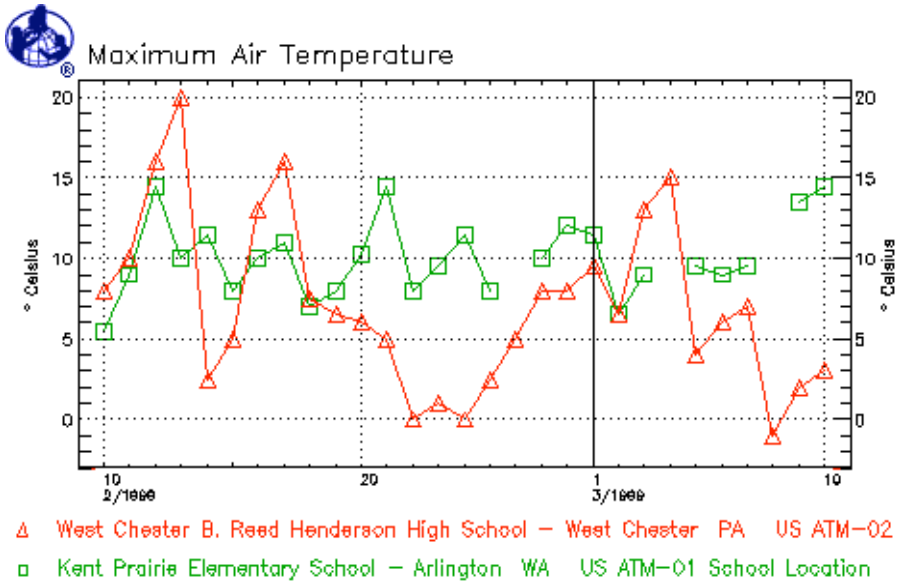
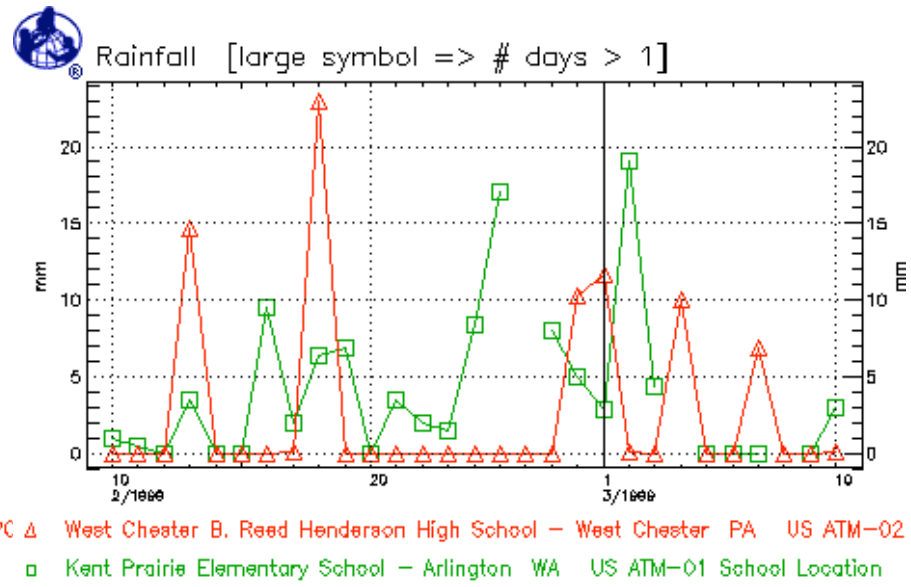
LAND COVER INVESTIGATION AREA
GLOBE SAMPLE STUDENT ASSESSMENT TOOL – HIGH SCHOOL

(Given data from the GLOBE data archives)
GLOBE Data for:
1) West Chester High School, West Chester, PA
2) Kent Prairie Elementary School, Arlington, WA

School	Latitude	Longitude	Elevation (m)
West Chester High School	39.9662 N	75.5977 W	338
Kent Prairie Elementary School	48.1832 N	-122.1198 W	157





(Present problem requiring use of GLOBE data archives)
West Chester High School and Kent Prairie Elementary are two GLOBE schools that have similar MUC codes. However, locations that have the same MUC may or may not have similar weather patterns. Recently, the two schools have decided to collaborate on a plant-growing science project and you and a small group of students have been asked to write the final report. The project involves finding which school has more favorable conditions for plant growth. Given air temperature and rainfall data from both schoo your job is to help determine which environmental factors are most important to plants growing at the two land cover sites.

1) **(Plan Investigations: Pose relevant questions)** Look at the GLOBE data above. Think of two questions you might ask regarding the data. A sample question might be "Is there anything unusual regarding air temperature between the two schools considering they have the same MUC code?"

   One question I would ask: do the peaks on the temperature graph match the peaks on the rainfall graph? Another question might be Do gradual increases in temperature, say over a few days, relate at all to the amount of rainfall?

