



## **Weather Data:**

### **A 5<sup>th</sup> Grade Unit Study of Using Data to Predict Weather Events**

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Morehead STEM Academy

This curriculum unit is recommended for:  
Fifth Grade Earth Science

**Keywords:** weather, climate, data, weather data, weather graphing, weather prediction

**Teaching Standards:** See [Appendix 1](#) for teaching standards addressed in this unit.

**Synopsis:** During this unit, students will collect, record, graph and analyze weather data. Students will be able to identify weather phenomena on a weather map and make predictions about how that weather will affect people throughout the United States. They will be able to use collected data to make connections between different weather phenomena, such as air pressure & wind or air pressure & precipitation. Students will graph their own data and analyze it while looking for correlations among atmospheric conditions and identifying patterns between days, weeks and seasons. They will participate in a number of activities that encourage them to use weather data to make predictions about weather events. The unit will culminate with an authentic assessment piece called “Meteorologist for a Day” where students will be given a set of weather data and they will create the weather forecast for those given atmospheric conditions.

*I plan to teach this unit during the coming year in to 120 students in 5<sup>th</sup> Grade Science Lab in the 2015-2016 school year.*

*I give permission for Charlotte Teachers Institute to publish my curriculum unit in print and online. I understand that I will be credited as the author of my work.*

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*Chrystal Cavanagh*

**Introduction**

Morehead STEM Academy is a K-8 STEM magnet school that caters to students in the central and north regions of the Charlotte-Mecklenburg Schools district. Formerly, we had been a county-wide magnet but the opening of Oakhurst STEM in the 2015-2016 school year has redistricted a number of our students. Our student population is ethnically and socioeconomically diverse. Of the 1300 students who attend Morehead, about 50% qualify for free & reduced lunch. The breakdown of our student population is: 60% Black/African-American, 12.6% Hispanic, 8.8% American Indian, 7.3% White, 7.0% Asian, 5.0% Multiracial. In the 2014-2015 school year, 94% of our students were at or above grade level on the 5<sup>th</sup> grade Science EOG and 97% were at or above grade level on 8<sup>th</sup> grade Science EOG. Our students know the content for the test, but application beyond that can sometimes prove difficult.

As a part of the special area rotation, I see each elementary level class once a week for 45 minutes. Classes are ability grouped based on their TRC reading level in grades Kindergarten through 3<sup>rd</sup> and based on EOG scores in 4<sup>th</sup> and 5<sup>th</sup> grade. The classes that have the lower testing students tend to be smaller with 19-22 students, while the classes with the higher testing students are considerably larger, with 28-30 students.

This school year, I have a cart of iPads in my classroom for student use and our 5<sup>th</sup> grade students have Chromebooks that they can bring to the lab and work on. I am new to Chromebook use but I am looking forward to learning how they can expand our learning in the lab.

Because we are a magnet school, we do not have a very transient population and our students tend to stay the same from year-to-year. The students that are currently 5<sup>th</sup> graders were 1<sup>st</sup> graders when I started teaching the Morehead Science Lab, so they are very well-acquainted with the science lab procedures and expectations. Because of this, we spend very little time on this at the beginning of the year and are able to jump right into learning and labs.

Students are grouped into learning teams in my room. Each team member has a number based on which seat at the table they are sitting in. Jobs/roles rotate each week so that students learn to be accountable to their own learning and to the learning of the team.

Students always have the option to “fire” a group member if they can provide the proper justification and documentation to do so. “Fired” students will get an alternate assignment to work on that covers the same objectives.

## Science Notebooks

I place a heavy emphasis in my classroom on Interactive Science Notebooks. These notebooks are meant to be a way for me to tie-in literacy (which is heavily pushed in CMS), as another tool for different types of learners and for my students to have another way to reference their previous learning on another day. Notebooks are stored in my classroom from week to week so that I can review them after students leave without losing valuable class time.

Notebook entries can vary in content from data collection, research notes, thinking maps, and diagrams that show our learning. We are often gluing and stapling content into our notebooks – things such as graphs and maps and printed materials that provide background information on a lesson. “Science notebooks support differentiated instruction” by “tapping prior knowledge, the five senses, interaction in groups, and primary language support.” (Klentschy & Molina-De La Torre, 2004) This is what I’m trying to accomplish in my 45 minute weekly class periods.

## Rationale

Working at a K-8 school gives me the opportunity to help prepare our students for middle school with input from middle school teachers. One of the major feedback concerns the middle school science team always gives is that students have a hard time breaking down the data or applying the content to broader topics, despite their understanding of terminology.

