ATMOSPHERE INVESTIGATION AREA
GLOBE SAMPLE STUDENT ASSESSMENT TOOL – HIGH SCHOOL

General Instructions to the Teacher:

This task took 11th and 12th grade students approximately two 45 minutes to complete.

Students may work individually, or in groups. If group work is the norm for your classroom, it is recommended that the final question be assigned as an activity for individual students.

Advanced Preparation and Set Up:

Each item in a GLOBE Classroom Assessment begins with an assessment framework statement / goal that cues the student and teacher to the critical features of the item. If this information is not useful to your students, remove the **bold parenthetical** statement at the beginning of each item. Several teachers found that the assessment strategy / goal reduced the number of "what-does-this-question-mean" questions from students.

The graphs on the opening page are information dense and colored markers / lines have been used differentiate high / low temperature. Check out the quality of any black and white reproduction before making copies for students.

Alternate graphs depicting data from your GLOBE site can be inserted and the storyline changed to fit local concerns. One teacher inserted student data and changed the "storyline" to center it around indoor vs. outdoor graduation ceremonies.
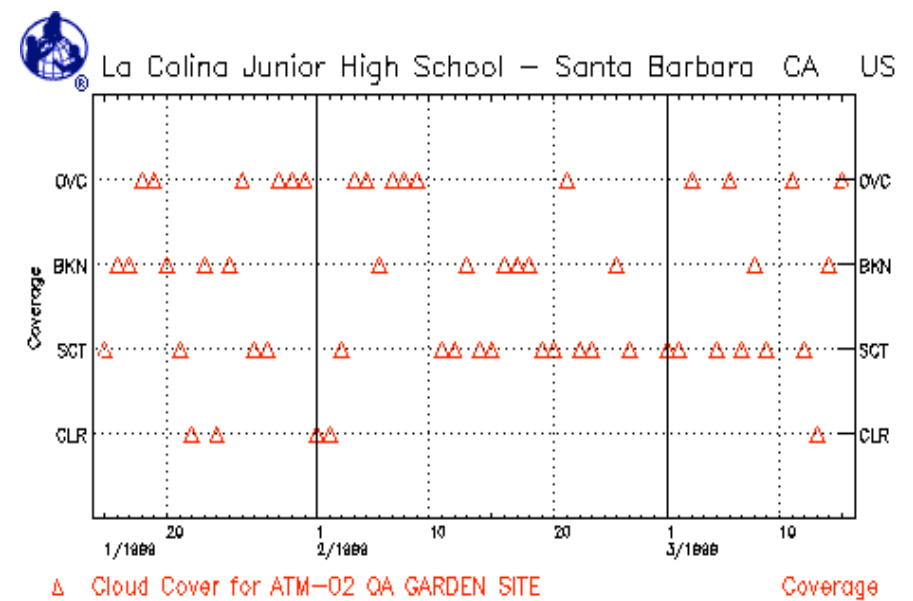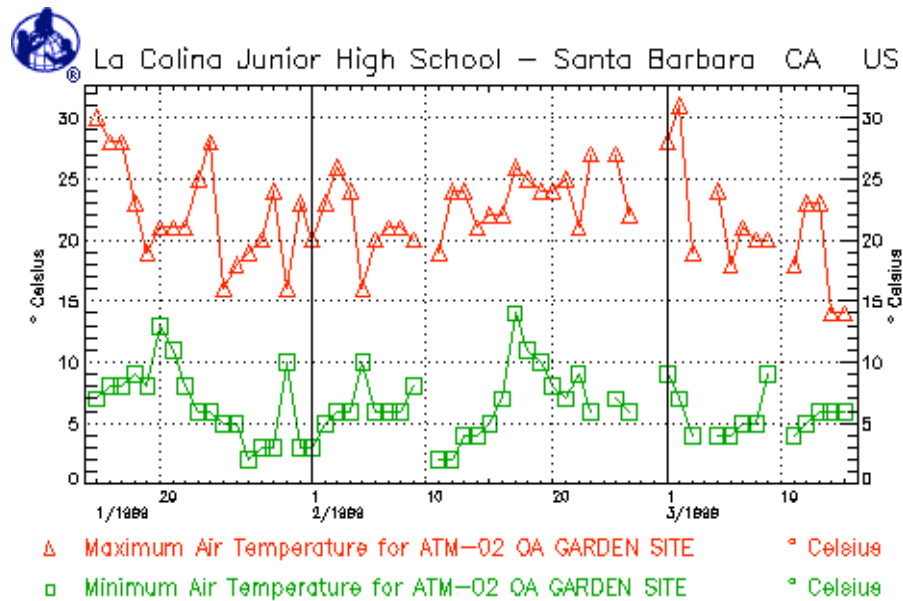
(Given data from the GLOBE data archives)
GLOBE Data for:
La Colina School, Santa Barbara, CA

School	Period of Data	Latitude	Longitude	Elevation (m)
La Colina School	1/15/99 – 3/15/9	34.4233 N	119.7033 W	0

(Present problem requiring use of GLOBE data archives)
You are a student at La Colina School located in the coastal town of Santa Barbara in Southern California. Your class is planning a beach par
and you are on the planning committee. Santa Barbara frequently experiences a great range in cloud cover due to its elevation and proximity t
the ocean. You have been asked to report to the committee your recommendations for when the party should be held. Given air temperature a
cloud coverage data collected at La Colina, your job is to determine what, if any, relationship there is between cloud cover and temperature at
your school and use this information to make a recommendation report to the committee that includes: a) the best time to hold the party and b
additional variables to study that would help you make a better decision.

