

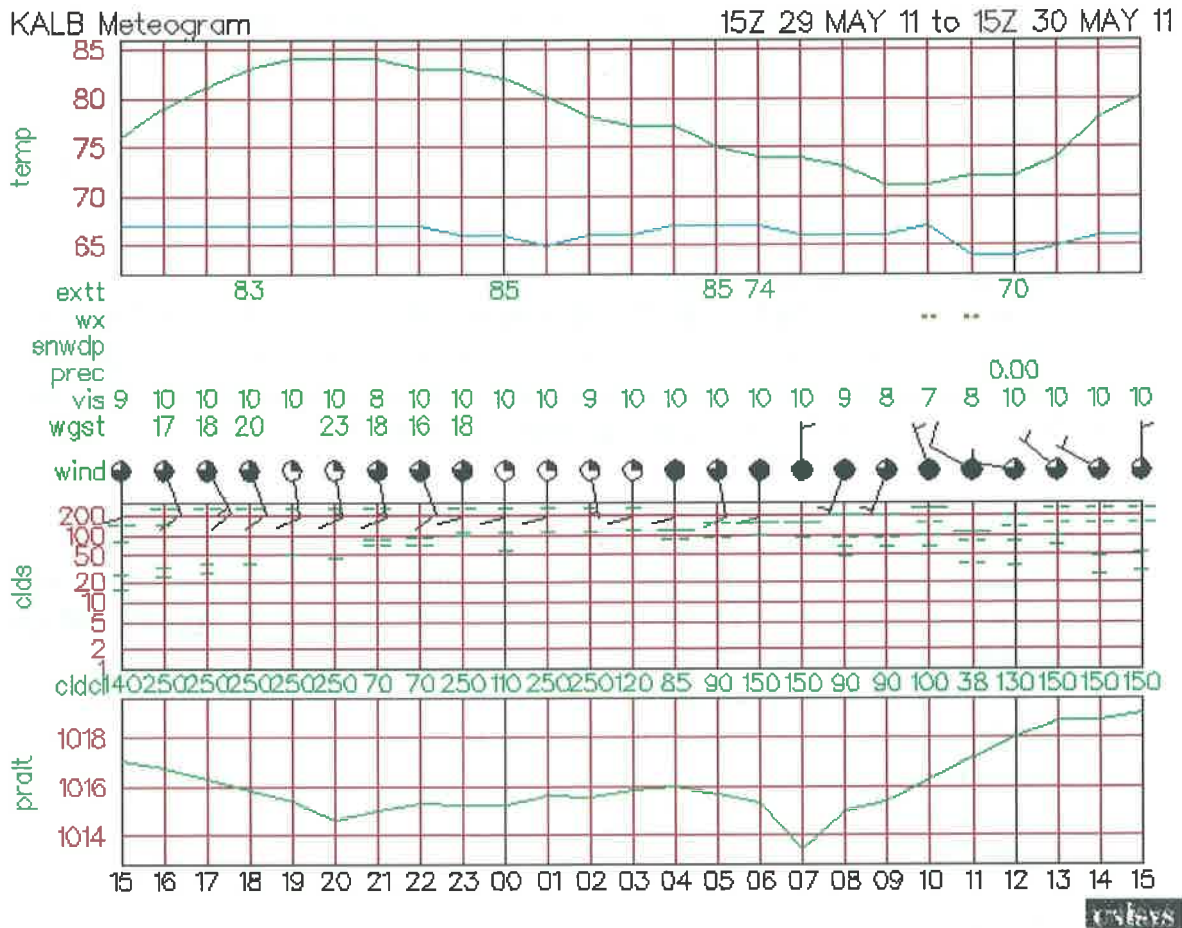
Monthly Meteograms

Weather Data Collection in Earth and Space Science

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This is a 25 hour time series for a particular surface reporting station location. The data plotted include temperatures, winds, pressure, clouds and present weather. These data are updated hourly

Temperature and dewpoint chart - This shows temperature as the top line and dewpoint as the bottom line

EXTT (extreme temperature) - The maximum and minimum temperatures are plotted below the chart at

PREC (precipitation) - This shows precipitation totals in inches. The values are 24 hour totals generally at

VIS (visibility) - This shows the horizontal visibility in miles.

WIND (winds and cloud cover) - This is the standard wind and cloud cover symbols used in the surface data plots. Up is north.