When I look at the formative and EOG data from previous 5<sup>th</sup> grade classes at our school, it is clear to me which topic is preventing more of our students from achieving 4s and 5s on the science EOG – weather. Our students have solid vocabulary knowledge but they often lack the application; they can tell me what a jet stream is but can’t tell me how meteorologists use it to predict weather, just as they can tell me a definition for El Nino but cannot explain to their lab partner how it has major impacts on weather patterns. Asking students to make a prediction about weather can often be a test of my patience when the response is, “Why do I have to when I can turn on the news and the weather man will tell me?”

We want our students to be able to look at a weather map of the United States and know what it is telling them and be able to make a future prediction for the weather locally. I want them to be able to look at a set of weather data (temperature, air pressure, etc) from a particular city and be able to identify the patterns that meteorologists use to give their forecasts.

Using data to teach this unit will give my students a deeper understanding of scientific content.

“Providing opportunities...to grapple with collecting and organizing data, struggle with how to represent and communicate ideas emerging from the data, and consider the alignment of these ideas with the science content being learned is reflective of authentic inquiry and supports the development of scientific understanding.” (Palmeri, 2009)

With a goal towards authentic inquiry in my classroom, using data is a natural fit. Weather units can often be laden with vocabulary and ‘how-it-happens’ lessons and hands-on lessons can be difficult to provide for students considering the big-scale nature of weather, but letting students explore through data will allow them to make their own connections through an observation and analysis of patterns and actual events.

In today’s climate of high-stakes testing, students also need to be able to answer higher-order thinking questions on weather predictions and phenomena. Unfortunately, being prepared for state science tests is essential to their academic future and the school’s labels of success. On these tests, the weather questions are often related to how one weather event affects another or how particular weather measurements reflect the overall weather data for an area.

For instance, students may see questions such as,

*What is the cause of rising surface temperatures of the Pacific Ocean, drought in the western United States, and flooding on the Pacific coast of South America?*

*A the Gulf Stream*

*B the jet stream*

*C La Niña*

*D El Nino*

(Source: NC Public Schools Accountability- Released 5<sup>th</sup> grade questions)

As students enter middle school, weather questions become more complex.

The data table below shows the weather conditions for City X over the course of one day.

***Weather Conditions for City X***

<b><i>Day &amp; Time</i></b>	<b><i>Tuesday at 8:00am</i></b>	<b><i>Tuesday at 2:00pm</i></b>
<b><i>Temperature</i></b>	<b><i>60°</i></b>	<b><i>40°</i></b>
<b><i>Pressure</i></b>	<b><i>30.28 in</i></b>	<b><i>29.97 in</i></b>
<b><i>Winds</i></b>	<b><i>Southwest</i></b>	<b><i>Northwest</i></b>
<b><i>Skies</i></b>	<b><i>Partly Cloudy</i></b>	<b><i>Cloudy; Rain &amp; Thunder</i></b>

*What has most likely occurred in this area?*

*A A warm front has passed.*

*B A cold front has passed.*

*C A blizzard has taken place.*

*D A high-pressure system has stalled.*

(Source: NC Public Schools Accountability- Released 7<sup>th</sup> grade questions)

## **Objectives**

North Carolina and Charlotte-Mecklenburg Schools use the North Carolina Essential Standards in Science to guide assessment and curriculum planning. I follow these standards closely and help support classroom teachers in their teaching of objectives. In my science lab, I like to pick a few objectives that are more difficult for students from each unit of study and plan several very hands-on and interactive lessons, while the classroom teachers often are forced by time constraints to move on quickly.

While North Carolina has not yet adopted the Next Generation Science Standards, I still use these standards as a guide in my lab because I do believe they are the future of science education in our country. These standards provide a guideline for what students should know of science content, but also provide a framework for science practices, cross-curricular connections and vertical alignment from Kindergarten through 12<sup>th</sup> grade. Unfortunately, the 5<sup>th</sup> grade objectives in the Next Generation Science Standards do not address weather & climate so I chose to include the middle school objectives as guidance for unit planning so I better understand what I'm preparing my students for.

The integration of Common Core math standards is an important link to the graphing skills that students learn within their mathematics curriculums. Creating and interpreting line graphs is an essential skill in both science and mathematics and teaching in both areas allows students to see the connections across their learning.

#### North Carolina Essential Standards Science Objectives

*5.E.1.1 Compare daily and seasonal changes in weather conditions (including wind speed and direction, precipitation, and temperature) and patterns.*

Students will collect daily weather data for Charlotte, NC. After a week of observations, they will compare and analyze the changes over time. Students will be given mystery weather data and be able to identify the location based on a weather map that shows current weather throughout the United States.

