Blue Group: Weather

Group Summary:	Roles:	Assignment Summary:
This group will track the wind speed and direction, humidity, rainfall, and temperature in the city via the Internet.	Assign roles. Each person tracks one weather feature or pollutant. 1. Wind Tracker 2. Ozone Tracker 3. Humidity Tracker 4. Particulate Tracker (PM_{10} & $PM_{2.5}$) 5. Rain Tracker 6. Carbon Monoxide Tracker **7. Temperature Tracker**	Each student will enter the data into a spreadsheet for his/her pollutant or weather feature.

COLLECT DATA: Set-up (1st time)

1. Decide on each of your roles (see above).

2. Decide on the location your group will monitor – 22nd & Craycroft or Rose Elementary. (*Note: PM tracker will use Geronimo for PM_{10} & Rose Elementary for PM $_{2.5}$*)

3. Go to the activity website (http://www.airinfonow.com/html/airexercise/materials.html) and download the Excel Spreadsheet for the "Blue Group: Weather."

4. Save the spread sheet onto your disk or computer.

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COLLECT DATA: Everytime

1. Open your previously saved Excel spread sheet for "Blue Group: Weather"

2. Go to the activity website (http://www.airinfonow.com/html/airexercise/materials.html) and click on the "Your Data" in the "Blue Group: Weather" column to obtain current weather data.

3. Select either the 22nd & Craycroft location or Rose Elementary Location.

4. Enter the date you need into the From: and To: boxes.

5. Make sure the time boxes (hh:mm) read 00:00 and 23:59 . (*Note: If you are looking at today's data, the second box will automatically read the current time. To get a full day of data you need to enter yesterday's date – or Friday's date if it is currently Monday*).

6. Click on "Show Report."

> The abbreviations for the weather data are:
>
> - OTP – outside temperature in degrees farenheight
> - VWD – variable wind direction in degrees
> - VWS – variable wind speed in miles per hour
> - RH – relative humidity in percent

7. Enter the date into the "Blue Group: Weather" spreadsheet.

8. Enter the data for your pollutant or weather feature into your spreadsheet.

9. Be sure to save your worksheet.

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Plot the data on a graph (weather vs. time or pollutant level vs. time).

1. Go to your spreadsheet and hold down the control button on the keyboard. With your mouse highlight the data for 8:00 and 17:00 for each day. (Continue to hold down control button.)

2. Click on the bar graph icon OR go to the "Insert" menu and select "Chart."

3. Select "Column" for chart type then select "Next."

4. Leave the data range alone and select "Series In: Columns."

5. Select "Next."

6. Enter a "Chart Title" such as "Wind Speed: Location" (or whatever your pollutant).

7. Enter a "Category (X) Axis" such as "Time."

8. Enter a "Value (Y) Axis" such as "MPH" " (or whatever units go with what you track)then select "Next."

9. Select "Place Chart: As New Sheet" and enter a label such as "Wind Graph 1."

10. Select "Finish."

11. Now refine your graph: (See Example)

   A. Delete the series box (right side of graph).

   B. Change the background color:
   - Double click in the open part of the graph.
   - In the "Area" section click on the white square.

   C. Create Text Boxes for each day:
   - Type the date in the black space at the top of the Excel window (following the =).
   - Hit enter.
   - Drag the text box to the appropriate location on the graph.

C. Change the X-Axis labels:
- Double click at the bottom of the graph and select the tab labeled "Patterns" then under "Tick Mark Labels" select "None."
- Create your own tick mark labels (0:00, 8:00, 16:00) for the x-axis by creating text boxes and dragging the boxes down to the appropriate location at the bottom of the graph. Repeat for each day.

D. Color code the days:
- Double click on the inside of a single bar (only that bar should highlight – not with squares in all the bars).
- The "Format Plot Area" window should come up.
- Select "Fill Effects." Use the same color code for each day – SEE BELOW (for each 0:00, 8:00, 16:00 period).