Clds (Cloud chart) - This chart gives cloud layer information. The vertical axis is height of cloud base in feet

Pralt (Pressure chart) - This chart plots sea level pressure (or altimeter setting if pressure not reported) in millibars. This may not be available for all sites.

Time - This is the reporting time in universal time.

Student Instructions

The preceding meteogram for Albany NY (KALB) is from the UNISYS site we use everyday in our current weather map analysis.

http://weather.unisys.com/surface/meteogram/sfc_met.php?inv=1&city=alb®ion=ne

- Throughout the semester you have been assigned the everyday task of collecting weather data including cloud types.
- You have also been instructed to regularly transfer that data to an electronic spreadsheet so that you can build monthly graphs for your data. Each column of data will end with a row for high, low, mean, median, mode and range values.
- The meteogram for KALB is for a 24 hour period but yours are to be by month because you only collect data once a day. In the spring semester you began data collection at the end of January and will end at the beginning of June. In the fall semester you collect data from the end of August to the end of January. You will construct 4 separate sets of graphs using your data for the four months in the semester you have this class. **September October November December or February, March, April, May.**
- Your graphs **are to be “stacked”** so that dates and data are in the same location to allow comparisons. See how the 3 meteograms shown on the previous page do this. I will show you examples of how students in previous classes have done this.
- It is preferred that you use **landscape layout** on your graphs so the data is spread out for better readability.
- After each set of monthly graphs, **provide an analysis** of what you saw for that month using the questions I will provide.
- **Create a cover** for your finished packet of weather data with the first three lines of the title I used on this instruction packet but with **your name, the date and the class block** you are in.
- Create the following data graphs
 - Air temperature and dewpoint (on one graph).
 - Atmospheric pressure.
 - Wind speed
 - Humidity
 - Precipitation
 - Cloud cover %
- **Attach all of your daily Weather Data Collection sheets you filled out by hand this semester.**
- Start each month’s section with the checklist I will provide to you.
- Each month’s work will be due shortly after the end of each month on a date I will announce in class.
- I will provide other forms and instructions as necessary as the project progresses.

Meteogram analysis questions Complete this analysis for each month of data collection

Data collected by (first) _____ (last) _____

Class block _____

Approximate local time of daily data collection _____ UTC time _____

Data collection dates for this meteogram: start _____ end _____

Mean is the average of numbers (total of all numbers in a set divided by the amount of numbers in the set) Median is the number in the middle. Mode is the number that occurs the most often in a set of numbers. Range is the difference between the highest and lowest number in a set of numbers.

Air Temperature

High _____ Low _____ Range _____ Mean _____

Dewpoint Temperature

High _____ Low _____ Range _____ Mean _____

Humidity

High _____ Low _____ Range _____ Mode _____

Barometric pressure

High _____ Low _____ Range _____ Median _____

Wind speed

High _____ Low _____ Range _____ Median _____

On which date was the air temperature and the dewpoint closest in value? _____

What was the range that day? _____ What was the humidity on that date? _____

On which date was the air temp. and the dewpoint most different in value? _____

What was the range that day? _____ What was the humidity on that date? _____

On which date was the atmospheric pressure the highest _____ & what was it? _____

What was the cloud type and % coverage that day? _____

On which date was the atmospheric pressure the lowest _____ & what was it? _____

What was the cloud type and % coverage that day? _____

What was the highest wind speed you recorded this month _____ what date? _____

$$\text{Percent change} = \frac{\text{Difference (range) in value}}{\text{Original value}} \times 100$$

Over what four-day period did the following measurements increase the most?

Air temperature. Date of start of three day period _____

Original temp _____ Range of change _____ % change _____

Dewpoint temperature. Date of start of three day period _____

Original temp _____ Range of change _____ % change _____

Humidity. Date of start of three day period _____

Original humidity _____ Range of change _____ % change _____

Air pressure. Date of start of three day period _____

Original pressure _____ Range of change _____ % change _____

Over what four-day period did the following measurements decrease the most?

Air temperature. Date of start of three day period _____

Original temp _____ Range of change _____ % change _____

Dewpoint temperature. Date of start of three day period _____

Original temp _____ Range of change _____ % change _____

Humidity. Date of start of three day period _____

Original humidity _____ Range of change _____ % change _____

Air pressure. Date of start of three day period _____

Original pressure _____ Range of change _____ % change _____

Name _____

Block _____ Date _____

Meteogram month for this checklist _____

Weather meteogram checklist

When you turn in your hard copy meteogram check off items on this list to make sure that you have done what is required and attach the checklist to your work when you submit it.

