**Unit 2: Communicating Climate: The Science of Climate Change**

Graphing Exercise: Create graphs, make observations, and communicate results

Your instructor will provide you with a data set as a Microsoft Excel workbook, representing a climate variable measured over time. Your task is to create a graph in Excel that effectively presents relevant trends and variations in the climate parameter and then explain your graph to others. You will need to format your graph to properly communicate the scientific data by choosing appropriate axis ranges and titles, and providing a graph title. You will then evaluate your graph and communicate your findings in a blog or wiki, which will be shared with your class.

Assignment:

Part 1. Create a graph for your climate data set using Excel (or another graphing program, if you prefer), showing the climate variable (y-axis) changing through time (x-axis).

* + Using Excel, you should plot your data as a scatterplot with straight lines and markers. If you do not know how to create a graph in Excel, you should work with your classmates to learn it, or explore online for instructions or helpful videos.
  + After creating your graph, move it to a separate worksheet to make editing easier. (Right-click on the graph, select “move chart,” then click “new sheet”.)
  + Edit axis ranges to optimize data presentation:  
    *X-axis* (year) should have the “smallest” (oldest) data at the origin (left) and present day at the right, and show the full time range of the data.  
    *Y-axis* (climate variable) should be scaled between an appropriate minimum and maximum range, depending on the data set you are plotting.
  + Add a linear trend line to the graph.
  + Axes must have titles and units that identify the variable being plotted.
  + Add an appropriate, informative title for your graph. The graph title should explain the parameter being plotted. If only one variable is plotted, you can delete the legend.

Part 2. After graphing your data in Part 1, create a shared blog or wiki that presents your graph and describes the plot to a non-scientist. Upload your blog or wiki on your course management page as described by your instructor.

* What data are shown in your graph?
  1. To answer this question, explain what your data mean. For example, what is a “temperature anomaly?” Why is it useful to plot temperature anomaly, rather than actual temperature?
  2. What geographic area is represented by this dataset?
* Describe the long-term or short-term trends and variations that you observe in the data.
* What time scale is represented by your graph?
* Do you see evidence of climate change in your graph? Explain.
* What part of the Earth’s climate system is represented by your data?
* Be sure to include a citation for your graph and data (such as “graph plotted from data obtained from … “)
* Revisit your concept map from Unit 1. How could you change your concept map to reflect a deeper understanding of systems level thinking?

Part 3: Peer Analysis and Reflection. Once you have created your blog describing your graph, you should review your classmates' blogs that present graphs of other data sets. Compare their graphs with yours, noting similarities and differences in climate parameters plotted, time scales, trends, and patterns of variability. In a separate summary section on your blog/webpage, you should include the following information:

* List the different data sets graphed by your classmates.
* Are the time scales on the different graphs similar? If not, how are they different?
* What trends or patterns do you see in the other data? How are those similar or different from the trends you observe in your data?
* Thinking back to what you learned about Earth's climate system, do the similarities and differences you observed in the different data sets make sense? (*e.g.,* *Would you expect precipitation levels to increase as temperatures increase? Why or why not?*)