask what they think will happen. Observe what is happening and ask them why this is happening. Then engage in a discussion about the motion of the dye: cold water is more dense, so it sinks. Draw the water motion on a whiteboard to help them visualize it. Have them draw the motion of warm/cold water on their worksheet. Have students read the associated statements, and circle the correct words.</p>	10 minutes	<p><b>Introduce</b> content.</p> <p><b>Engage</b> the students.</p> <p><b>Explore</b> content with physical demonstration.</p> <p><b>Allow</b> creativity.</p>
<p align="center"><b>2. Air behaves like water</b></p> <p>Equate the relative vertical motion of warm/cold water to warm/cold air. Ask them which is more dense, and if they would expect rising/sinking. Mention that where warm and cold air collide weather fronts form. Weather – clouds – happen near the boundaries (fronts) and near the warm rising air. Think of the water cycle – what happens when air rises? It evaporates and then condenses, forming clouds. Clouds form where air rises. What happens where air sinks (opposite)? – Sun. Have them draw the air circulation on the worksheet, just as they did with the water. Include where the sun and clouds would be.</p>	10 minutes	<p><b>Introduce</b> content.</p> <p><b>Get</b> them thinking.</p> <p><b>Allow</b> creativity.</p>
<p align="center"><b>3. Exploring a weather map</b></p> <p>On a whiteboard draw a low and a high pressure – Like on TV. Explain that the high is just sinking air, and that the air moves toward the boundaries. Draw clouds at the boundaries – so that the system represents a mature mid-latitude cyclone. Then allow them to look at printouts of IR satellite and a frontal map of a real system to compare.</p>	10 minutes	<p><b>Provide</b> real world context.</p>
<p align="center"><b>4. Severe Weather</b></p> <p>Explain that when air collides at the boundaries, or when it rises very quickly, sometimes we can get severe weather. Bring out the tornado machine as a fun way to show an example of severe weather. Allow them to interact with it before recapping that warm air – less dense – rises – clouds form (opposite for cold)</p>	10 minutes	<p><b>Engage</b> the students.</p> <p><b>Assess</b> retention.</p>

## Why Weather Happens Worksheet - Front

Name: Alexandra Benson

Grade: 6

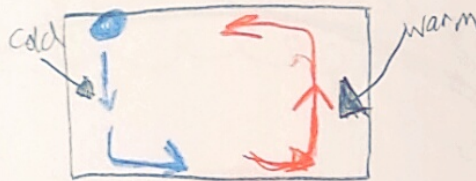
Date: \_\_\_\_\_



Weather happens because warm and cold air have different *densities*.  
*Density is how compact a substance is.*

### 1. Water has density!

**Draw** where the **cold water** flows in the tank



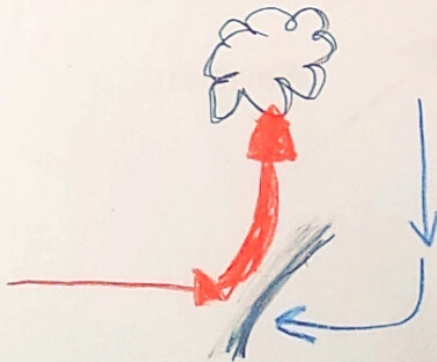
Circle the correct **bold** word

Cold water: **rises** or **sinks**

Cold water is: **more** or **less** dense

### 2. Air behaves just like water!

**Draw** how **cold air** and **warm air** flow around the boundary



Circle the correct **bold** word

Cold air: **sinks** or **rises**

Warm air: **sinks** or **rises**

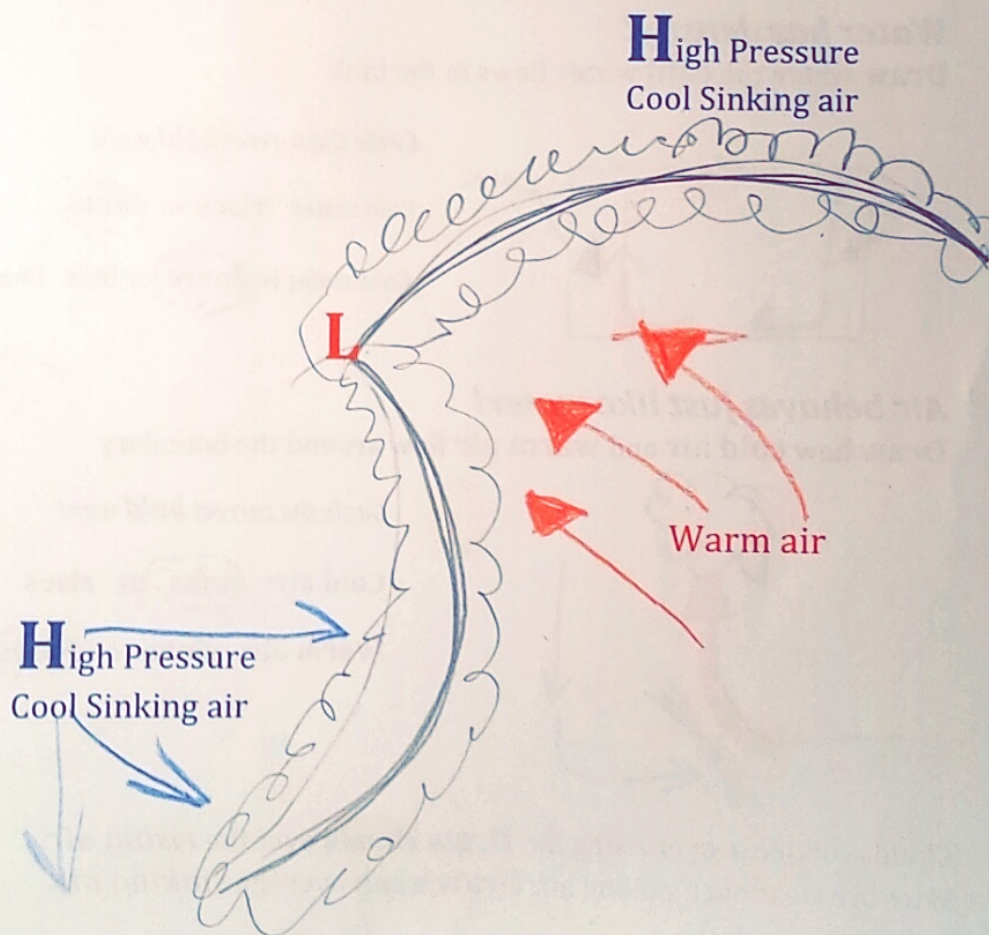
Clouds condense over rising air. **Draw** **clouds** over the **rising air**.  
Skies are clear over sinking air. **Draw** a **sun** over the **sinking air**.

## Why Weather Happens Worksheet – Back



*Lets explore a weather map!*

Draw **cold air** and **warm air** moving toward the boundaries.  
Draw **clouds** at the **boundaries** and a **sun** near the **sinking air**.



## Lesson Plan: Lansing Middle School Afterschool Program – 3

Topic: **Weather Instruments**

<u>Activity Type</u>	<u>Target Ages</u>	<u>Estimated Activity Time</u>
Interactive Session	Grade 5 through 8	50 - 60 minutes

### **Essential Question:**

What do we use to measure the weather?

### **Activity Background:**

This lesson provides a brief introduction into three of the most common weather instruments. It gives students the opportunity to explore and ask questions about the instruments. Ultimately the lesson is a very hands-on activity that allows students to create their own weather station that can be used to measure weather events at their home or school.

### **Lesson Objectives:**

1. Understand how a thermometer, anemometer, and rain gauge work
2. Build a personal weather station

### **Required Resources:**

Cup anemometer, rain gauge, thermometer  
- the extras from the Game Farm shed were used  
(the remaining supplies below are **per student**)  
Weather Instruments worksheet  
One large paper plate  
Two large plastic cups AND four small paper cups  
One new pencil – with eraser AND one writing device  
Duct tape, One index card, One thumb tack

**Note:** This activity involves a significant amount of hand-coordination including ripping tape and poking holes. This activity involves the use of thumb tacks. It is recommended that a low student to instructor ratio be in place for this activity as younger students are likely to require physical assistance.

<u><b>Class Component</b></u>	<u><b>Time</b></u>	<u><b>Purpose</b></u>
<p align="center"><b>Welcome and Introduction!</b></p> <ul style="list-style-type: none"> <li>Hello! We're here to talk about the types of instruments that we use to measure the weather. Can you think of any? Today we're going to do a lot of hands-on building to build our own weather instruments.</li> </ul>	<5 minutes	<p><b>Engage</b> with them.</p> <p><b>Assess</b> their background.</p> <p><b>Provide</b> a sense of direction.</p>
<p align="center"><b>1. Basic Weather Instruments</b></p> <p>Someone read the names of the instruments on your worksheet:  Thermometer, Anemometer, Rain gauge  Can anyone guess what each one measures?  Do they know how each one works?  Anemometer: what do you think the different parts of this do?  Allow them to spin the cups and ask questions.  Rain gauge: show them the parts – funnel, tube, ruler  Thermometer – the alcohol or mercury in the tube expands when it gets warm – moves up the tube.</p>	10 minutes	<p><b>Introduce</b> content.</p> <p><b>Engage</b> the students.</p> <p><b>Allow</b> exploration.</p>
<p align="center"><b>2. Build a weather station</b></p> <p>First we're going to build a rain gauge then an anemometer.</p> <p><b>Rain gauge:</b> Give each student a large, clear plastic cup, an index card, a ruler, and a pencil. Have them mark off inches on the long side of the index card. Then have them tape the index card to the outside of the cup so the numbers can be read. Tape the rain gauge off-center on a paper plate.  Everyone hold up their rain gauges!</p> <p><b>Anemometer:</b> Give each student four little cups and two straws. Have them a cup to either end of each straw. Orient the cups so that they are facing opposite directions at each end of the straw. Tape the two straws, with their cups attached, so that they cross each other. The cups should all face the same way like a pinwheel. Give each student a big cup and a new pencil. Turn the big cup upside-down and tape it next to the rain gauge on the same paper plate. Help them to poke the pencil the pencil through the bottom of the cup. Then help the student to pin the crossed straw pinwheel to the eraser of the pencil.  Everyone hold up their rain gauge.</p>	30 – 40 minutes	<p><b>Explore</b> content.</p> <p><b>Engage</b> physically.</p> <p><b>Allow</b> creativity.</p>
<p align="center"><b>3. Test your weather station</b></p> <p>Review what each part of the weather station is called and what it is used to measure. Check when the next rain storm is and test the weather stations. Compare your future measurements to online weather stations.</p>	< 5 minutes	<p><b>Assess</b> retention.</p> <p><b>Reinforce</b> content.</p>