*5.E.1.2 Predict upcoming weather events from weather data collected through observation and measurements.*

Students will use daily weather data collected to make predictions about weather events that occurred or may occur soon. For example, if their real-time data collection shows a fall in air pressure, they will predict that it may soon begin to rain.

As a final assessment, students will be given a set of atmospheric weather data and they will be asked to make prediction as they act as the meteorologist giving a weather report.

*5.E.1.3 Explain how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.*

Students will use weather maps to observe how weather travels throughout the United States. Through regular discussions on current weather maps, students will understand that weather moves from east-to-west in the United States because of wind patterns. They will be able to see how precipitation and air pressure are correlated. They will also be able to observe how winds are directed related to a change in air pressure.

#### Next Generation Science Standards

*MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions*

Student will participate in weather map analysis that will have them making predictions about the movement of air masses and how they affect weather.

Common Core: Mathematics

**5.OA.3** *Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.*

Students will use weather data to create line graphs that show patterns over time in a given city. Students will need to label their x- and y-axis and be able to plot points on their graph accurately.

### **Science Skills**

During this unit I plan to address the following scientific skills:

- Collect and record data
- Evaluate data, draw conclusions based on data, and communicate findings with peers
- Make connections to real-life events
- Identifying weather patterns
- Explaining weather phenomena
- Creating weather graphs based on collected weather data

### **Scientific Content: Overview for Teachers**

This weather unit focuses on students being able to look at data on atmospheric measurements and make predictions on weather conditions. Students will also learn how to analyze weather condition maps, such as those found on The Weather Channel. Analyzing weather maps requires an understanding that weather typically moves from west to east in the United States. This occurs because the global wind patterns push air masses and weather systems in this general direction. A weather system found in the Midwest on Wednesday will likely be affecting the southeastern United States by Friday.

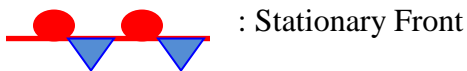
### **Weather Map Symbols**



: Isobars – indicate pressure. The closer together they are, the lower the pressure.

**H**: high pressure

**L:** low pressure



### Weather Vocabulary

Below is a list of vocabulary terms that teachers should be familiar with going into the unit. For more complex terms, additional information is provided that will give a more contextual weather understanding.

air mass: a large volume of air in the atmosphere that is uniform in temperature and moisture levels

- maritime polar: cool, moist air masses
- maritime tropical: warm, moist air masses
- continental polar: cool, dry air masses
- continental tropical: warm, dry air masses

air pressure: the amount of force exerted by the air;

- High pressure is an area of sinking air and as it sinks, it will dry out – giving us sunny skies.
- Low pressure areas are cloud or rainy pockets of weather -- where lower pressure is stormy weather. Low-pressure air rises, which causes the moisture inside of it to condense, creating more clouds and precipitation.
- Air moves from areas of high pressure to low pressure.
- Air pressure can be changed by changes in temperature, humidity,

anemometer: a weather tool used to measure wind speed

atmosphere: the air that surrounds the Earth; where weather occurs (specifically, in the troposphere.)

barometer: a weather tool used to measure air pressure

cirrus: light, wispy clouds made of ice crystals found high in the troposphere.

climate: an area's overall patterns of temperature, rainfall and other weather factors

convection current: the movement of air caused by the uneven heating of Earth's atmosphere.

- Air close to Earth's surface is heated causing the air to rise. As it rises higher into the atmosphere, it is cooled and it begins to sink again.

cumulonimbus: large, towering clouds that produce heavy rain, hail, thunder & lightning (thunderstorms)



cumulus: white, puffy clouds that are found low in the troposphere; associated with fair weather

El Niño: a change in weather patterns that brings unusually warm ocean temperatures

front: a boundary between air masses

- Cold fronts bring cooler and drier air masses into an area. Often, rain and thunderstorms form on the border where the cold & warm air is colliding.
- Warm fronts bring warmer & moister air into an area. Rain and showers can occur along and behind a warm front.

hemisphere: the parts of the globe separated by the equator

humidity: the amount of moisture in the air

jet stream: a fast-flowing “river” of air in the troposphere that forms between air masses of different temperatures

- There are two jet streams that affect our weather – a polar jet and subtropical jet. As the position of the jet streams change, air masses move in one direction or another.

