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January 2015

LESSON PLAN

Wacky Weather

CLASS DISCUSSION

The year 2014 brought some crazy weather to the United States. While there was no singular stand-out storm - no Hurricane Sandy, no Hurricane Katrina – weather radar recorded some interesting and significant seasonal events in the past 12 months.

Last January we were introduced to the *polar vortex*, a large pocket of frigid air that sits over the polar region during the winter months. Occasionally a very high air pressure system from the Pacific will push the polar vortex southward into Canada and the United States, bringing frigid temperatures that can last days at a time. Such was the case last winter when dangerously low temperatures stretched across the much of the United States. Babbett, Minnesota saw 37 degrees below zero on January 6, 2014, with the usually temperate city of Dallas, Texas at only 18 degrees. Record lows were set across the country on January 9th, and snow and ice led to countless interruptions of school, business and travel.

As temperatures climb in the spring, warmer air coming up from the Gulf of Mexico will often clash with the still cool air flowing south from Canada, leading to violent thunderstorms and *tornadoes*. Chilly temperatures presided over much of the United States into early spring of 2014, leading to a later-than-usual tornado season. But despite the late start, the storms were devastating. In late April, violent and sudden tornadoes took a huge toll on the country. Multiple long-track tornadoes erupted from Nebraska to Louisiana, Illinois to Florida, and Oklahoma to North Carolina, with damaging floods striking Maryland.

The summer months of 2014 witnessed several *tropical storms* originating in the Atlantic basin. The Atlantic hurricane season commonly begins in June and ends at the end of November, and affects primarily the Gulf coast and southeastern states. Arthur was the first cyclone of the season, and as it moved inland it intensified to a category 2 hurricane. It was the earliest known hurricane to touch landfall in North Carolina in history.

Lesson Plan Continued

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Traditional autumnal chills went way beyond the norm in 2014, as the polar vortex made its second appearance of the year. Arctic air dove down into the north central United States bringing 40-degree temperature drops across much of the country. The eastern Great Lake states were slammed with wintery weather in early November. Snow was falling at an amazing rate of four inches per hour in Buffalo, New York, accumulating to over six feet – and it wasn't even Thanksgiving yet!

Each significant weather event of 2014 had a ripple effect, as weather and climate have a direct impact on the national economy. It is estimated that the polar vortex cost up to $5 billion due to disruptions to business and travel, school closings and slow retail sales as customers stayed indoors. The economic effect of drought, wildfires, tornados and hurricanes is readily seen in the millions and billions of dollars lost due to personal injuries and property damage. The importance of understanding and anticipating weather is critical to the safety of US citizens as well as to the economic security of our country.

ACTIVITY

Forecasters use several different types of maps to illustrate weather conditions across the country. Satellite maps, radar maps, temperature maps, are just a few.

Satellite maps are literal pictures of the earth taken from a satellite orbiting the planet. Satellite maps show snow, fog and cloud coverage. Radar maps show precipitation, intensity of precipitation and anticipated movement of rain or snow. Temperature maps show the high and low temperatures at any given time. Temperature maps can also illustrate wind chill – the temperature that your body feels when the air temperature is combined with wind speed.

In this activity, students will generate their own weather maps, charting the temperatures across the country one day a week, for a period of eight weeks.

Direct students to collect and review weather maps found in the local newspaper, and at online resources such as weather.com and Accuweather.com. Discuss with students the varying colors, icons and markings on the maps and their meanings. Explain the color legend for temperature, with red representing 100 degrees and gray 0 degrees.

Download and print the US map template and the weather symbol sheet found at uspsconnection.com/cc_site/teaching-guide-supplements and distribute to students. (Alternatively, project the map template and the weather icons onto the white board and as a class create one weather map.) Students are to interpret the weather by coloring the appropriate hue for the temperatures in the various regions of the country. Students will then draw weather icons that represent the weather conditions across the country. Select one day a week for this exercise over an eight-week (minimum) period. At the end of the eight-week period, students are to write a summary of temperature patterns over the course of the mapping exercise, to be submitted with their temperature maps.

DESIRED OUTCOME

At the end of this class discussion and learning activity, students will begin building a basic understanding of weather concepts. Students will gain experience in collecting and interpreting data, working with maps, and communicating results by drawing and writing their findings.

CURRICULUM STANDARDS

This lesson addresses NGSS (Next Generation Science Standards) from the National Science Teachers Association:

- Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. 3-ESS2-1
- Obtain and combine information to describe climates in different regions 3-ESS2-2