# Weather Instruments Worksheet – Front

Name: Eli

Grade: 5

Date: Today



## Weather Instruments

**Match** the instrument to the weather it measures

Thermometer

Rainfall

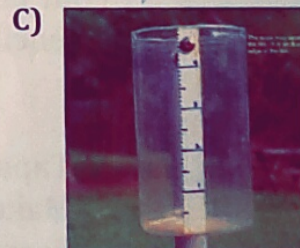
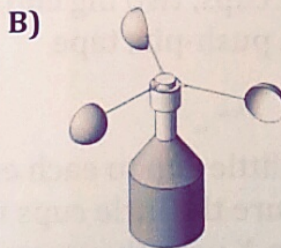
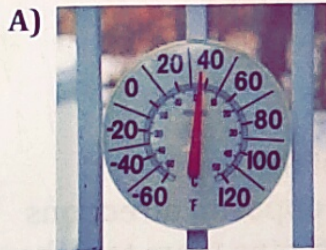
Anemometer

Temperature

Rain Gauge

Wind speed

**Match** the instrument name with the picture



B Anemometer

A Thermometer

C Rain Gauge



## ***Let's Build a weather station!***

### **Rain gauge**

#### Supplies:

One cup, One strip of paper,  
A pencil, A ruler, Tape

#### Instructions:

- 1) Lay the ruler next to the paper
- 2) Use the pencil to mark the paper like a ruler
- 3) Use the tape to attach the paper to the cup

### **Anemometer**

#### Supplies:

Four little cups, two big cup, two straws,  
a pencil, a push-pin, tape

#### Instructions:

- 1) Tape a little cup to each end of the straws
- 2) Make sure the little cups face opposite directions
- 3) Form an X with the straws and tape them together
- 4) Pin the center of the X to the pencil eraser
- 5) Poke a hole in the bottom of each big cup
- 6) Stack the big cups and insert the pencil

## Lansing Middle School Afterschool Program Photos



Ethan Burwell '16 fields questions from the middle schoolers



The middle schoolers are captivated by the warm/cold water density demonstration



The library is full of middle schoolers!

## CCAMS Education Outreach Event #07 and #08

**Event Name:** Lansing Middle School Science Club

**Date:** November 19, 2015 and December 3, 2015

**Description:** The Lansing Middle School Science Club is comprised of roughly five to ten 5<sup>th</sup> through 8<sup>th</sup> grade students. They meet roughly once a week for 30 to 45 minutes to discuss and engage in topics related to the sciences.

**Contact:** The Science Club advisor has been science teacher **Gwen Beck** [gbeck@lcsd.k12.ny.us](mailto:gbeck@lcsd.k12.ny.us) or [gwen.beck@lcsd.k12.ny.us](mailto:gwen.beck@lcsd.k12.ny.us). It took a while for her to respond via email.

**Activity:** Tornadoes and atmospheric measurements (weather balloons)

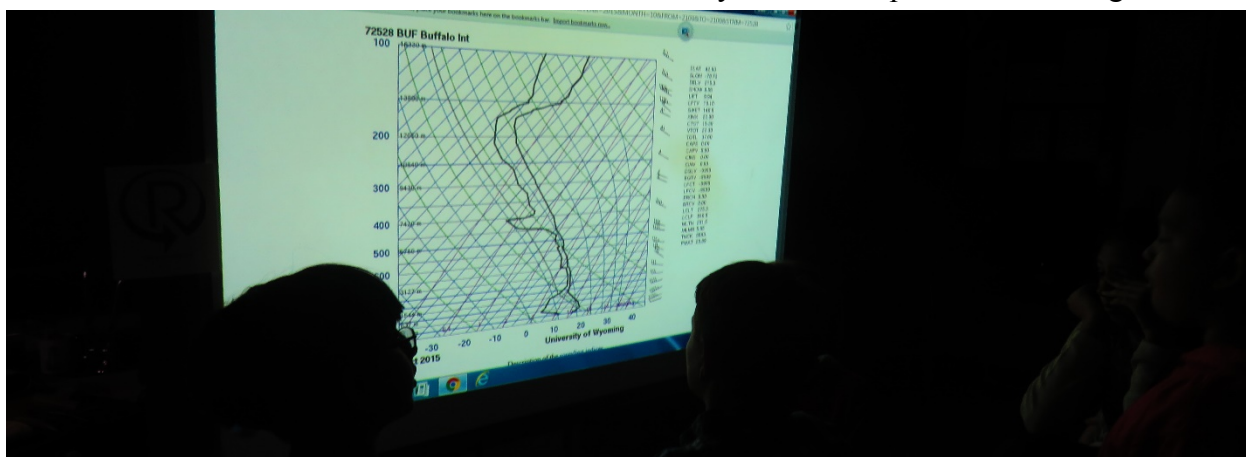
**Activity Details:** The Science Club visits were informal events, in that no specific curriculum was prepared. Instead, the intention was to facilitate the students' interests by letting them direct the sessions; the student's questions were used as guides for the interactions. The tornado machine was brought both times as a hook for the events.

1. During the first visit, there was much interest in the tornado machine. Tornado formation was explained to the students limiting the process to three main factors: warm moist air, vertical uplift, and rotational shear. Each of these three mechanisms are illustrated via the tornado machine. This was supplemented by discussion of the different types of "tornadic" phenomena: water spouts, dust devils, and fire-nados. YouTube videos of each were found on the spot to illustrate the differences and similarities.
2. The second visit centered on a weather balloon that had been found. The balloon was from the October 21<sup>st</sup> 00z Buffalo, NY launch, and it had happened to land in the Lansing Middle School playground with the parachute still attached. It was found the following morning. A discussion was had with the club about what the balloon was and the instruments that it carried. Online images of inflated weather balloons were found and the actual sounding from the launch was accessed from the University of Wyoming's Atmospheric Soundings page. A simple description of the skew-t was given to the students, and its information was recorded for them to keep: flight duration 93.60 minutes, Burst height 31,694.7m or 19.7 miles, pressure at max altitude 8.94 mb, surface pressure 995 mb, and coldest temperature -68.5 C. The club's introduction to weather balloons was supplemented by showing them a video of **Felix Baumgartner's** 24-mile freefall on October 24, 2014. The assemtation of his balloon and capsule was highly analogous to that of a weather balloon, both in height and in physical process. The club decided to email **Dan Kelly** [Dan.Kelly@noaa.gov](mailto:Dan.Kelly@noaa.gov) of the Buffalo NWS office to inform them of their find, and that they would be mailing the radiosonde back to the office like the attached sticker asked. Dan responded that he was glad the instrument could be used for education after its flight and he provided charts and data related to its flight.

## Lansing Middle School Science Club Photos



The Science Club shows off the radiosonde they found. The parachute is orange.



The Science Club looks at the October 21, 2015 00z Buffalo, NY sounding



Ethan Burwell '16 with members of the Science Club and the tornado machine.

## CCAMS Education Outreach Event #09

**Event Name:** National Weather Service StormReady Certification

**Certification Date:** December 1, 2015

**Description:** StormReady is a branch of the NOAA Weather-Ready Nation initiative. The program recognizes local communities, universities, and other institutions that are adequately prepared for weather emergencies by meeting specific requirements. Preparation for such certification requires significant coordination between every sector of the community, from emergency management officials to local meteorologists to community leaders. <http://www.stormready.noaa.gov/>

**Contact:** Cornell Emergency Manager, **Dan Maas** [dim1@cornell.edu](mailto:dim1@cornell.edu) served as the primary contact for CCAMS involvement with the certification process. P&C Fresh manager, **Allan Malek** [mgr107@pandcfresh.com](mailto:mgr107@pandcfresh.com) was contacted to coordinate tabling in the store.

**Certification Details:** StormReady Certification is contingent on meeting five requirements:

- 1. Establish a 24-hour warning point and emergency operations center*
- 2. Have more than one way to receive weather warnings, forecasts, alert the public*
- 3. Create a system that monitors weather conditions locally*
- 4. Promote the importance of public readiness through community seminars*
- 5. Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.*

CCAMS's involvement with the certification process primarily addressed the fourth requirement via contributions to weather safety outreach efforts, with specific focus on the student body and local community. In addition to previous Fall 2015 events, much of this outreach occurred during the 2014-2015 academic year. Outreach activities included off-campus tabling events, on-campus promotion of weather awareness, and social media campaigns. There was collaboration between CCAMS and Cornell's **Environmental Health & Safety Department** to focus the efforts and receive guidance as to how our work would fit in with their overall StormReady goal.



Certification ceremony. Carolina Bieri '16 (second from right) lead CCAMS's involvement.

The Cornell Daily Sun  
**Cornell Receives ‘StormReady’ Award**

By So Hyung Kim  
December 1, 2015

The National Weather Service officially recognized Cornell as a “StormReady” university Tuesday for its commitment to hazardous weather preparedness.

StormReady is a program by the National Weather Service that helps better prepare community members and leaders for weather-related emergencies. To be recognized as StormReady, a university must maintain a 24-hour warning point and emergency operations center, be able to monitor local weather and flood conditions and conduct preparedness programs, among several other requirements.

During the recognition ceremony, Katherine Hawley, a meteorologist for the National Weather Service forecast office in Binghamton, New York, presented Cornell with its StormReady certificate.

“This is a very important accomplishment for Cornell University,” Hawley said in a National Weather Service press release. “The Ithaca area has a long history of severe weather, snowstorms, floods and even a few tornadoes. Cornell has taken all the necessary steps to be better prepared for whatever Mother Nature has in store. These efforts will no doubt make the University safer and even save lives in the future.”