La Niña: a change in weather patterns that brings unusually cool ocean temperatures

latitude: a measurement of how far away from the equator you are located on Earth

nimbostratus: low-laying clouds that produce slow, steady rain

precipitation: any type of water that falls from the sky – rain, snow, sleet, hail

rain gauge: a weather tool used for measuring rain fall

stratus: low-laying clouds that blanket the sky

temperature: how much heat is contained in the atmosphere

thermometer: a weather tool used for measuring temperature

weather: the current atmospheric conditions in an area

wind: the movement of air caused by the uneven heating of Earth and movement of air through areas of high & low pressure

wind vane: a weather tool used for determining wind direction

## **Strategies & Classroom Activities**

While developing activities for my unit, I wanted to include a variety of methods for collecting, recording, interpreting and displaying data. As Coskie and Davis (2009) pointed out, “It’s intellectually demanding for children to consider their inquiry questions, identify their data set, figure out possible variables involved, and then imagine a structure that will be efficient and effective.” By varying my lessons to include several different interactions with data, students have more opportunities to internalize data interpretation to be successful.

## Charlotte Weather Data Collection & Analysis

At the start of our learning unit, learning teams will be asked to do a daily weather collection using their Chromebooks. ([Appendix 2](#)) This collection of data will have to take place on their own/in their classrooms since I only see them once a week. Students will have an assigned day to collect data and then be asked to share this data with their groups. After collecting 7 days of data, students will analyze the data collected looking for patterns. They will create graphs to represent their data and graphs will be posted throughout the room for comparison and analysis.

Some guiding questions for this data analysis might be:

- 1) What patterns or connections do you notice between precipitation & air pressure?
- 2) What correlation do you notice between precipitation and humidity levels?
- 3) Is there any relationship between changes in temperature and other weather data you collected?
- 4) Did the wind come from the same directions for the entirety of our data collection? When did it change? Were there any other changes in the weather that occurred at the same time that could be related?
- 5) Look at your data for air pressure and wind speed. Can we find a relationship between the two?

Having students compare and discuss their data will allow for them to look for any inconsistencies or questions that they might have. When they look more deeply at those inconsistencies, they will be forced to “ask questions and generate conjectures to refine and explain the observations.” (Palmeri, 2009).

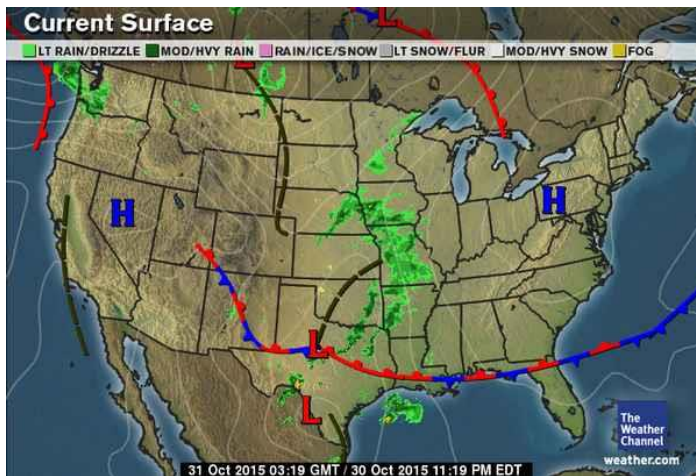
## US Weather Map Comparison

During the time that students are collecting their daily weather data, I will be pulling and saving daily weather maps, such as the ones below from the Weather Channel website. As students dissect data, weather maps with dates noted will be available for them to review. This will begin with a very teacher-directed modeling of how to look at these maps, which are something the students have never seen before. Giving students a print-out of a few of the maps will allow them to label the things that are newer to them, such as the different fronts and pressure system.

In conjunction with the mini-lessons being taught in each class session, students will gain an understanding of what each of these weather terms mean without having to memorize definitions.

As time progresses, students can identify the weather changes that occur with high and low pressure systems and different types of fronts. Students will be able to make connections to how these weather systems affect temperatures or create new weather for an area. Their daily analysis of weather maps and data pulled from those maps will bring a new level of understanding to weather & climate knowledge.

### *Sample Weather Maps*



The 'Current Surface' map shows where high and low pressure systems and any fronts are located currently in the United States. It also uses isobars to represent changes in air pressure.