For each month's data .

- **Daily record of weather data you collect in class**
- **Spreadsheet**
 - Print in landscape layout.
 - Include gridlines.
 - Remove extra date columns except for the first one.
 - Include a cell and data at the end of each column for mean, median, mode, high, low, range.
 - Include data for every day.
- **Weather graphs**
 - X axis (date) labeled by twos (every other day's date is shown).
 - Make the Y axis upper and lower limits close to the upper and lower limits of the data.
 - Label both axes include units (F, %, etc.).
 - Each graph has a title of month and data type shown.
 - Each graph has a legend (key).
 - Two graphs per page lined up over each other.
 - Make graphs as wide as is possible.
- **Analysis question sheet**

Blank back side

Student Name _____

Date of data m/y _____ Block _____ Submission date _____

Weather Data and Analysis Proficiency Checklist

This checklist is used to assess the level of proficiency of the monthly weather data and analysis PBGR. The work you turn in for each month will be marked up in the following way;

A blue highlighter checkmark on the page being reviewed indicates that all elements are completed correctly. The graphs will have multiple blue checkmarks that indicate that individual elements on the graph are correct or pink ones that indicate the need for revision.

The areas highlighted in pink may need to be revised and resubmitted to demonstrate proficiency for the project. The expected level of proficiency increases with each of the four months of data collection and analysis. Errors that you make in the first month may not prevent you from approaching proficiency for that month's data collection and analysis, while similar errors in subsequent month's work will require revision. Growth and improvement in performing a skill is the expectation when the pursuit of proficiency is the goal.

The following list is a summary of the artifacts contained in this project and their level of meeting a standard of proficiency. The codes are as follows;

R. N. = revision necessary **A.S.** = approaching standard **M.S.** Meets standard

Evidence ↓	Assessment →	R.N.	A.S.	M.S.
Raw daily data sheet				
Electronic spreadsheet data				
Graphs ↓				
Dewpoint and temperature titles, labels and size				
Dewpoint and temperature X and Y axis numerical values				
Humidity title labels and size				
Humidity X and Y axis numerical values				

Turn page over for additional assessments

Evidence ↓	Assessment →	R.N.	A.S.	M.S.
Barometric pressure titles, labels and size				
Barometric pressure X and Y axis numerical values				
Wind speed titles, labels and size				
Wind speed X and Y axis numerical values				
Precipitation titles, labels and size				
Precipitation X and Y axis numerical values				
Cloud cover titles labels and size				
Cloud cover X and Y axis numerical values				
Data analysis sheet questions				

Overall assessment for this month's data package			
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Comments

Student Name _____

Date of data m/y _____ Block _____ Submission date _____

Weather Data and Analysis Summative Proficiency Checklist

This form is used to record the level of proficiency for each month's weather data and analysis submission and the summative evaluation of the weather data and analysis project.

The following list is a summary of the submissions contained in this project and their level of meeting a standard of proficiency. The assessment codes are as follows;

N. S. = not submitted

R. N. = revision necessary

A.S. = approaching standard

M.S. = Meets standard

Month of submission	Assessment →	N.S.	R.N.	A.S	M.S.
September					
October					
November					
December					
4 month combined					
Overall proficiency assessment					
Final written reflection assessment					

Comments

Blank back side

Name (first and last) _____ Block _____ Date _____

Weather Data Collection and Analysis Final Reflection

You have just finished a semester of Earth science in which the long term Capstone project required you to collect, organize and analyze daily weather data. This project is a PBGR task and is provides one piece of evidence towards successful PBGR completion. In this project a well written reflection of your efforts is the final assignment and will become part of this completed PBGR task.

Proper writing techniques including grammar, spelling and structure are important in this final piece. You must use complete sentences and provide details to support your reflections. Legible writing or printing is also required as you respond to the following prompts;

Describe how well (regularity, accuracy, neatness etc.) you performed the daily data collection including the numerical data and the cloud type and coverage observations.

Describe how effectively you used your time in the computer lab when it was scheduled during class time? Provide specific details. (Time on task, problem solving listening to instructions, etc.)