Cornell’s partnership with the National Weather Service will supplement the emergency measures already in place by the Cornell Department of Environmental Health and Safety.

“A lot of things that go into being StormReady are part of our comprehensive emergency management program,” said Dan Maas, emergency manager of EHS in an interview with The Sun.

“It is a collaborative group effort across many campus departments,” Maas said. “Everyone plays an active role in preparing Cornell for weather related hazards and help monitor, evaluate, and respond to serious weather events.”

The Cornell Police said it is responsible for monitoring the impact the weather is having on campus and the emergency notification process.

“Part of our process is consulting with the office of emergency management,” said CUPD Deputy Chief David M. Honan. “Our officers are out there 24/7 and our communications center is always staffed on campus to give reports on inclement

weather. We forward that information to the larger group to make decisions about needed actions and how the University will respond.”

Infrastructure Properties and Planning evaluates the weather events and makes decisions about changes to the campus operations depending on the potential impacts. Facilities Management and the Department of Earth and Atmospheric Sciences provide some of the weather monitoring tools, according to Maas.

**Students have been actively involved in this process through the Cornell chapter of the American Meteorological Society. Carolina Bieri '16, co-president of the chapter, said the club has been mostly involved with community outreach.**

**“We help out with some of the outreach to the local community and to the student body,” Bieri said. “We’ve done tabling at grocery stores to teach the locals about flood safety. We also post reminders about staying safe during the winter season for students on Facebook.”**

Representatives from the Department of Environmental Health and Safety, Infrastructure Properties and Planning, Facilities Management, Department of Earth and Atmospheric Sciences, Cornell Police, University Communications and the Cornell chapter of the American Meteorological Society were also present at the ceremony.

The StormReady certificate is valid for three years and can be renewed at the end of the term.

**Article Link:**

<http://cornellsun.com/2015/12/01/cornell-receives-stormready-award/>

The CornellChronicle

# Winter is coming, but Cornell is StormReady

By Nancy Doolittle

December 4, 2015

The National Weather Service recognized Cornell for its commitment to weather preparedness Dec. 1.

At a ceremony held in Clark Hall, Katherine Hawley, meteorologist for the National Weather Service forecast office in Binghamton, New York, presented Cornell officials with a certificate and sign that designated Cornell a “StormReady University.”

“This is a very important accomplishment for Cornell University,” said Hawley. “The Ithaca area has a long history of severe weather, snowstorms, floods and even a few tornadoes. Cornell has taken all the necessary steps to be better prepared for whatever Mother Nature has in store. These efforts will no doubt make the university safer and even save lives in the future.”

The program helps community leaders and residents prepare for hazardous weather and flooding.

“The partnership with the National Weather Service enables Cornell University to better prepare for weather-related events that could impact our students, faculty and staff,” said Dan Maas, Cornell emergency manager. “It complements our communication efforts on severe weather preparedness and offers us a partner we can look to for additional information in a time of crisis.”

“StormReady” universities commit to implement infrastructure and systems needed to save lives and protect property when severe weather strikes. To be recognized as “StormReady,” a university must maintain a 24-hour emergency operations center; have more than one way to receive National Weather Service warnings and to alert the public; monitor local weather and flood conditions; conduct preparedness programs; and ensure hazardous weather and flooding are addressed in formal emergency management plans, which include training SKYWARN volunteer weather spotters and holding emergency exercises.

Among its many emergency preparedness responsibilities, Cornell’s Office of Emergency Management and Business Continuity supports campus departments in the development of plans to continue services during times of crisis, and partners with Cornell Police for the CornellALERT emergency notification system.

The office collaborates with campus units to help prepare for, evaluate and respond to hazardous weather conditions and other emergencies. Key partners include:

- Infrastructure Properties and Planning evaluates weather events, determines their potential impacts and makes decisions about changes to campus operations;

- Department of Earth and Atmospheric Sciences provides weather monitoring tools;
- Cornell Police assists with weather monitoring and the emergency notification process;
- University Communications assists with emergency and awareness message development; and
- **The Cornell Chapter of the American Meteorological Society conducts public education and awareness activities.**

The Office of Emergency Management and Business Continuity also has developed a comprehensive emergency website that not only includes winter weather advice but the Emergency Action Guide, with information about what to do in case of an active shooter, bomb threat, fire, building evacuation, workplace violence and other crises.

The Office of Emergency Management and Business Continuity is part of the Department of Environmental Health and Safety and can be reached at [ehsem@cornell.edu](mailto:ehsem@cornell.edu) or 607-255-8200.

**Article Link:**

<http://www.news.cornell.edu/stories/2015/12/winter-coming-cornell-stormready>

## CCAMS Education Outreach Event #10 and #11

**Event Name:** Carline Elementary School and Fall Creek Elementary School

**Date:** December 11<sup>th</sup> and 15<sup>th</sup>, 2015

**Description:** Every year, third grade students in the Ithaca City School District study weather.

**Contact:** Email received from **Jennifer Wilkie** [jwilkie@icsd.k12.ny.us](mailto:jwilkie@icsd.k12.ny.us) a teacher and science coordinator in the Ithaca City School District on November 9<sup>th</sup> asking to share our expertise with the third-grade students. A meeting was set up with Ms. Wilkie, **Jennifer Emerson** [jennifer.emerson@icsd.k12.ny.us](mailto:jennifer.emerson@icsd.k12.ny.us), **Michael Cecere** [mcecere@icsd.k12.ny.us](mailto:mcecere@icsd.k12.ny.us), and **Ryan Conklin** [ryan.conklin@icsd.k12.ny.us](mailto:ryan.conklin@icsd.k12.ny.us) (Caroline Elementary Teachers) and **Tanya Kszystyniak** [tanya.kszystynia@icsd.k12.ny.us](mailto:tanya.kszystynia@icsd.k12.ny.us) (Fall Creek Elementary) to meet in person and talk about what they were looking to have in their classrooms.

**Activity:** Exploring Climate!

**Activity Details:** Explore the different types of climates, focusing on the places in stories that the students have read: *Rain School*-Chad, Africa; *Nasreen's Secret School*-Afghanistan; *Waiting for the Biblioburro*-Colombia; *The Book Woman*-Kentucky, U.S. (Appalachian Mountains).



Stephanie Lin '19 and Ethan Burwell '16 with the third graders and their climate posters

## Lesson Plan: Carline Elementary School and Fall Creek Elementary School

### Topic: Exploring Climates

Activity Type	Target Ages	Estimated Activity Time
Interactive Session	Grade 3	50 minutes

#### Essential Question:

What types of climates are there, and what are they like?

#### Activity Background:

The students of Caroline and Fall Creek Elementary Schools study weather in the third grade. Over the course of the fall, they also read four stories that take place in different parts of the world. In this meteorology lesson, we explore climate by using the stories that the students have read as reference points. The activity uses a simplified approach to climate zones with high/low values of temperature/precipitation resulting in four main climates: Polar, Temperate, Desert, and Tropical. The geography in stories previously read by the students serve as contextual anchors for some of the climates being introduced: Desert: *Rain School*-Chad, Africa; *Nasreen's Secret School*-Afghanistan; Tropical: *Waiting for the Biblioburro*-Colombia; Temperate: *The Book Woman*- Kentucky, U.S.

#### Lesson Objectives:

1. Understand the different types of climates
2. Explore the characteristic of each climate
3. Relate the climates to the geographical settings in prior class readings

#### Required Resources:

Chalkboard/white board  
Four large sheets of paper/poster boards  
Class-set of markers  
Desks or tables to draw on the paper

Class Component	Time	Purpose									
<b>Welcome and Introduction!</b> <ul style="list-style-type: none"><li>• Thank you for inviting us!</li><li>• You’ve all been talking about weather in class – tell me what you know about climate! (anything they know)<ul style="list-style-type: none"><li>• Explain the session</li></ul></li></ul>	5 minutes	<b>Engage</b> with them. <b>Share</b> what they know. <b>Assess</b> their specific level. <b>Provide</b> a sense of direction									
<b>1. Introduce the climates</b> <p>For simplicity, the four main climates are introduced as a dichotomy with warmer/cooler being the main factor. Within each temperature zone there is a “wet climate” and a “dry climate”. For simplicity, desert is treated as warm, but great if they know about cold deserts.</p> <table><tr><td></td><td><b>Cooler</b></td><td><b>Warmer</b></td></tr><tr><td><b>Drier</b></td><td>Polar</td><td>Desert</td></tr><tr><td><b>Wetter</b></td><td>Temperate</td><td>Tropical</td></tr></table> <p>As each climate zone is introduced (write them on board), the class should be surveyed on what they already know about the climate. Given leading questions/background, they should be asked about what they would expect to find there and to relate it to any of the stories that they have read.</p>		<b>Cooler</b>	<b>Warmer</b>	<b>Drier</b>	Polar	Desert	<b>Wetter</b>	Temperate	Tropical	10 - 15 minutes	<b>Introduce</b> content. <b>Engage</b> with them. <b>Allow</b> them to talk. <b>Get</b> them thinking.
	<b>Cooler</b>	<b>Warmer</b>									
<b>Drier</b>	Polar	Desert									
<b>Wetter</b>	Temperate	Tropical									
<b>2. Climate activity!</b> <p>Divide the class into four teams. Each team is provided with a large sheet of paper and markers. Each team is designated a climate zone.</p> <p>Write the name of the climate on each poster. Have the students write or draw anything that they think goes in their climate – weather, animals, plants, the name of the stories that they read, what people might wear, what people might live in, what food might grow there, what people might do, transportation – absolutely anything that might be relevant. Use appropriate prompts to get them to think of potentially correct items/places.</p>	10 - 15 minutes	<b>Allow</b> creativity. <b>Get</b> them thinking. <b>Engage</b> physically. <b>Foster</b> collaboration.									
<b>3. Climate presentations</b> <p>Everyone sits, and one at a time, each group presents their climate. Instructor can hold the poster, so students can see. Have them tell about their climate and about what they drew. One at a time, each student can point to one or two things that they drew, so everyone can participate. Instructor should provide concise, relevant commentary or feedback.</p>	10 -15 Minutes	<b>Encourage</b> participation. <b>Share</b> what they know. <b>Allow</b> ownership.									
<b>Recap as a group</b> <table><tr><td>Warm + Dry = Desert</td><td>Cool + Dry = Polar</td></tr><tr><td>Warm + Wet = Tropical</td><td>Cool + Wet = Temperate</td></tr></table>	Warm + Dry = Desert	Cool + Dry = Polar	Warm + Wet = Tropical	Cool + Wet = Temperate	<2 minutes	<b>Assess</b> retention. <b>Reinforce</b> content.					
Warm + Dry = Desert	Cool + Dry = Polar										
Warm + Wet = Tropical	Cool + Wet = Temperate										

## Caroline and Fall Creek Third Grade Photos



(Left) Marc Alessi '18 assists students (Right) The students consult each other over their work



Jessica Hubbard '16 oversees a group's climate presentation



(Left) Students Present (Right) Marc, Ethan, Jessica, and Stephanie at Caroline Elementary

## CCAMS Education Outreach Event #12

**Event Name:** Cornell Spring ClubFest

**Date:** January 31, 2016

**Description:** *A celebration of Cornell's amazing student groups that showcases their activities and promotes recruiting new members.* For CCAMS, this is a good way to increase our campus presence.