2) **(Interpret GLOBE Data: Infer patterns, trends)** One of the students in your investigation group, Martha, suggested that finding trends in different sets of data is sometimes helpful for analysis. What trend do you see regarding the air temperature for West Chester High School? What trend do you see regarding the rainfall for West Chester?

   For West Chester High School it seems that the temperature moves up and down gradually – it gets hotter, slowly cools down, slowly gets hotter, etc. The rainfall for West Chester seems to jump back and forth pretty quickly – it seems to rain on single days, not two days in a row (except for one place.)

3) **(Take GLOBE Measurements: Use quality assurance procedures)** You have watched some of the students at your school collect GLOBE data and have been impressed by how thorough they are. As a check, are there any data that you suspect might be due to a measurement error? How can you tell? What would you tell these students to insure that this doesn't happen again?

   I think it is kinda hard to tell – I would say that if the temperature graph bounced up and down every day, making these wild jumps between hot and cold, I would look for some kind of measurement error.

   It seems like there are many places where measurement errors could occur – the students don't know how to use the equipment well, they take inaccurate readings form the equipment, they make a mistake writing the readings down, or they might make an error entering the data into the computer. I would say that you would just have to be very careful when taking measurements and recording the GLOBE data.

4) **(Analyze and Compare GLOBE Data: Identify data components)** Another student in your investigation group, Antonio, mentioned that finding trends between different variables can be a very useful part of analysis. What is the relationship between the two variables given? For example, if rainfall increases, what happens to the air temperature?

   The trend I see for West Chester High School is that when the temperature increases, there seems to be rainfall - it looks like the peaks on the two match each other. For Kent Prairie it looks like there is a similar matching of peaks between the two graphs, although it doesn't seem as clear cut as with West Chester High School.

5) **(Interpret GLOBE Data: Create multiple formats to represent data)** Using the maximum air temperature graph, break the graph into four 1-week groups. Make a table showing the range in temperature for each week at each school. Compare the range in temperatures between the two schools. How may this table you just created be helpful in finding which school has more favorable conditions for plant growth?

Max Air Temp	Week 1	Week 2	Week 3	Week 4
West Chester	17 °C	16 °C	10 °C	16 °C
Kent Prairie	8 °C	7 °C	4 °C	7 °C

I think it is interesting that West Chester High School has a much greater temperature range per week than Kent Prairie. I think it might be harder on plants to have a big swing in temperature in one week, especially if the temperature range goes from around freezing up to 20 °C in a single week (like during the first week for West Chester.)

6) **(Interpret GLOBE Data: Create multiple formats to represent data)** Using the rainfall graph, create a similar table to the one you made for question 5 but find the total amount of rainfall for each school for each week. Compare the amount of rainfall between the two schools. How may this table you just created be helpful in finding which school has more favorable conditions for plant growth?

Rainfall	Week 1	Week 2	Week 3	Week 4
West Chester	15 mm	23 mm	22 mm	17 mm
Kent Prairie	12 mm	29 mm	43 mm	27 mm

On average Kent Prairie has more rainfall per week. I think this would be better for plants because they get rained on more and it is not too much rain that it floods the plant out.

7) **(Analyze and Compare GLOBE Data: Identify data components)** When analyzing graphs there is a lot of information to be aware of. What does it mean if there is a break in one of the graphs? If you are looking at the maximum air temperature graph, what does the line between two data points mean? If you are looking at the rainfall graph, what does the line between two data points mean?

A break in one of the graphs means that a measurement was not taken or not recorded by a school for that day. The line between two data points on the maximum air temperature graph shows the temperature changing – a sharp change in temperature if the slope is steep and a gradual change in temperature if the slope is slight. If we are looking at the line between two data points on the rainfall graph, it really doesn't tell you anything. Since the each data point on the rainfall graph tells you the total amount of rainfall for that day, the line connecting the points doesn't tell you anything more. I guess you might be able to say that if the line between two points is steep it means that there is a big difference in the amount of rainfall between those two days – it seems that you could tell this anyway just by looking at how close together the two data points are.

8) **(Plan Investigations: Set up another problem)** Choose another school with the same or very similar MUC code from the GLOBE database and compare this school with the two schools above. What trends do you see from this new school? In other words, how is this school the same and/or different from the two schools given above? What other land cover variables might you look at to tell you more about the environmental factors at each school? Why did you choose these variables?

9) **(Communicate: Compose reports to explain or persuade)** Using the data analysis you have done, write a short report (1 – 2 pages) that summarizes your findings and explains which school site has more favorable conditions for plants. Keep in mind that not all plants require the same environmental conditions for growth. Be sure to support your conclusions with data you have analyzed and suggest other data that might be helpful for further study of the land cover sites.