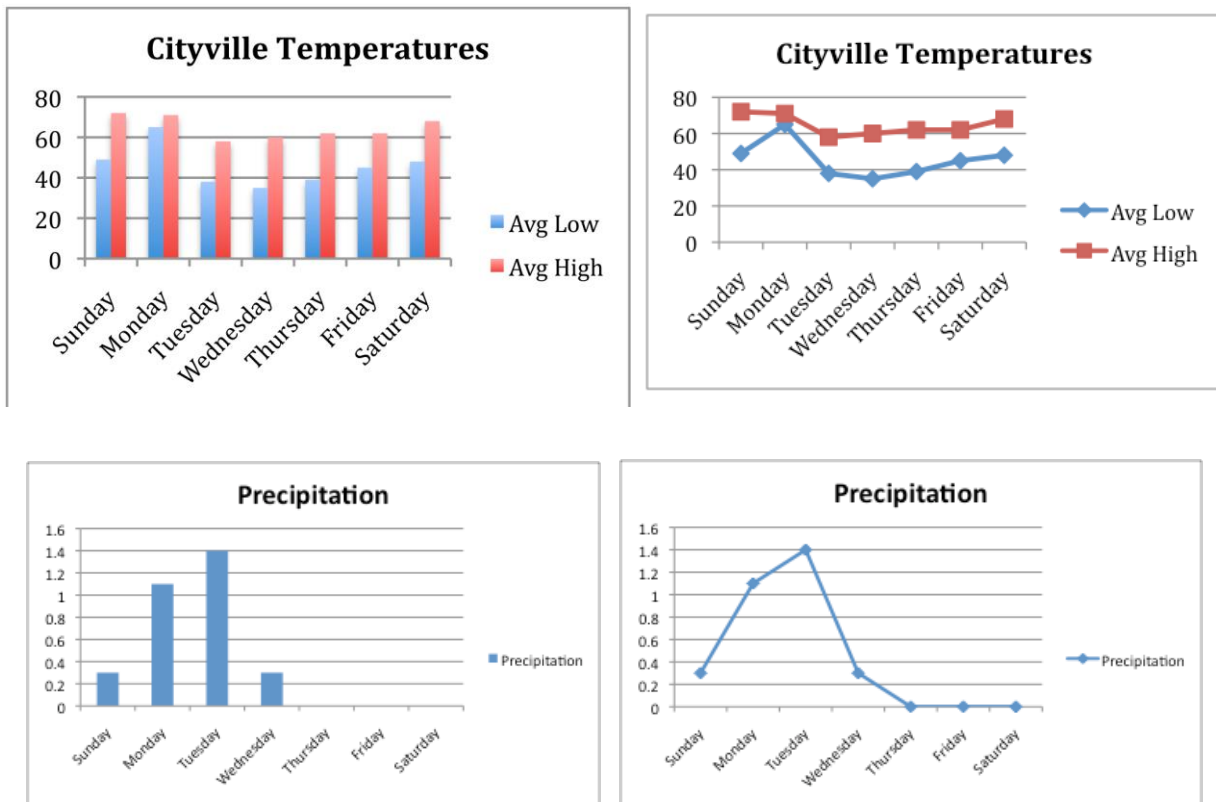


The 'Current Temperatures' map uses collected temperature data and color to represent current air temperatures across the United States.

## Mini-Lessons

Each week, classes will begin with a mini-lesson on specific weather phenomena. Some weather topics need a certain amount of direct instruction to be understood. I will direct student learning here to introduce vocabulary and use weather maps and other authentic tools to explain the following:

*Week One: Weather Graphs* – Display these two graphs for students - a bar graph and a line graph that both show the daily average high & low temperatures for a city. Which graph is the best graph for this set of data? Pulling on the students' background knowledge in math, discuss why so much weather data is best represented with line graphs and when it's appropriate to use a bar graph.



*Week Two: How to Create a Weather Graph.* At Morehead, students have already learned how to create line graphs at this point in the school year in math, but it is important to review this for all levels of learners. In this lesson, I will focus on labeling the axes, creating scales for the temperature data on the y-axis, and plotting points on the graph.

*Week Three:* Fronts – What is a cold front? What is a warm front? Which type of weather can be associated with them? Using diagrams that students will include in their notebooks, I will explain the two types of fronts, how they occur and how they affect weather.

*Week Four:* Students will use their Chromebooks and the NOAA site on Air Masses to research and create a map that shows the air masses that have an affect on the weather in the United States and where those air masses originate.

*Week Five:* Jet Stream – By now students should have developed some background knowledge on the jet stream from their classroom teachers and through our discussion on fronts and air masses. On this day, students will have 10 minutes to create a jet stream anchor chart that tells everything they already know on the jet stream. This will tell me whether they need more support.

*Week Six:* Air Pressure – This week will begin with a hands-on lab.

- Each group will get a water bottle with a balloon stretched over the top. At the center of their tables, they will have a bowl of very hot water and a bowl of ice water.
- Students will begin by placing their bottles in the bowl of very hot water. They will draw and describe their observations into their science notebooks.
- Next, students will move their bottle from the hot water to the ice water. Again, they will draw and describe their observations.
- Using guiding questions, discuss with the class what is happening inside the water and the balloon and why it's happening.

After the activity, make the connection from air within the bottle to the air in the atmosphere and its effect on the formation of clouds and precipitation.