**Contact:** Information on ClubFest had to be sought via the Cornell websites. Registration for Fall and Spring ClubFests opens around April and applications are accepted on a rolling basis. Fall was filled by July 2015. CCAMS registered for the Spring session on August 5<sup>th</sup>. There was a \$12 registration fee. Contact email [cornellwelcomeweekend@gmail.com](mailto:cornellwelcomeweekend@gmail.com) [http://cornelltickets.universitytickets.com/user\\_pages/event.asp?id=1186&cid=65](http://cornelltickets.universitytickets.com/user_pages/event.asp?id=1186&cid=65)

**Activity:** General Information Distribution

**Activity Details:** The bean bag toss was used as a hook for students at the event. Students were invited to toss the bean bag to win prizes (weather stickers, CCAMS bookmarks, and candy). We then present them with information about the club. Copies of Ithacation were given out to interested individuals, and the CCAMS calendar, AMS poster, and Carbon Footprint poster were used to embellish the table. Note: Electricity was not available for the tornado machine.



Carolina Bieri '16, Christopher Dickson '18, Shaun Howe '16, and Matthew Grieco '16

## Cornell Spring ClubFest Photos



Stephanie Lin '19, Griffin Moore '18, Tyler Leicht '18



Stephanie and Tyler share their experiences.



A student shows interest!

## CCAMS Education Outreach Event #13

**Event Name:** NOAA Weather-Ready Nation Ambassador Certification

**Certification Date:** February 7, 2016

**Description:** Weather Ready Nation is the National Oceanic and Atmospheric Administration's 2011 initiative aimed at preparing the nation to be more prepared and resilient in the face of extreme water, weather, and climate events.

**Contact:** [wrn.feedback@noaa.gov](mailto:wrn.feedback@noaa.gov) forwards relevant information to Ambassadors roughly twice a month. The individual taking the lead on education outreach should manage these emails, and if personal emails are being used, only the current recipient can add his or her replacement. For questions contact [katie.collins.garrett@noaa.gov](mailto:katie.collins.garrett@noaa.gov) / (301) 713-3447 .

**Certification Details:** *As WRN Ambassador, you will serve as a change agent and leader in your community. You will inspire others to be better informed and prepared, helping to minimize or even avoid the impacts of these natural disasters.* As Ambassadors, we have access to and free use of the various resources provided on the Weather Ready Nation website: <http://www.nws.noaa.gov/com/weatherreadynation/ambassadors.html>. Also, by being a part of the email newsletter, we are connected to national campaigns and outreach events that the Weather Ready Nation initiative is engaging in, so that we can carry those initiatives into our own communities. The 2016 CCAMS Spring Severe Weather Campaign was one such event.



## “Undergrads shine as weather ambassadors”

CornellChronicle article on CCAM’s Weather Ready Nation Certification  
Published March 15, 2016

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### Undergrads shine as weather ambassadors

March 15, 2016

Today’s forecast: Sunny with a chance of learning.

The National Oceanic and Atmospheric Administration, or NOAA, has recognized the Cornell Chapter of the American Meteorological Society (CCAMS) for practicing atmospheric diplomacy with the NOAA Weather-Ready Nation Ambassador award.

More than gazing toward clouds to predict rain, this undergraduate group brings earthy education and fun to community events – like Ithaca’s Apple Festival – and to places like Caroline and Fall Creek elementary schools. So, when tempestuous clouds gather and the wind roars, local grown-ups and their kids know what to do.

Additionally, CCAMS members have spoken to Lansing and DeWitt Middle school students about meteorology careers, tracking storms and how snow is predicted.

Last year, CCAMS collaborated with the university and the National Weather Service office in Binghamton to get Cornell certified “StormReady.” The club’s outreach chair Ethan Burwell ’18 said the group is organizing a spring weather awareness campaign to help people set weather alerts for mobile phones and to enlighten budding meteorologists on the distinctions between watches, warnings and advisories.

- Blaine Friedlander



Jessica Hubbard '16, foreground, Marc Alessi '18, left, Ethan Burwell and Stephanie Lin — members of the Cornell Chapter of the American Meteorological Society — at Caroline Elementary School.

Direct link:

<http://www.news.cornell.edu/essentials/2016/03/undergrads-shine-weather-ambassadors-0>

## CCAMS Education Outreach Event #14

**Event Name:** Lansing Middle School STEAM Day

**Date:** February 20, 2016

**Description:** *Lansing Central School District is celebrating STEAM (science, technology, engineering, art, and mathematics) throughout the month of February. We hope to inspire our students to learn more about some of the many possibilities within these disciplines.*

**Contact:** First contacted by Amy K. Somchanhmvong [ayk3@cornell.edu](mailto:ayk3@cornell.edu), Cornell Associate Director of Service-Learning and Partnership, on December 16<sup>th</sup>. Put in touch with Karin Silva [karin\\_silva@yahoo.com](mailto:karin_silva@yahoo.com), Lansing Middle School PTSO VP, and Lynn Green [mac\\_green@msn.com](mailto:mac_green@msn.com), Lansing Middle School PTSO, on January 27<sup>th</sup>.

**Activity:** Forecasting the weather

**Activity Details:** The purpose of this activity was to expose the students to how weather forecasts are made, utilizing school related impacts –i.e. snow days- as a hook. The activity had two parts: 1) reading model outputs to generate a forecast, and 2) physically illustrating how storms move.



Ethan Burwell '16 with Lansing Middle School Students

## **Lesson Plan: Lansing Middle School STEAM Day**

### **Topic: Forecasting the Weather**

<b>Activity Type</b>	<b>Target Ages</b>	<b>Estimated Activity Time</b>
Interactive Session	Grade 5 through 8	50 minutes

#### **Essential Question:**

How do we forecast the weather?

#### **Activity Background:**

The Lansing Middle School STEAM Day seeks to expose students to art and science fields. In doing so it aims to spark student's interests within these disciplines. The lesson seeks to introduce students to weather forecasting by utilizing snow days as a hook. In the first part of the lesson emphasis is placed on extracting forecast model information from maps to compile a storm profile. In the second part, students engage in an activity to illustrate the motion of storms. This activity works best with <10 students. Part 1 can also be done in a computer lab. Parts 1 & 2 have the potential to be divided/developed into separate lessons.

#### **Lesson Objectives:**

1. Understand the main factors considered in forecasting the weather
2. Extract information from a forecast model
3. Explore how storms move

#### **Required Resources:**

“Forecasting the Weather” worksheet (with snow chart)

GFS Forecast model maps for temperature, snowfall, precipitation, and simulated radar

Print out 24 hours of maps for each variable, and sort in labeled folders

The number of folders per variable should be tailored to class size

Mark your location on the maps. Consider writing standard time stamps

(Maps should ideally be fairly current and depict some sort of snowfall event)

Pencils and table to work at. Open floor space.

Masking tape marking out a roughly 8 X 8 ft. box with a 2 X 2 grid inside

Class Component	Time	Purpose
<p><b>Welcome and Introduction!</b></p> <ul style="list-style-type: none"> <li>• Thank you for inviting us!</li> <li>• <i>Can you think of any jobs that people do with weather?</i> <ul style="list-style-type: none"> <li>- Discuss the different aspects of the weather field</li> </ul> </li> <li>• Explain the session – you’re going to be forecasters!</li> </ul>	5 minutes	<p><b>Engage</b> with them. <b>Share</b> what they know. <b>Assess</b> their background. <b>Provide</b> a sense of direction</p>
<p><b>1. Forecast A Snow Day</b></p> <p>Spend several minutes showing the students how to read a forecast model print out. Key emphasis on how to read the legend and time stamps. That models are just guides.</p> <p>Divide the students into four teams – one per weather variable. Distribute the respective variable folders/maps to each team. Have each team use their maps to look up the variable quantity for your location, and record the value on the worksheet at the given time intervals. Instructor circulates to assist. After all groups have completed, reconvene as a class to share each team values with the rest of the group.</p> <p>When all teams have gotten all values, turn the worksheets over to the snow day graphs. The graphs show a profile of previous NYS snow storms and their ultimate effect of schools. Have the students plot their values and then determine if their line is more representative of the “no school”, “two-hour delay”, or “early dismissal” snow events.</p>	<p>5 minutes</p> <p>15 – 20 minutes</p> <p>10 minutes</p>	<p><b>Introduce</b> content.</p> <p><b>Practice</b> being forecasters.</p> <p><b>Application</b> of forecasts.</p>
<p><b>2. How Storms Move</b></p> <p>On the taped grid, simulate a Low being steered by a High. Have one student (low) enter the box from a corner, and try to exit through the opposite. Have the “low” as it moves forward. At first, have one other student in the middle (weak high) - note the path the low took. Then, have more students in the middle (strong high) – note the new low path (more erratic/deflected), and time differences (takes longer). Ask expectations before.</p> <p>Make it fun – like weather football, using terms like “<b>blocking</b> high”. Explain that differences like this can affect storm track, which can affect how much snow we get during a storm.</p>	10 minutes	<p><b>Get</b> them thinking. <b>Engage</b> physically.</p>
<p><b>Recap as a group</b></p> <p>Name the weather variables that affect snow days: Temperature, precipitation, snowfall, and timing How are storms steered?</p>	<2 minutes	<p><b>Assess</b> retention. <b>Reinforce</b> content.</p>