How did you grow as a learner of technical applications as you constructed the spreadsheets, graphs and organized the monthly data into its final form each month?

How well did you manage your time throughout the project including time outside the scheduled computer lab time during class? Did you work on the project during callback and at home. Did you meet deadlines for monthly submissions and progress checks?

How to Chart Weather Data Using Google Spreadsheet

What is a spreadsheet?

Spreadsheets are digital data management tools. Spreadsheets consists of tables made up of vertical Columns (labeled alphabetically A, B, C...) and horizontal Rows (labeled numerically 1,2, 3, ...). Each box in the spreadsheet is called a cell and each cell has a unique code (ex. A1, A2, B4, etc.) which the program uses to look up and manage the data.

Enter your data:

1. Sign on to Google Drive. Open a new spreadsheet and name it appropriately.
2. In Column "A" please type the following:
 - a. Row 1 = Your full name (First and Last)
 - b. Row 2 = "Block #"
 - c. Row 3 = "Weather Data"
 - d. Row 4 = Type the month (ex. "January")
3. Skip Row 5
4. In Row 6, please type in the following **Variable headers**:
 - a. Column A = "Date"
 - b. Column B = "Temp (F)"
 - c. Column C = "Dewpoint (F)"
 - d. Column D = "Humid (%)"
 - e. Column E = "Press. (mb)"
 - f. Column F = "Precip (in.)"
 - g. Column G = "Wind (mph)"
 - h. Column H = "Wind (direct.)"
 - i. Column I = "Could cov. (%)"
 - j. Column J = "Cloud type"
5. Fill in the Date Header with the day of the month (number only) starting at Row 7 with the first day of the month and continue to fill the rows below for each day of the month (ex. 1, 2, 3...31).
6. In the 6 rows below your last date in Column A (beginning in row 38 for a month with 31 days) add the following headers: Mean, Median, Mode, Min, Max, Range.
7. In each cell in column B that corresponds to the header created in step 6, create a formula that calculates the value of each header name.
 - B38: To calculate the mean (average) of your collected data, type **"=AVERAGE(B7:B37)"**
 - B39: To calculate the median of your collected data, type **"=MEDIAN(B7:B37)"**
 - B40: To calculate mode of your collected data, type **"=MODE(B7:B37)"**
 - B41: To calculate the minimum of your collected data, type **"=MIN(B7:B37)"**
 - B42: To calculate the maximum of your collected data, type **"=MAX(B7:B37)"**
 - B43: To calculate the range of your collected data, type **"=B42-B41"** (*max - min*)
8. **Copy and paste your calculations** to the remaining columns that contain headers.
 - a. Highlight the cells that contain your calculations (B38:B43)
 - b. Click-and-Drag the dot that appears in the bottom right corner of your highlighted range of cells to the right-- until it highlights the columns that will hold your data

38	Mean:	
39	Median:	
40	Mode:	
41	Min:	
42	Max:	
43	Range:	

9. Turn on **Cell Borders** for your data.

a. Highlight the cells that contain your data (A6:J43).



b. Click the Borders button in your button bar and select the "All Borders" option.

10. Fill in your Temperature data for each day in Column B and repeat this for all your other variables.

11. Label the tab at the bottom of the spreadsheet "January". You can then add additional spreadsheets to the workbook and title them "February", "March", "April", and "May".

	A	B	C	D	E	F	G	H	I	J
1	Student Name									
2	Block 2									
3	Weather Data									
4	January									
5										
6	Date	Temp (F)	Dewpoint (F)	Humid (%)	Press. (mb)	Precip. (in.)	Wind (mph)	Wind (direct.)	Cloud cov. (%)	Cloud type
7	1									
8	2									
9	3									
10	4									
11	5									
12	6									
13	7									
14	8									
15	9									
16	10									
17	11									
18	12									
19	13									
20	14									
21	15									
22	16									
23	17									
24	18									
25	19									
26	20									
27	21									
28	22									
29	23									
30	24									
31	25									
32	26									
33	27									
34	28									
35	29									
36	30									
37	31									
38	Mean:									
39	Median:									
40	Mode:									
41	Min.:									
42	Max.:									
43	Range:									

Chart your data:

1. To make a chart showing temperature changes over the course of the month:

- Highlight all of your data** in Columns A, B, & C for the “Date”, “Temp (F)”, and “Dewpoint (F)” headers).