*Weeks 7-8:* These mini-lessons will be planned as needed based on teacher observation and assessments during class periods.

### Comparing Data from Cities in Different Regions

As a follow-up to the earlier graphing activity, students will collect weather data from a variety of locations around the country. Students will choose their own cities but no doubles should be allowed so that we can get a wide range of places throughout the country.

1. Using our Chromebooks, we will collect average weather data - high temperature, low temperature and precipitation for the months of

January, April, July, and October - for 2 cities in different regions of the US. This data will give students a snapshot of what each season is like in those regions.

2. Using the collected data, students will create graphs for their data sets. (Graph template, [Appendix 3](#))
3. Graphs will be posted in the room by region (Northeast, Southeast, Midwest, South, Mountain, Southwest, and Northwest)
4. Students will complete a gallery walk around the room to observe, compare and contrast graphs and make inferences about the type of climate of that region of the United States.
5. To tie in other areas of their science curriculum so far this year, students will be asked to identify the main biome or ecosystem of some of the regions based on the weather data.
6. Using the data posted throughout the room, I will create a bank of questions that students will answer the following week. Because of the student-driven nature of this activity, it will be hard to pre-prepare questions but they might include things like:
  - When is the rainy season in this region? What do you know about air masses and fronts that to explain that?
  - Which of these regions is most likely to have a successful farming industry? Why?
  - Compare City A and City B. Which city has more overall rainfall for the year?

### Weather Map Mystery

As we near the end of the unit, students will solve a Weather Map Mystery. I will tell students that my brother is lost somewhere in the United States and they have to help me solve the mystery of where he is. Each day, he will send us an email with weather clues in it as to where he is. These cannot be pre-written as they will be based on the current weather in a city that I select. Each day I will pull up that city's weather and write to the students.

Here is an example of what an email would say:

“It sure is sunny here today – not a cloud in the sky! According to my thermometer, it is 45° today. This morning, I was able to climb a tree to get a better look around because there is hardly any wind at all. There wasn't a cloud in the sky as far as I could tell!”

From this information, students make inferences about the weather (high pressure and cold) and use a weather map to identify possible locations. Students will record clues

in their Weather Mystery charts ([Appendix 4](#)). By the end of a week, students will write an email back to my brother explaining where they think he is and why.

Since I won't see students daily, my brother's "emails" will be shared with students using their Canvas accounts. Canvas is an online learning site where teachers can post assignments for students and students can share answers, files and completed work.

### Meteorologist for a Day

As a final authentic assessment, students will be asked to "Meteorologist for a Day" ([Appendix 5](#)) by looking at weather data and making a prediction. Students will be asked to both draw and describe the weather. I often ask students to do both because many of my more visual learning students will have a hard time describing but their illustrations & diagrams will clear up any confusion I have while reading their paper.

Based on this activity, I will be able to assess whether students have mastered the objectives of being able to read & analyze weather data to make predictions about upcoming weather events. This will be the only independent activity that the students do throughout the unit and it will take one class period to complete.

### Visiting Meteorologist

At the completion of the unit, I will set-up an in-school "field trip" with a visit from a local meteorologist. The objective of this visit will be for students to have an opportunity to hear how a meteorologist uses science, math and technology (a tie to our STEM focus at school) to complete his/her job on a daily basis. My specific request of the meteorologist will be to discuss how they use data every day to do their job!

To prepare for this visit, students will each fill out an index card where they will ask a meteorologist one question. These questions may be related to something we learned but also could be an extension of their learning, such as on the topic of severe weather. Having them pre-prepare their questions allows students to have the time to properly think through and word what it is they want to know.

### **Other Classroom Activities**

Some other possible classroom activities are as follows. Some of these will be used as "filler" activities on days when a class finishes an activity before class time is over; other activities can be used as a re-teaching tool for students who haven't mastered an objective or struggled with a previous lesson.

- Watching real weather reports from local and national weather sources
- Creation of weather maps that show the jet stream, high & low pressure systems, cold fronts & warm fronts using collected weather data.
- An iPad project that involves students using an interactive whiteboard app to teach an audience about how a set of weather data (air pressure, wind speed & direction, etc) relate to the current weather



## **Appendix 1: Implementing Teaching Standards**

**Overall Standard 5.E.1:** Understand weather patterns and phenomena, making connections to the weather in a particular place and time

**5.E.1.1** *Compare daily and seasonal changes in weather conditions (including wind speed and direction, precipitation, and temperature) and patterns.*

Students will collect, record, graph and analyze local weather data.

**5.E.1.2** *Predict upcoming weather events from weather data collected through observation and measurements.*

Students will use weather maps and atmospheric weather data to make predictions about weather events.