# Forecasting the Weather Worksheet – Front

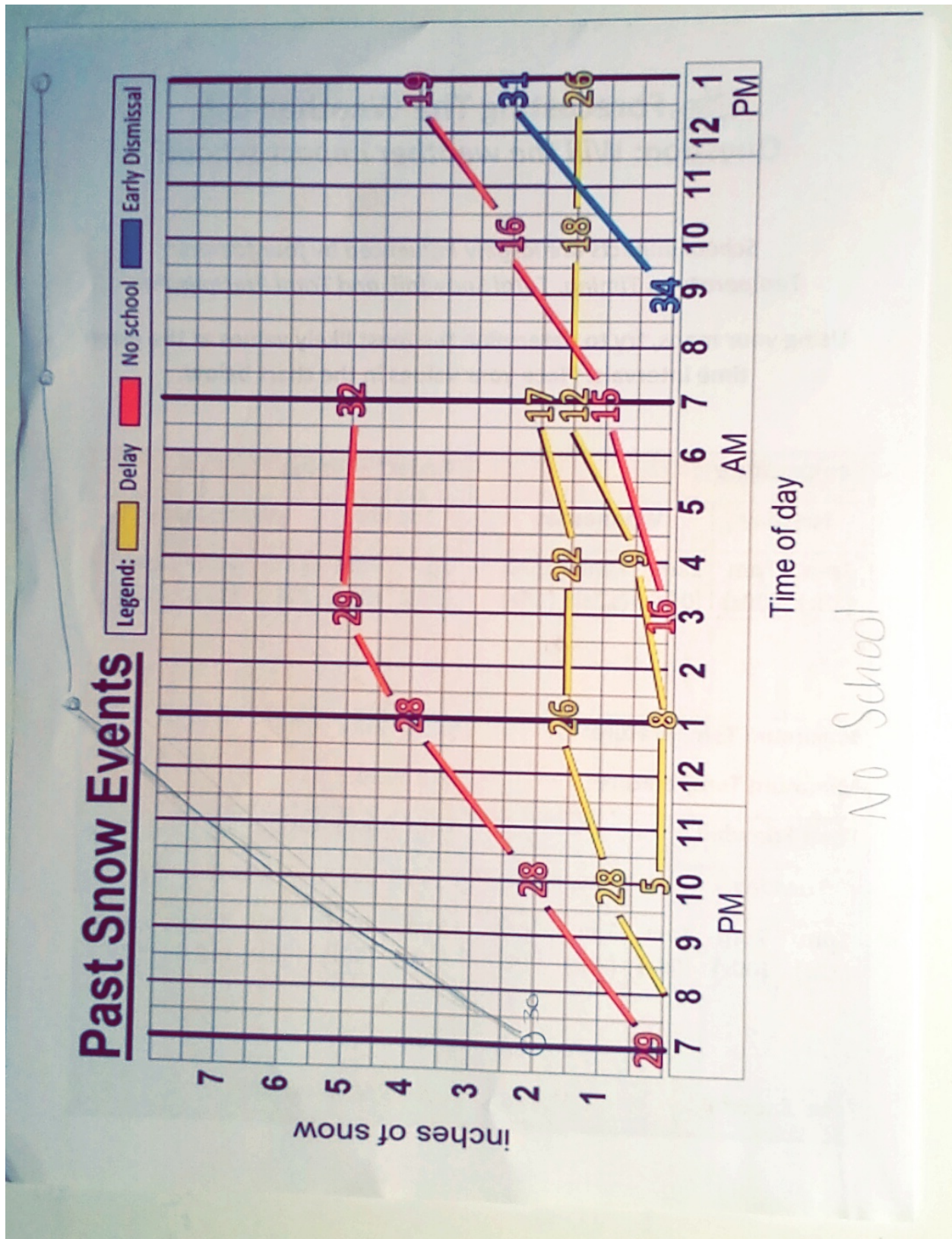
## **Forecasting The Weather** **Question: Will the weather impact school?**

*School impacts are largely influenced by four factors:  
Temperature, Timing, Total Snowfall, and Total Precipitation*

Using your maps, try to determine the most likely values at the given time intervals. Place your values in the chart below.

Temperature					"Radar" - Timing				
Tuesday		Wednesday			Tuesday		Wednesday		
1pm (18z)	7pm (00z)	1am (06z)	7am (12z)	1pm (18z)	1pm (18z)	7pm (00z)	1am (06z)	7am (12z)	1pm (18z)
33°	30°	30°	28°	36°	X	snow	snow	snow	X
Maximum Temperature:					Start Time: 7pm				
Minimum Temperature:					End Time: 7am				
Total Snowfall					Total Precipitation				
Tuesday		Wednesday			Tuesday		Wednesday		
1pm (18z)	7pm (00z)	1am (06z)	7am (12z)	1pm (18z)	1pm (18z)	7pm (00z)	1am (06z)	7am (12z)	1pm (18z)
0.1	2	9	10	11	0.05	0.1	1	1	1
Total Snowfall: 11					Total Precipitation: 1				

## Forecasting the Weather Worksheet – Back



*Numbers embedded in the line represent the temperature*

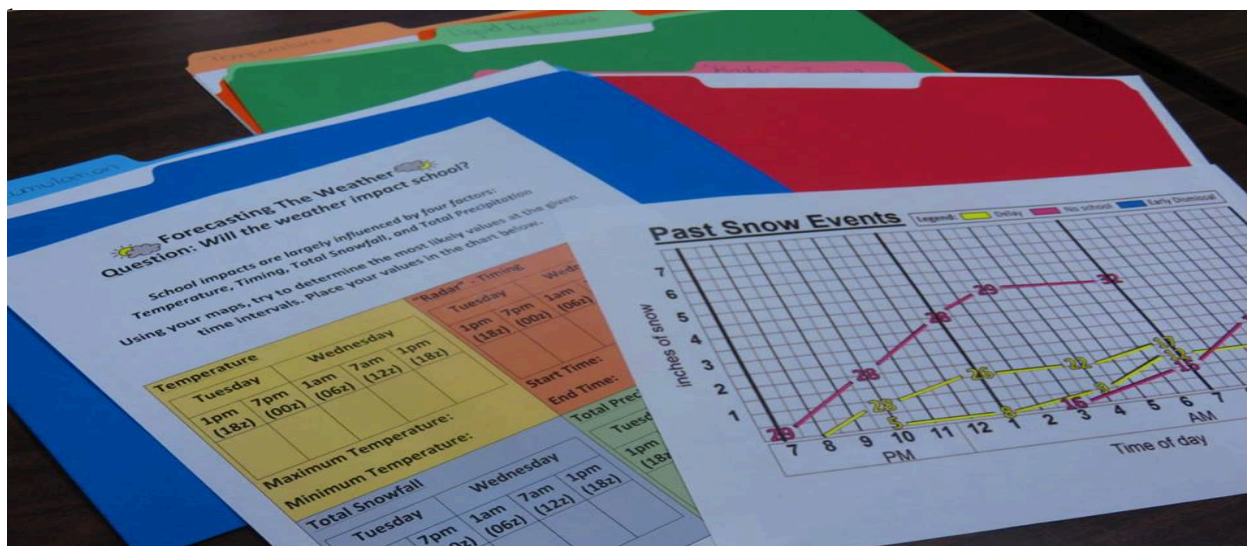
## Lansing STEAM Day Photos



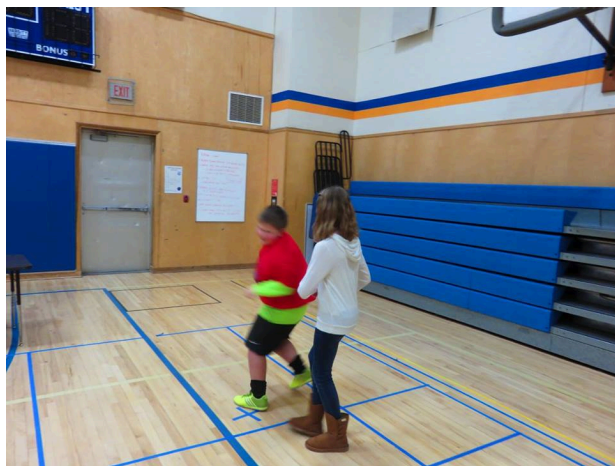
(Left) Deciphering forecast models



(Right) Our “low pressure” enters the grid



Blank forecast worksheets lie on top of the variable folders



(Left) Our “low” zips past a small, weak “high”



(Right) The “low” gets deflected by a larger “blocking high”

## CCAMS Education Outreach Event #15

**Event Name:** Spring Severe Weather Campaign

**Date:** April 11-15, 2016

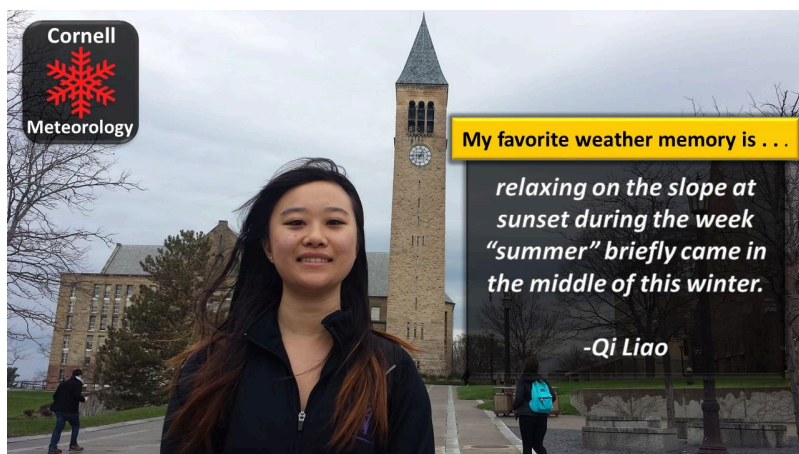
**Description:** An outreach event to the campus, and public via social media, as part of our Spring Severe Weather Awareness initiative.