- Click “insert” at the top of your spreadsheet and select “chart” or click on the chart button in the button bar. *This opens the Chart Editor window.*

c. Under the “Start” Tab

- Click the checkbox for “Use row 6 as headers”
This will identify the items that will be listed in your Legend.
- Click the checkbox for “Use column A as labels”.
This puts your days of the month on your horizontal axis.



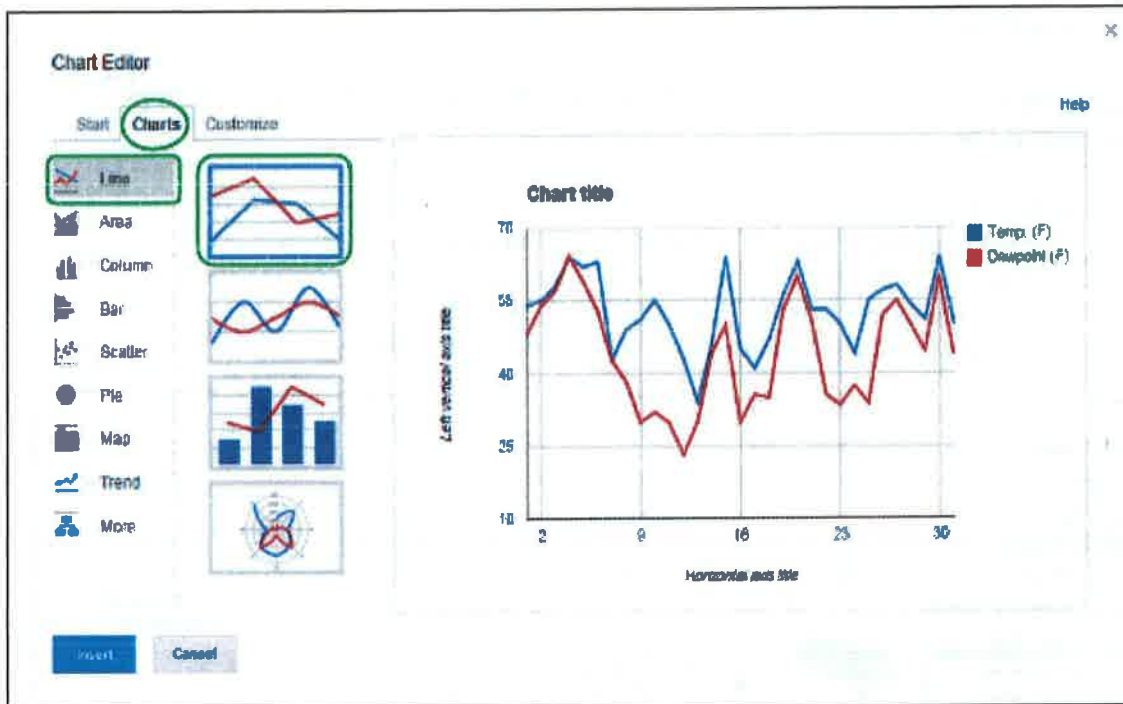
** If your data columns are not in consecutive columns (for example, Columns A and D) Follow these steps:

- Highlight all of your data in Column A
- Click “insert” at the top of your spreadsheet and select “chart” or click on the chart button in the button bar. *This opens the Chart Editor window.*
- Click “Select Ranges...”
- Click “Add Another Range”
- Highlight the data in the column you’d like to add and click OK