**5.E.1.3** *Explain how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.*

Students will analyze national weather maps to describe how weather will change locally.

## **Next Generation Science Standards**

**MS-ESS2-5** *Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions*

**MS-ESS2-6** *Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.*

Students will use weather maps and atmospheric weather data to make predictions about weather events.

## **Common Core: Mathematics**

**5.OA.3** *Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.*

Students will graph collected weather data.

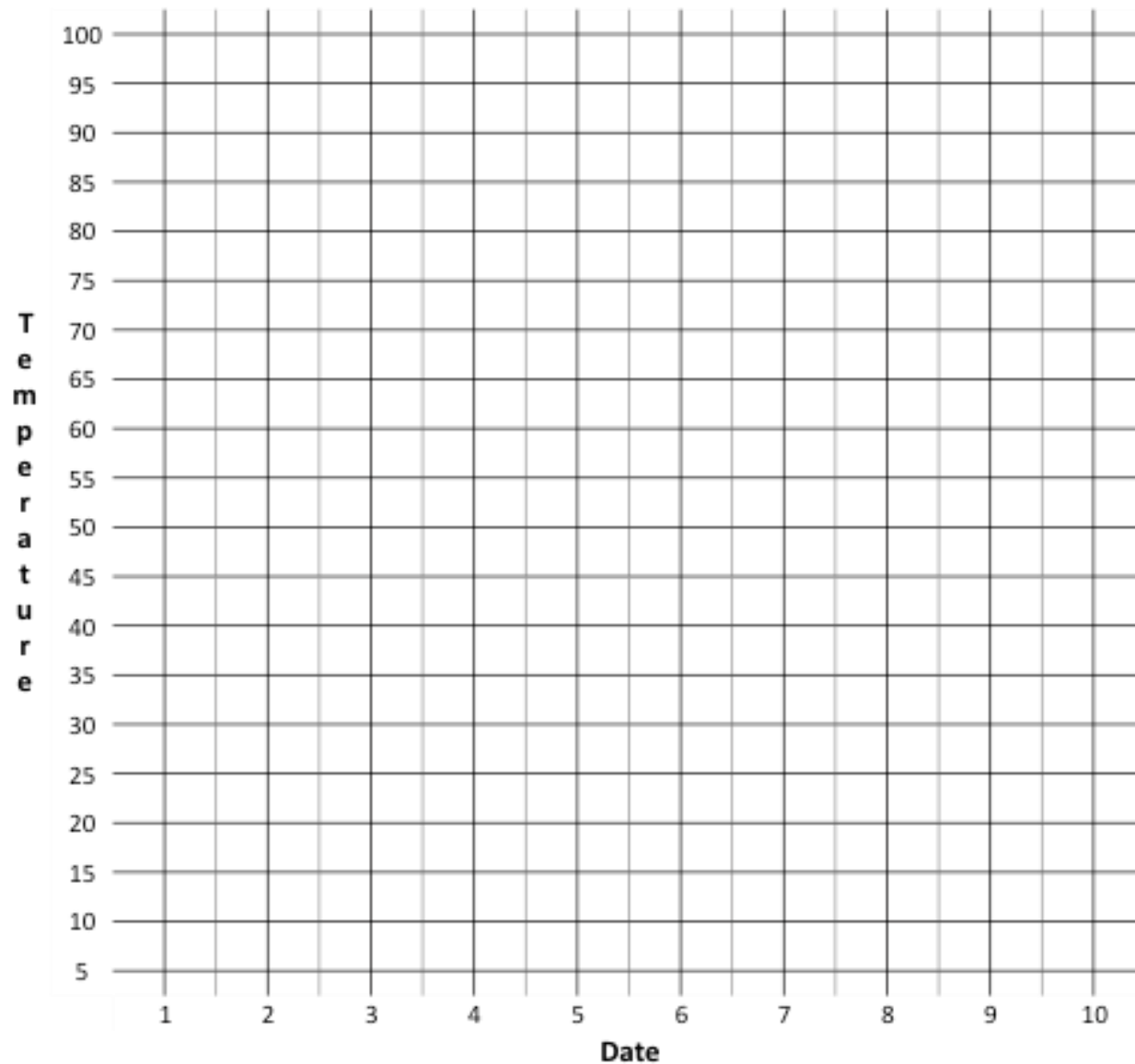
Appendix 2

## Weather Log

Date	Time	Temp	Relative Humidity	Dew Point	Barometric Pressure	Wind		Cloud		Precipitation	
						Direction	Speed	Type	Cover	Type	Amount
	:	°F	%	°F	↑ ↓				%		in
	:	°F	%	°F	↑ ↓				%		in
	:	°F	%	°F	↑ ↓				%		in
	:	°F	%	°F	↑ ↓				%		in
	:	°F	%	°F	↑ ↓				%		in
	:	°F	%	°F	↑ ↓				%		in
	:	°F	%	°F	↑ ↓				%		in
<b>Total / Average / Dominant</b>		°F	%	°F	↑ ↓				%		in
MM/DD	Include AM or PM	Degrees Fahrenheit	Percent	Degrees Fahrenheit	Rising or Falling	N, NE, E, SE S, SW, W, NW	Miles Per Hour	C=Cumulus S=Stratus SC=Stratocumulus CN=Cumulonimbus NS=Nimbostratus AC=Alto cumulus AS=Altostratus CR=Cirrus CC=Cirrocumulus CS=Cirrostratus		N=None R=Rain S=Snow H=Hail SL=Sleet	in=Inches

### Appendix 3

Graphing Our Local Weather Patterns  
Location \_\_\_\_\_



(Each day should be represented on every other line of the x-axis and match the key table)

X-Axis Key	
#	Date
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Y-Axis Key	
Color	Temp
1	High Temps
2	Low Temps

## Appendix 4

### Weather Map Mystery

Investigators' Names: \_\_\_\_\_

**WHERE IN THE WORLD?** Use the chart below to help you keep track of where our missing person is. Refer to this chart and your maps when narrowing your choices.

<b>Date</b>	<b>Type of map used</b>	<b>Clue(s) in email</b>	<b>Possible states</b>
Ex: 4/15	Temperature	Temp. 47 degrees F	OH, MI, PA, KY

**Last Day:** Write a note to our missing person explaining their location and your reasons for saying this. You must have at least 4 reasons. Be specific! Do this on another sheet of paper. Look at today's weather map and highlight the location. Attach it to your note.

## Appendix 5

### Meteorologist For a Day

Using your knowledge of weather, forecast the weather based on the given atmospheric conditions. Represent that prediction using a drawing and a description below.