**Contact:** Event request submitted March 25<sup>th</sup>: <https://registrar.cornell.edu/Sched/roomres.html>

**Activity:** Ho Plaza Tabling & Quarter-carding

**Activity Details:** *There will be four main components to this event. 1) Distribution of information related to Cornell's existing emergency protocol (ex: the warning sirens), 2) Engagement with the Campus about the different types of weather warnings that affect Ithaca, 3) Engagement with the Campus about how they can register to receive official National Weather Service advisory notifications on their mobile device, and 4) To better engage the students we would like to set up a 7 x 6 foot free-standing green screen cloth, and allow participating students to be photographed with a custom weather-related background of their choosing.*

Email requests to CU Police for information regarding Cornell's severe weather emergency plan went unanswered by the time of the event. Rain during the event days prevented the green screen from being utilized. Event consisted of distribution of warning information, mobile advisory information, and collection of weather stories & photographs.



Two students pose on Ho Plaza as part of CCAMS severe weather campaign.

The photos and their stories were uploaded to the Cornell Weather social media to engage students with the campaign.



# *What's your favorite weather memory?*

**Take** a picture. **Tell** your story.  
We'll **share** it to our social media.



All photographs and stories are collected with the intention of being uploaded to Cornell Meteorology social media at:  
[www.facebook.com/CornellWeather](http://www.facebook.com/CornellWeather)

# Cornell Meteorology

## Weather Photograph & Story Survey and Release form

All photographs and stories are collected with the intent  
of being uploaded to Cornell Meteorology social media at:  
[www.facebook.com/CornellWeather](http://www.facebook.com/CornellWeather)

**My name is:** \_\_\_\_\_

**My favorite weather memory is:** \_\_\_\_\_

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By filling out this form, you are consenting to have your photograph, story, and name publically  
uploaded to the [www.facebook.com/CornellWeather](http://www.facebook.com/CornellWeather) unless otherwise indicated below.

Please fill any bubbles that apply to you:

- ☐ Do **NOT** publically share my **name**
- ☐ Do **NOT** publically share my **photograph**
- ☐ Do **NOT** publically share my **story**

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

### **Cornell Meteorology Use Only**

Photograph number: \_\_\_\_\_

Photograph time: \_\_\_\_\_

# Severe weather Watches vs. Warnings

Cornell Meteorology  Twitter.com/CornellWeather Facebook.com/CornellWeather	Watch		Warning	Monitor <b>Weather.gov</b> for the latest severe weather headlines
Severe Thunderstorm	A <b>Watch</b> is issued when hazardous weather is possible, but its specific location and/or timing is uncertain.		A <b>Warning</b> is issued when hazardous weather is occurring, is imminent, or has a very high probability of occurring.	Hail: 1" diameter Winds: 40 mph +
	<b>Description:</b> "Severe storms are <u>possible</u> "  <b>Action:</b> "Be alert for Warnings" "Keep your eyes to the skies" "Prepare an emergency plan"		<b>Description:</b> "A severe storm is <u>occurring</u> "  <b>Action:</b> "Go in doors" "Avoid electric appliances & trees" "If outside - lie on the ground"	
Tornado	<b>Description:</b> "Tornadoes are <u>possible</u> "  <b>Action:</b> "Be alert for Warnings" "Prepare an emergency plan" "Identify safe areas"		<b>Description:</b> "A tornado is <u>occurring</u> "  <b>Action:</b> "Seek shelter IMMEDIATELY" "Be in interior, lower rooms" "If outside, lie close to ground"	Winds: 65 - 318 mph

# Get severe weather notifications on your mobile device



**STORM**



<b>Name (Website)</b>	<b>Storm</b> wunderground.com/micro/storm	<b>weatherUSA</b> weatherusa.net/alerts
<b>Cost</b>	<b>Free</b>	<b>Free</b>
<b>Format</b>	<b>Application</b>	<b>Text</b>
<b>Features</b>	Severe weather alerts Current forecast Detailed radar	Severe weather alerts for custom location

## CCAMS Education Outreach Event #16

**Event Name:** Cornell Bring a Child to Work Day

**Date:** April 28, 2016

**Description:** *Bring a Child to Work Day is a national education-based program in which children accompany an adult to their job for a day. The day is intended to transcend a typical “shadowing” experience by actively engaging children in meaningful activities.*

**Contact:** Email received from **Bring a Child to Work Day Program**  
[bring\\_a\\_child@cornell.edu](mailto:bring_a_child@cornell.edu) on February 26<sup>th</sup>.

**Activity:** Weather Warriors!

**Activity Details:** *People vs. Nature: From raging storms to devastating floods, from blistering heatwaves to the perils of winter, every day around the world humans engage in constant struggles against the weather. Come join us as we explore how people are using science to battle back. Come be a Weather Warrior!*



The opening slide of the Weather Warriors presentation

## Lesson Plan: Cornell Bring a Child to Work Day

### Topic: Weather Warriors! How Society is Responding

Activity Type	Target Ages	Estimated Activity Time
Interactive Session	Grades 5 through 9	60 minutes

#### Essential Question:

How is society responding to weather and climate change?

#### Activity Background:

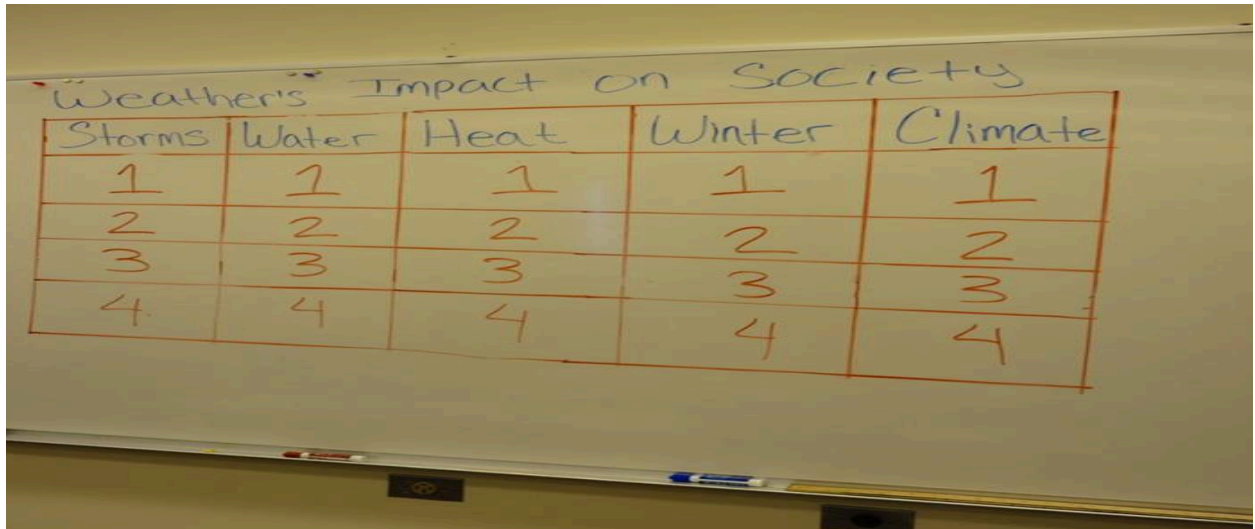
People vs. Nature: From raging storms to devastating floods, from blistering heatwaves to the perils of winter, every day around the world humans engage in constant struggles against the weather.

#### Lesson Objectives:

1. Understand current meteorological risks
2. Understand how society is reacting
3. Understand how students are getting involved

Lab Activity Component	Time	Purpose
<b>Welcome and Introductions!</b> Everyone introduces themselves: - name, why decided to come, favorite weather memory.	5 minutes	Establish inclusive atmosphere
<b>Explain the Session</b> - Purpose of the session ( <i>See Activity Background</i> ) - Goals of the session ( <i>See Lesson Objectives</i> ) - How we'll be meeting the goals ( <i>i.e. this lesson plan</i> )	5 minutes	Provide a sense of direction
<b>1. Current Meteorology Risks</b> Jeopardy style trivia utilizing facts from current events to show the breadth and intensity of meteorology to establish current global hazards - divide the room in half, assign team names, keep score	20 minutes	Interactive presentation of meteorological risks
<b>2. Presentation of Scientific Response</b> A lecture-PowerPoint presentation of how society is responding to the risks presented in <i>1. Current Meteorology Risks</i> , focusing specifically on Storms/floods, heatwaves, and overall climate change.	15 minutes	Presentation of scientific response
<b>3. How YOU Can Help</b> Inform them about the interdisciplinary ways that students can get involved, ex: via engineering, mathematics, environmental studies, etc.	10 minutes	Show direct connection to students
<b>4. Any Questions?</b>	5 minutes	

## Cornell Bring a Child to Work Day Photos



Storms	Water	Heat	Winter	Climate
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4

Impact on Society Jeopardy board



Ethan Burwell '16 Interacting with one of the sessions



Final section of the Weather Warriors presentation

## CCAMS Education Outreach Event #17

**Event Name:** Expanding Your Horizons

**Date:** April 30, 2016

**Description:** *Expanding Your Horizons (EYH) is a one-day conference for 7th–9th grade girls. The goals of the conference are to stimulate the participants' interest in math and science through these hands-on activities, to provide them with female scientist role models, and to foster awareness of opportunities in math and science-related careers.*  
<https://ohr.cornell.edu/life/celebrating/bactwd.html>

**Contact:** Email received from Expanding Your Horizons [eyh@cornell.edu](mailto:eyh@cornell.edu) on March 7<sup>th</sup>.  
Michael Lynch [mjl354@cornell.edu](mailto:mjl354@cornell.edu) and Josue San Emeterio [js3262@cornell.edu](mailto:js3262@cornell.edu),  
2016 EYH Science Resource Chairs