Wind Speed - Location
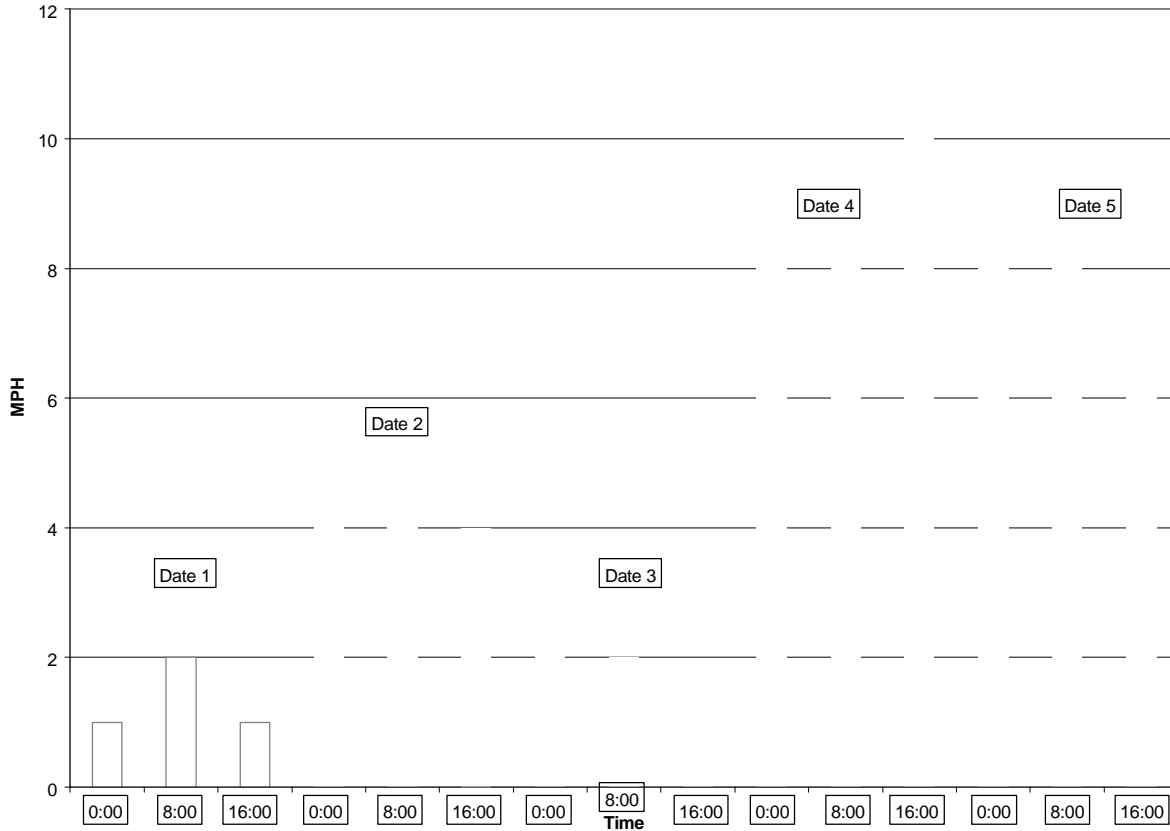
PRESENTATION PREP: Find Averages

DO THIS AFTER EACH FULL MONTH OF DATA IS ENTERED (20 DAYS).

1. Find the average and standard deviation for each time at the end of each month.

2. You will notice there are some squares with the words "#DIV/0!". These squares already have the formula to find the average of your data. (Note: The average changes as you enter the data.)

3. You will need to enter the formula for the average for the remaining squares.

4. Select a cell that already contains an average calculation. Copy the cell and paste the formula into the cell you want. Be sure to double check that the formula includes the correct cells for which you want to take the average (*Note: 16:00 will be one cell number higher than 8:00 a.m. – e.g. B104 instead of B103*).

5. You will need to find the Standard Deviation (which tells you how variable your data is or how much of a change in the weather there is on different days at the same time). Do this by copying and pasting the formula from one Standard Deviation cell into the cell you want.

PRESENTATION PREP: Graphing #2

DO THIS AFTER EACH FULL MONTH OF DATA IS ENTERED (20 DAYS).

1. Graph the month's averages for your pollutant using a bar graph.

CHALLENGE: Try to make a scatter plot combining 2 of your variables (e.g. temperature & ozone).

PRESENTATION PREP: Find Trends

1. As a group, analyze trends in air quality based on different weather events.

Consider the following (use your graphs to help you):
- Does ozone, carbon monoxide, PM_{10}, or $PM_{2.5}$ increase, decrease, or not change as a function of temperature, wind, humidity, or other weather feature?
- Are these trends consistent over the month, 2 months, 5 months?
- Develop one or more hypothesis to describe the trends. Be careful not to draw conclusions or overstate your data.

PRESENTATION

Present your data, graphs, hypothesis, and/or conclusions to your class.