Explore Your Local Weather

Weather is the current state of the atmosphere (the air above the earth), at a specific location and time. When you see a weather forecast on television or the internet, you typically see predicted values for temperature, relative humidity, wind speed, barometric pressure, and chance of precipitation. These values are usually generated by models developed by meteorologists.

Looking at the patterns and average readings of weather overtime helps establish the climate of an area. Climate is the long term pattern of weather over many years.

How does the realtime weather in your location compare to that presented in the weather forecast for your location? Within a relatively small geographic area, such as a school campus, do you think all the measurements are the same at every location or does it vary?

Materials

Graphical Analysis 4 app on a Chromebook, laptop, or mobile device
Go Direct Weather Sensor
meter stick
weather report for your location

Procedure

1. Identify two locations where you will collect data. Choose locations that are different from each other, such as
   1) the middle of a field and 2) close to a building
   OR
   1) the north side of a building and 2) the south side of the same building

2. Set up the Weather Sensor and Graphical Analysis.
   a. Launch Graphical Analysis.
   b. Connect the Go Direct Weather Sensor to your Chromebook, laptop, or mobile device.
   c. Click or tap Sensor Channels.
   d. Select Temperature, Relative Humidity, and Barometric Pressure. Leave Wind Speed selected.
   e. Click or tap Done.
   f. Click or tap View, , and select 1 Graph.

3. As a class, discuss which units you will use when collecting your data.
    a. Record the units you chose in the spaces provided in the data table.
    b. If necessary, change the units in Graphical Analysis. Click or tap the meter for the channel(s) you want to change, and choose the correct unit.

4. Calibrate the barometer for the elevation of your testing location.
    a. Click or tap the Barometric Pressure meter and choose Calibrate.
    b. Enter your elevation in meters, and then click or tap Keep.
    c. Click or tap Apply.

5. Take the data-collection equipment to the first location.

6. Describe the location and collect data at 10 cm.
    a. Record a description and observations of the location. You may use words, a sketch, or a photo, as long as it can be submitted as part of your report.
    b. Position the Weather Sensor so the bottom of the sensor is 10 cm above the ground and facing into the wind. **Note**: Make sure not to block the wind as it blows through the sensor.
    c. Start data collection and hold the sensor steady for 60 seconds. Data collection will end automatically.

7. Once data collection is complete, determine the mean (average) of each variable.
    a. Start with wind speed. Ensure that a graph of wind speed *vs*. time is displayed. If not, click or tap the y-axis label of the graph. Select Wind Speed and deselect the data you do not want displayed. Click or tap the graph to dismiss the menu.
    b. Click or tap Graph Tools,  , and choose View Statistics.
    c. Record the average wind speed in your data table.
    d. Click or tap the y-axis label of the graph. Select Temperature and deselect the data you do not want displayed. Click or tap the graph to dismiss the menu.
    e. Click or tap Graph Tools,  , and choose View Statistics.
    f. Record the average (mean) temperature in your data table.
    g. Repeat this process to determine and record the average relative humidity and barometric pressure.

8. Collect data at 90 cm.
    a. Move the sensor so that the bottom of the sensor is 90 cm above the ground, still facing into the wind.
    b. Start data collection and hold the sensor steady for 60 seconds. **Note**: The previous data set is automatically stored.
    c. Repeat Step 7 to analyze and record data for 90 cm.

9. Move to the second location and repeat Steps 6–8.

Data and Observations

	Location 1		Location 2	
Date and time				
Description and observations				
Height above ground surface (cm)	10	90	10	90
Wind speed (_____)				
Temperature (_____)				
Relative humidity (%)				
Barometric pressure (_____)				

Analysis Questions

1. Write a summary of the similarities and differences of the physical environment of the two locations at which you collected data.
2. Compare the 10 cm and 90 cm readings for the first location. Describe the similarities and differences for the data at the different heights. Do you see the same patterns at the second location? If not, describe how the data for the second location compare to the data for the first location.
3. Compare your measurements to the forecast for your local area during the time you collected the data. How do they compare? Explain any similarities or differences you observed.
4. Which location is more representative of the campus as a whole? If you had to choose one location for a permanent weather station, would you select something similar to those that you used for this experiment or would you try a different location? What factors would you use to decide on an ideal location?
5. What is the difference between weather and climate?