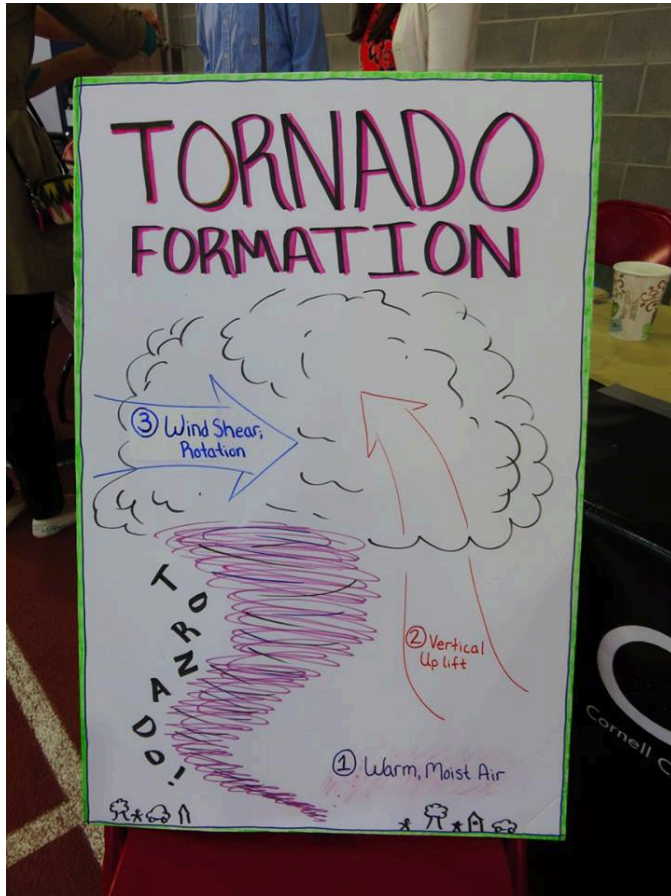
**Activity:** Tornado Lab Tabling

**Activity Details:** The main hook of the event was the tornado machine. It was set up so that people could see it. The main mechanisms of the machine/tornado formation were explained (1. warm, moist air, 2. vertical updraft, 3. wind shear rotation) to the students and a complementary tornado formation poster was set up. Students were encouraged to touch and interact with the vortex to change its size and shape. A laptop was set up with footage of real tornadoes and with footage of a dust devil recorded by CCAMS on campus. The dust devil footage is on the Cornell Weather Facebook page.



Jessica Hubbard '16, Carolina Bieri '16, and Shaun Howe '16 talk tornadoes

## Expanding Your Horizons Photos



## CCAMS Education Outreach Event #18

**Event Name:** Weather on a Stick

**Date:** May 4 – 6, 2016

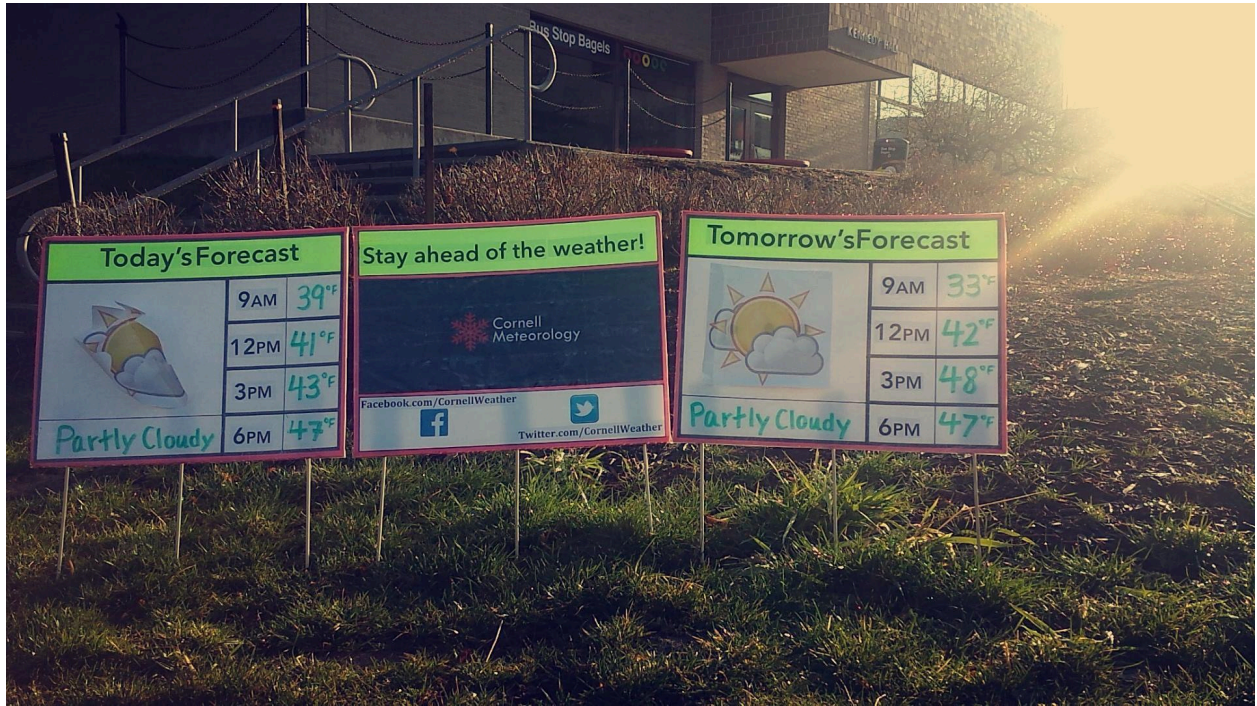
**Description:** This was a passive event that was intended to raise awareness of our group's presence on campus. It was also intended to give weather forecasts greater relevance in people's lives by displaying and communicating the forecasts through a non-traditional, yet effective, method.

**Contact:** Event request submitted March 25<sup>th</sup>: <https://registrar.cornell.edu/Sched/roomres.html>

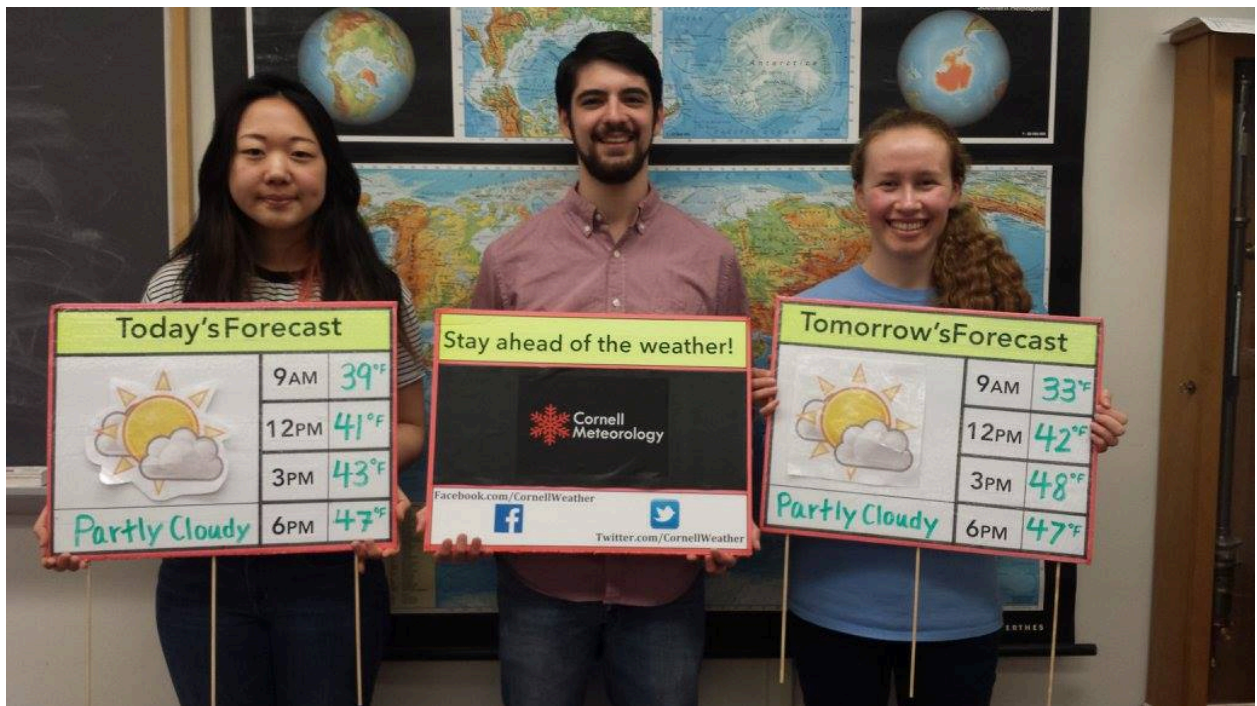
**Activity:** Weather Forecast Signs

**Activity Details:** Two forecast signs were made (today and tomorrow). A third sign with the CCAMS social media information was also made. All signs are dry-erase compatible and are intended to be set up during the evening with the 48-hour forecast. This event was well received and reached a lot of people. Coordinating the permissions through the University was exceedingly tedious and should be done with plenty of time before planned dates (or just do it). It is recommended that this activity be done at the change of seasons to increase interest. One issue that was had was blowing in the wind. Signs should be put several inches in the ground. Signs can be made water resistant with additional packaging tape to seal the posters. The signs were updated after 6 o'clock each evening.

## Weather on a Stick Photos



The Forecast Signs stand outside of Trillium and Bus Stop Bagels



Stephanie Lin '19, Shaun Howe '16, and Laura Kee '19 show off the new Forecast Signs

## CCAMS Education Outreach Event #19

**Event Name:** South Hill Elementary School

**Date:** May 25, 2016

**Description:** The third-grade students at South Hill study meteorology, and the teachers were looking for forecasters to speak to their students *as they dive deep into inquiry around understanding local climate, weather conditions in the US, and think about how one can make predictions of weather based on seasonal info.*

**Contact:** Email received from **Jennifer Wilkie** [jwilkie@icsd.k12.ny.us](mailto:jwilkie@icsd.k12.ny.us) a teacher and science coordinator in the Ithaca City School District on April 14<sup>th</sup> relaying a request from South Hill. A meeting was eventually set up with Carol Wilhelm [cwilhelm@icsd.k12.ny.us](mailto:cwilhelm@icsd.k12.ny.us) a teacher at South Hill to plan the visit.

**Activity:** Measuring the weather

**Activity Details:** CCAMS brought in weather instruments, and showed the third graders at South Hill how each one is used. Students were able to touch and interact with the equipment.