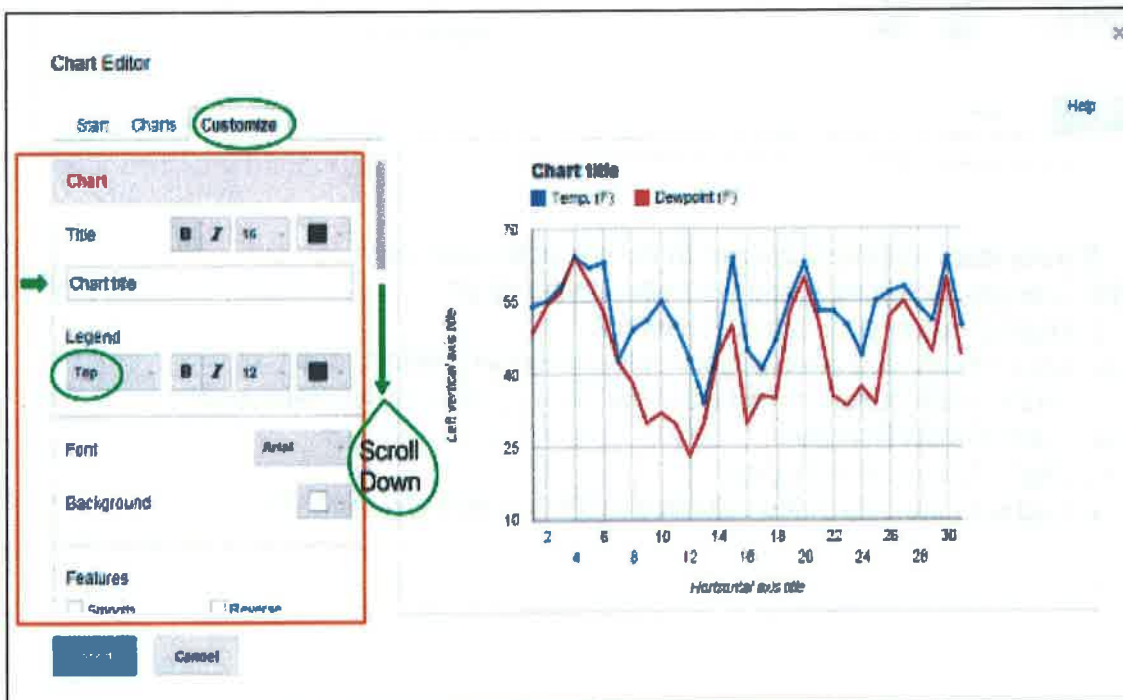


d. Under the “Charts” Tab

- i. Select "Line" in the list of charts on the left
- ii. Select the picture of the "Line Chart" beside it.



- e. Under the "Customize" Tab
(see expanded view of scrollable options in orange box on next page)



Make the following adjustments:

i. Chart

1. Chart Title = "January Temperature"
2. Legend = Top

ii. Axis

1. Horizontal axis title = "Date"
2. Left vertical axis title = "Degrees (F)"
3. Gridlines

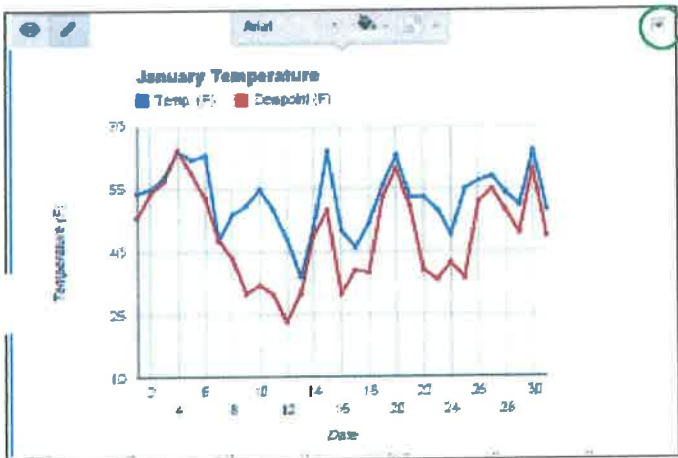
Major = 15 (Type 15 in the box to override)
 # of vertical lines in your chart. This will cause your x-axis to display every 2 days.

iii. Series

1. Point size = 2 for EACH series

Click the BLUE insert button in the bottom left corner to insert the chart into your spreadsheet.

* * * * *



Edit Chart after it's created:

1. Click on chart to select it
2. Click the drop down arrow in the top right corner of the chart
3. Choose "Advanced Edit..."

Move Chart to it's own Sheet:

4. Click on chart to select it
5. Click the drop down arrow in the top right corner of the chart
6. Choose "Move to Own Sheet..."

Create a final product to submit:

Combine your elements by copying and pasting them into a Google doc.

of

1. Create a new google doc and name it appropriately.
2. Type your heading in the top left
 - a. Your full name (First and Last)
 - b. Block #
 - c. Weather Data
 - d. Month (ex. "January")
3. Change your margins
 - a. >file >Page Setup...
 - b. set top, bottom, left, and right to .5 inches
4. Open your spreadsheet to your data collection tab and highlight your data (cells A6:J43)
5. Click the "Copy Chart" button in the top left in gray
6. Go to your google doc and paste the chart onto the page.