

WEATHER PHENOMENA EXPLORE ACTIVITY

Bomb Cyclone, 2019

What makes a storm a “bomb” is how fast the atmospheric pressure falls; falling atmospheric pressure is a characteristic of all storms. By definition, the barometric pressure must drop by at least 24 millibars in 24 hours for a storm to be called a bomb cyclone; the formation of such a storm is called bombogenesis. Here is how it works: Deep drops in barometric pressure occur when a region of warm air meets one of cold air. The air starts to move, and the rotation of the earth creates a cyclonic effect.

Source: Fountain, H. (2018, Jan. 3). Retrieved from www.NewYorkTimes.com

Directions

Using the simulation map from <http://earth.nullschool.net/> you are going to explore weather data from the 2019 Bomb Cyclone.

1. Click anywhere on the map. This will produce a green circle with latitude and longitude measurements in the bottom left hand corner of your screen.
2. Move the circle near to where you would imagine Colorado would be. Your goal is to get as close to Hartman, CO as possible. The exact coordinates are 38.25°N, 102.15°W
3. Once you obtain your location, click on the icon that reads “earth” in the bottom left hand corner. This will result in a navigation window opening.
4. Using the calendar icon, change the date from today’s date to March 13, 2019. You can use the single arrows to change the time of day to 01:00 Local
5. Select the MSLP overlay icon. This will change the view of your map to look at pressure in hPA.

Recording Data

Using the single arrows to change the time of day. Record the pressure changes over 24 hours in the table provided. Use the accompanying box to answer a few questions.

Time	Pressure (hPA)
01:00	
04:00	
07:00	
10:00	
13:00	
16:00	
19:00	
22:00	
01:00 (14 th)	

What do you notice about the changes in pressure?
Try different overlays, like Wind or Temp. Do they reveal anything interesting about the bomb cyclone?



Hurricane Harvey, 2017

A hurricane is a type of tropical cyclone, which is a generic term for a low pressure system that generally forms in the tropics. The cyclone is accompanied by thunderstorms and, in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface. Hurricanes are categorized according to the strength of their winds using the Saffir-Simpson Hurricane Scale. A Category 1 storm has the lowest wind speeds, while a Category 5 hurricane has the strongest. When the winds from these storms reach 39 mph (34 kts), the cyclones are given names.

Source: www.hurricane.com

Directions

Using the simulation map from <http://earth.nullschool.net/> you are going to explore weather data from Hurricane Harvey.

1. Click anywhere on the map. This will produce a green circle with latitude and longitude measurements in the bottom left hand corner of your screen.
2. Move the circle near to where you would imagine Texas would be. Your goal is to get as close to Port Aransas, TX as possible. The exact coordinates are 27.87° N, 96.73° W.
3. Once you obtain your location, click on the icon that reads "earth" in the bottom left hand corner. This will result in a navigation window opening.
4. Using the calendar icon, change the date from today's date to August 25, 2017. You can use the single arrows to change the time of day to 00:00 Local.
5. Next, select the MSLP overlay icon. This will change the view of your map to look at pressure in hPA.

Recording Data

Using the single arrows to change the time of day. Record the pressure changes over 24 hours in the table provided. Use the accompanying box to answer a few questions.

Time	Pressure (hPA)
01:00	
04:00	
07:00	
10:00	
13:00	
16:00	
19:00	
22:00	
01:00	

What do you notice about the changes in pressure?
Try different overlays, like Wind or Temp. Do they reveal anything interesting about Hurricane Harvey?

Calculating Measures of Central Tendency

Mean

To find the mean, you are simply finding the average. Talk with your partner about how you think you could find this measure and test your hypothesis.

Your hypothesis:

Test it. What did you find?

Let's check your work. Add up all of the pressure measurements you found in the exploration. Record your total in the box below.

Total

How many data points did you record? Enter this number in the box below.

Number of Data Points

Now, divide your two numbers: Total/Data Points. Record the result in the box below.

Answer: _____

How does this number compare to the number you found in your hypothesis?

The process of totaling all of your data points and dividing that value by the number of data points is the same process that statisticians often use to calculate the mean for a data set. You can use this method for finding the mean of other data sets as well.

Median

To find the median, you are simply finding the number that is in the middle of your data set. Talk with your partner about how you think you could find this measure, and then test your hypothesis.

Your hypothesis:

Test it. What did you find?

Let's check your work. First, list each of the pressure measurements in order from least to greatest.

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Because you have an odd number of measurements, locate the number in the very center.

Central Number

How does this number compare to the number you found in your hypothesis?

Like we say with finding the mean, this process is the same one that statisticians often use to determine the median for a set of data. You can use this method for finding the median of other data sets as well.

Does the median tell you different information than the mean?

How is it similar?

How is it different?

What do you think would happen if you had an even number of data points in your data set?
How would you find the median then?

Mode

To find the mode, you are simply finding the number that occurs most frequently in your data set. Talk with your partner about how you think you could find this measure, and then test your hypothesis.

Your hypothesis:

Test it. What did you find?

Let's check your work. Using the same list of numbers you created to find the median, check to see which numbers occur most frequently.

Do any numbers appear two or more times? If so, which ones?

Try this. You are writing a program that determines whether or not a tornado touches down. A 1 represents a tornado touchdown, while a 0 represents a tornado that does not touch down. You crunched the numbers, which resulted in the following list:

0, 1, 1, 1, 0, 0, 1, 1, 1, 0, 1, 1, 0, 0, 1, 0, 1

Which number occurs most frequently?

What does this tell you about tornadoes?