Ethan Burwell '16 and Jessica Hubbard '16 with South Hill third grade students

## Lesson Plan: South Hill Elementary School

Topic: **Measuring the Weather**

<u>Activity Type</u>	<u>Target Ages</u>	<u>Estimated Activity Time</u>
Interactive Session	Grade 3	45 minutes

### **Essential Question:**

How do we quantitatively measure the weather?

### **Activity Background:**

Weather is often characterized **qualitatively** – by what we feel. However, in order for weather to have scientific value we must measure it **quantitatively** – with numbers. This interactive session explores why and how we quantitatively measure the weather.

### **Lesson Objectives:**

4. Understand WHY we need to measure the weather quantitatively
  - a. Conditions are relative
5. Understand HOW we measure the weather quantitatively
  - a. Precipitation, Temperature, Wind

### **Required Resources:**

Internet access and video display for 20 second [hurricane](#) clip

A rain gauge,

Cup anemometer

- Borrowed rain gauge and cup anemometer from spares in Game Farm shed

Hand-held anemometer,

- Hand held anemometers are in the education outreach bag

Thermometer

Jug of water

<u><b>Class Component</b></u>	<u><b>Time</b></u>	<u><b>Purpose</b></u>
<p><b>Welcome and Introduction!</b></p> <ul style="list-style-type: none"> <li>• Thank you for inviting me!</li> <li>• You’ve all been talking about weather in class – tell me what you know about weather! (anything they know)</li> </ul>	< 5 minutes	<p><b>Engage</b> with them.  <b>Assess</b> their specific level.  <b>Share</b> what they know.</p>
<p><b>Explain the Session</b></p> <ul style="list-style-type: none"> <li>- Purpose of the session (<i>See Activity Background</i>)</li> <li>- Goals of the session (<i>See Lesson Objectives</i>)</li> </ul>	< 5 minutes	<p><b>Provide</b> a sense of direction.</p>
<p><b>1. Why we measure the weather quantitatively</b></p> <p>Generally oral survey question to the class:  “why do you think we measure the weather?”</p> <p><b>Conditions are relative</b></p> <p><i>Sometimes we need to know HOW windy or cold it is</i></p> <p><b>A.</b> Blow on the palm of your hand – is your “wind” fast or slow. Is it fast or slow compared to the wind in the room?  Is it fast or slow compared to a <a href="#">hurricane</a> (video)?</p> <p><b>B.</b> Blow on your hand again – does it feel warm or cold?  Is it cold as cold as ice? As cold as snow?</p> <p>If it is going to be “windy” is it a hurricane wind or a softer wind? If it is going to be “cold” is it ice cold or just cool?</p>	5 minutes	<p><b>Engage</b> with them.  <b>Allow</b> them to talk.  <b>Get</b> them thinking.</p> <p>Simple tangible illustrations.</p> <p><b>Establish</b> a need for numbers.</p>
<p><b>2. How we measure the weather quantitatively</b></p> <p><i>These are what we use to measure:</i>  (Rain gauge, anemometer, thermometer)  Display each. Allow students to touch them:  “What do you think each could be used to measure?”  Explain each instrument.</p> <p><i>Now you are all going to get to be weather observers:</i></p> <p><u>Precipitation</u>: Have the students form a single line, and assist each student to pour a splash in the gauge. Have the students guess the amount, then have one or two students come up and measure the amount.</p> <p><u>Wind</u>: have the student stand in a row and then go around with the hand-held anemometer so everyone can blow it. See who can get the fastest speeds and see the range.</p> <p>Show picture of Game Farm weather station.  Have the students identify the instruments.</p>	30 minutes	<p><b>Provide</b> content.</p> <p><b>Get</b> them thinking.</p> <p><b>Show</b>, don’t “tell”.</p> <p><b>Engage</b> physically.</p> <p><b>Engage</b> with them.</p> <p><b>Provide</b> context.</p>
<p><b>Recap as a group</b></p> <p>Why do we need numbers to measure the weather?  <i>Because conditions are relative</i></p> <p>What does thermometer/anemometer/gauge measure?  <i>Temperature/wind/precipitation</i></p>	5 minutes	<p><b>Assess</b> retention.  <b>Reinforce</b> content.</p>

## South Hill Elementary School Photos



(Left) Students get to be “rain clouds” as they fill the rain gauge

(Right) Students get to be “the wind” as they spin the anemometer



Weather is FUN!

## General Education Outreach Recommendations

In previous years Education Outreach has participated in Cornell Ag Day (Activity: Same as ECO Fall Fest), tabling at P&C Fresh (Activity: Ithaca Flood Awareness utilizing CCAMS flood posters and bookmarks), visiting DeWitt Middle School in collaboration with the Cornell Ecology House (Activity: Presentations on what meteorology is and how we use it), and the production of Weather Safety Videos (<https://youtu.be/wd8i6ykWPUg>). Details can be found in the Club Minutes section of the CCAMS website <http://ccams.eas.cornell.edu/>.

Other events that were considered, but ultimately not undertaken, this academic year were: the creation of a “**Where from here?**” poster (a poster all of the sub-fields and jobs within meteorology based off of where Cornell Alumni have gone from “here” in the department), the aforementioned **Journal Sessions** mentioned in the “Our Audience” section of this report, a **haunted weather house/booth** on campus for Halloween (extreme weather), a club field trip to **Science on a Sphere** in Horseheads, NY ([http://sos.noaa.gov/What\\_is\\_SOS/sos\\_map.html](http://sos.noaa.gov/What_is_SOS/sos_map.html)), a community outreach event at the **Ithaca Library**, paper **snowflake making** at the elementary schools, the creation of a portable **flood tank** (scaled to fit matchbox cars and used to physically illustrate the different types of flooding that are common in the finger lakes), and the creation of a CCAMS **Weather Warriors Day Camp** (an application-based weekend weather immersion for middle/high school students centered on introducing them to all things weather . . . including interactive sessions, research being done in the department, Game Farm, and college in general).

Within CCAMS, it is recommended that Education Outreach collaborate with other committees when possible. Some suggestions are . . . **Web Media Committee**: Collaboration to disseminate education and outreach content on the web and social media . . . **Broadcasting Committee**: Collaboration to create education and outreach graphics and videos, and utilization of the green screen as a hook for outreach events . . . **Fundraising Committee**: Combining fundraising and outreach events as a means to attract greater attention . . . **Forecasting Committee**: Collaboration to address the “club” audience mentioned at the beginning of this report . . . **Alumni Committee**: Development of the “Where from here?” poster, or similar concept. It is recommended that CCAMS collaborate with **Cornell Emergency Management** to raise campus awareness about the specifics of the StormReady Certification plan of action.

For any given outreach event, the most universal recommendation is to **MAKE IT FUN**. Be outgoing and engage with people at events; ask and use their names in conversations. Explore new ways to introduce various topics (example: don’t just talk about the process of orthographic cloud formation . . . bowl a ball toward a ramp to illustrate air motion). Find activity hooks that grab the audience’s attention before the content is even introduced (example: the bean bag toss to introduce trivia questions). To quote a lamenting Michael Scott from “The Office”, *they had visual aids, and all we had were the facts. You don’t go to the science museum and get handed a pamphlet on electricity; you go to the science museum and you put your hand on a metal ball, and your hair sticks up straight – and you know science* (Season 3, Episode 19). Find ways to make Education Outreach interactive. Find ways to make it fun.

## Primary Contacts

**Amy K. Somchanhmavong** [ayk3@cornell.edu](mailto:ayk3@cornell.edu), Cornell Associate Director of Service-Learning and Partnership. Amy served as a primary point of contact for most of the school events and has connections with potential partnerships, not limited to schools.

**Jennifer Wilkie** [jwilkie@icsd.k12.ny.us](mailto:jwilkie@icsd.k12.ny.us) Ithaca City Schools Science Coordinator. Jennifer played a significant role in facilitating events within the schools.

Any of the teachers previously listed as contacts for events this year. All teachers were glad that CCAMS was able to work with them, and would likely be receptive of future collaborations. South Hill Elementary explicitly expressed a desire to collaborate during the 2016-2017 year.

### Previous Education Outreach Committee Chairs:

Ian Breslow, 2016-2017: [www.linkedin.com/in/ian-breslow-115a328a/](http://www.linkedin.com/in/ian-breslow-115a328a/)

Ethan Burwell, 2015-2016: [www.linkedin.com/in/ethanburwell](http://www.linkedin.com/in/ethanburwell)

Aaron Match, 2013-2015: [www.linkedin.com/in/aaron-match-788136a1](http://www.linkedin.com/in/aaron-match-788136a1)

Carolyn Entelisano, 2012-2013: [www.linkedin.com/in/carolyn-entelisano-bb262a56](http://www.linkedin.com/in/carolyn-entelisano-bb262a56)

Nicole Dulaney, 2011-2012: [www.linkedin.com/in/nicole-dulaney-6727a617](http://www.linkedin.com/in/nicole-dulaney-6727a617)

### Additional Education Outreach Resources:

National Severe Storms Laboratory: <http://nssl.noaa.gov/education/>

National Oceanic and Atmospheric Administration: <http://www.noaa.gov/education>

AMS: <https://www.ametsoc.org/ams/index.cfm/about-ams/ams-local-chapters/>

National Weather Service: <http://www.weather.gov/owlie/>

NASA Games: <http://climatekids.nasa.gov/menu/play/>

NOAA Games: <http://games.noaa.gov/>

National Hurricane Center: <http://www.nhc.noaa.gov/outreach/>

SciJinks: <http://scijinks.jpl.nasa.gov>

SciGirls: <http://pbskids.org/scigirls/>

Science Courseware: <http://www.sciencecourseware.com/eecindex.php>

## Education Outreach Committee 2015-2016 Report

Compiled by Ethan Burwell '16,  
2015-2016 Education Outreach Chair  
Cornell Chapter of the American Meteorological Society

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An electronic version of the 2015-2016 Education Outreach Committee Report and most of the documents made for/used during the events can be found online in an open Google Drive folder at: <https://drive.google.com/drive/folders/0B17JluTDyuU1dXBUTXRucFVQRHc?usp=sharing>