



WEATHER PREDICTION AND STORM CHASING ACTIVITY

STEM Lesson: *Students will learn about some weather prediction basics, the art of plotting weather characteristics and how a storm chaser forecasts and decides where to go chasing. Through this knowledge, any participant can be “weather ready”, able to use basic tools and information provided by the National Weather Service to stay aware, and stay safe during severe weather events.*

Severe weather affects everyone, no matter where you live. Being “weather aware” is the best way to stay safe and avoid potentially dangerous hazards. This awareness requires the use of simple tools, like national weather service outlooks, watches and warnings. A few minutes of familiarization of these tools, plus doppler radar, will allow you to understand and predict when severe weather will strike.

The fundamentals of storm prediction are fairly straight forward. As the air heats and cools, this produces areas of higher and lower pressure. These pressure systems create winds, and winds aloft move these systems around the globe. Because of the spinning of earth, bands of winds move in different directions at different latitudes. The latitudes over the United States move from West to East, which means that weather systems move in the same direction. As pockets of air with different temperatures move, it creates boundaries, like cold fronts and warm fronts. Most severe weather is associated with cold fronts anchored to a low pressure system. Understanding how to read maps, like convective outlooks, will help you decide when action is needed. These maps generally outline large areas of severe weather possibility. To refine this to smaller areas, maps that include more detailed information, found on pivotal weather, can help pinpoint locations to within 25 miles of where severe weather will strike.

The combination of these tools, along with the basic understanding of how weather works, allows one to be safe. Storm chasing takes these basics into consideration and adds more data and maps to help chasers locate and identify the severe weather taking place. Although weather is hard to forecast and not always predictable, there is a science behind severe weather forecasting and many textbook scenarios can be found when one spends time learning the basics.

STEM Careers:

Atmospheric Researcher

These intrepid explorers spend much of their time outside, exploring active weather and collecting data. From understanding the formation of hurricanes and predicting their path, to what causes supercell thunderstorms and tornadoes, these researchers not only develop theories about how weather works, in many instances they develop software and/or hardware to collect various data points on all types of weather phenomena. Typically these careers require a minimum of a Masters degree, are university or government based, and take teamwork and collaboration.

Broadcast Meteorologist

This is the person that you see on the news at night or when they break into regularly scheduled programming to alert members of their community about hazardous weather conditions. While some of their time is spent on air, much of it requires having the same skill set that forecasters for the National Weather Service need. They dig through weather data and computer models to predict everything from a warm sunny day, to flash flooding or large hail. They are typically the first form of communication for local entities with regards to severe weather and work closely with storm spotters to confirm that the weather they are predicting and describing is what is actually happening.

Needed Materials for the Activity:

- Copies of blank weather plot forms
- Example of [simplified weather plot](#)
- For Surface Weather Plot extension
 - [surface plot key](#)
- Computer with tabs open to the following webpages:
 - [Convective Outlooks](#)
 - [Pivotal Weather](#)
 - [El Reno Tornado Survey](#)
 - 5 current weather locations of your choosing
- A review of [various frontal boundaries](#) and how the overarching process of the activity ([Weather Plots](#), [Drawing Conclusions](#)) works, derived from the National Weather Service.

Activity Instructions:

This activity has three components:

Component #1: Surface Weather Plots

For All ages

- Using the [Example simple weather plot](#) have students either use blank paper to plot the weather in 3 different locations
- Have students read the [Surface Observation Map](#) and determine the weather in 5 different locations
- Extension
 - If they want a greater challenge, they can learn and plot all 10 weather characteristics for any location using the National Weather Service's [surface plot key](#).

Component #2: Drawing Conclusions

Students will use the [Air Pressure Change Map](#), [surface air pressure map](#), [surface temperature map](#), and [surface dewpoint maps](#) to predict an upcoming weather event. found in the [Drawing Conclusions](#) lesson from NOAA's Jet Stream. Tie in information from [How to read surface weather maps](#) to help them determine where the warm fronts and cold fronts are.

- Students will connect similar items. For instance, on the barometric pressure map, they connect similar shapes with a line. The triangle and circles will make a circle, the other shapes will make curved lines and do not reconnect.
- Discuss with students how if they overlap the two maps, they can see that there is a low pressure system located over the central rockies (where the triangles are located), high pressure over Michigan (the northern end of the square, diamond, heart and donut) and the squares/diamonds create the cold front.

Component #3: Convective Outlook Maps

- Have a tab open with [Convective Outlooks](#) to explore.
- Have the [El Reno Survey](#) interactive video guide open in a separate tab for older students (6-12) who are interested in learning more about convective outlook maps. Only provide this challenge if students seem ready for this challenge.
- Advanced users can learn how to use [Pivotal Weather](#)
- Review NOAA's Jet Stream [Introduction to Thunderstorms](#) and use this knowledge to write a weather forecast for one location for the upcoming week.