<b>Atmospheric Conditions</b>	
Temperature: <u>34°F</u>	Chance of Precipitation: <u>60%</u>
Air Pressure: <u>Falling</u>	Humidity: <u>80%</u>
<b>Atmospheric Conditions</b>	
Temperature: <u>25°F</u>	Chance of Precipitation: <u>0%</u>
Air Pressure: <u>Increasing</u>	Humidity: <u>10%</u>

**Atmospheric Conditions**

Temperature: 90°F

Chance of Precipitation: 20%

Air Pressure: Increasing

Humidity: 30%

**Atmospheric Conditions**

Temperature: 82°F

Chance of Precipitation: 80%

Air Pressure: Falling

Humidity: 75%

## Bibliography

Coskie, Tracey L. and Davis, Kimberly J. "Science Shorts: Organizing Weather Data." *Science & Children*, 46.5 (2009): 52-54. NSTA Press. Print. In this article, children and teacher work together to find a structure for recording and interpreting weather data. The focus on older children shows how they compare using different types of graphs and how this changes what is communicated about their weather data.

*Current Surface Map*. Digital image. *The Weather Channel*. N.p., 30 Oct. 2015. Web. 30 Oct. 2015.

*Current Temperatures*. Digital image. *The Weather Channel*. N.p., 30 Oct. 2015. Web. 30 Oct. 2015.

Klentschy, M. and Molina-De La Torre, E. (2004). Students' science notebooks and the inquiry process. In W. Saul (Ed.). Crossing Borders in Literacy and Science Instruction: Perspectives on Theory and Practice. Newark, DE: International Reading Association Press. This article provides the argumentation for more frequent science notebook use to reach a larger variety of learners while integrating literacy instruction into a science curriculum.

Palmeri, Amy. "Making Sense of Data." *Science & Children* 47.2 (2009): 30-33. NSTA Press. Print. Providing opportunities for students to grapple with collecting and organizing data, struggle with how to represent and communicate ideas emerging from the data, and consider the alignment of these ideas with the science content being learned is reflective of authentic inquiry and supports the development of scientific understanding.

### Resources for Students

"Air Masses of North America." *Air Masses & Fronts*. Lyndon State College of Atmospheric Sciences. Web. 30 Oct. 2015  
[http://apollo.lsc.vsc.edu/classes/met130/notes/chapter11/na\\_airmasses.html](http://apollo.lsc.vsc.edu/classes/met130/notes/chapter11/na_airmasses.html)

"Jet Streams." *Jet Streams*. North Carolina State University, 9 Aug. 2013. Web. 30 Oct. 2015 <https://climate.ncsu.edu/edu/k12/.JetStreams>