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1) **(Plan Investigations: Pose relevant questions)** Look at the GLOBE data provided. Think of two observations that come to mind when you compare the GLOBE data from this site in Santa Barbara, CA and your GLOBE site. A sample observation might be, "The difference between the maximum and minimum air temps is much greater in Santa Barbara compared to (name of your area)."

these will vary depending on your location

2) **(Analyze and Compare GLOBE Data: Identify data components)** What does it mean if there is a steep slope between two data points on the temperature graph? What does it mean if the slope slowly increases over several data points?

A steep line on the temperature graph means that there is a big change in temperature between two days (or data points.) If the line slowly increases over several data points this is just showing a gradual increases in temperature. If there was a steep line upward and then a steep line downward over a three day period, this shows a big change in temperature over these days. If I were an atmospheric scientist I might be concerned that something strange is going on with the weather.

3) **(Take GLOBE Measurements: Use quality assurance procedures)** Are there any data in the graphs that you suspect might be due to a measurement error? How can you tell? What range of temperatures would you expect for this day?

It is difficult to tell if any data are in error because air temperatures vary a lot and it is not unusual for the temperature to be high one day and then lower the next day. So even though there is a step line between those two days it doesn't mean it's in error. I think the temperature measurements fall inside the expected temperature range.

4) **(Interpreting GLOBE data: Infer patterns & trends)** One of the students on the committee, John, says that air temperature and cloud cover are completely random – it can be hot and sunny one day and cold and overcast the next. Do you agree with John, or do you see a trend regarding air temperature? Do you see a trend regarding cloud coverage? Use data from the graphs to explain your answer?

The air temperature (both max and min) seem to follow some sort of up and down motion – it slowly goes from hot to cool and to hot again. The cloud coverage one is tough. In a way it follows a type of up and down wave but it is hard to tell.
OR
There is no real pattern to the cloud cover. The high temps seems to go up and down, up and down and so do the low temps but not on the same days as the high temps are also cycling.

5) **(Interpret GLOBE Data: Explain data & relationships)**
Another student on the committee, Emma, thinks it might be helpful to look at average temperature instead of daily temperatures. Since there are many data points, divide the graph into three-day periods and find the average for each three day period. Create a table that shows the *average* air temperature for the same time frame as shown on the graph.

3-day segment	Average temp (^{o}C)
d 1-3	$30 + 28 + 28 = 86 \quad 3 = 28.7\,^{o}$C
d 4-6	$23 + 19 + 21 = 63 \quad 3 = 21$
d 7-9	$21 + 21 + 25 = 67 \quad 3 = 22.3$
d 10-12	$28 + 16 + 18 = 62 \quad 3 = 20.7$
d 13-15	$19 + 20 + 24 = 63 \quad 3 = 21$
d 16-18	$16 + 23 + 20 = 59 \quad 3 = 19.7$
d 19-21	$23 + 26 + 24 = 73 \quad 3 = 24.3$
d 22-24	$16 + 20 + 21 = 57 \quad 3 = 19$
d 25-27	$21 + 20 + 19 = 60 \quad 3 = 20$
d 28-30	$24 + 24 + 21 = 69 \quad 3 = 23$
d 31-33	$22 + 22 + 26 = 70 \quad 3 = 23.3$
d 34-36	$25 + 24 + 24 = 73 \quad 3 = 24.3$
d 37-39	$25 + 21 + 27 = 73 \quad 3 = 24.3$
d 40-42	$27 + 22 + 28 = 77 \quad 3 = 25.7$
d 43-45	$31 + 19 + 24 = 74 \quad 3 = 24.7$
d 46-48	$18 + 21 + 20 = 59 \quad 3 = 19.7$
d 49-52	$20 + 18 + 23 = 61 \quad 3 = 20.3$
d 53-56	$23 + 14 + 14 = 51 \quad 3 = 17$

6) **(Interpret GLOBE Data: Create multiple formats to represent data)** Another committee member, Luis, thinks that the best way to look at the data is to look at the temperature range. Use the temperature graph to create a table that shows the *range* in temperature over time. As you did in the previous question, divide the graph into three-day periods and find the range for each segment. For example, the temperature range for the first 3 days is 28 to 30 C.

3-day segment	Range in temp (^{o}C)
d 1-3	28° -30° C.
d 4-6	$19 - 23^{o}$ C.
d 7-9	$21 - 25^{o}$ C.
d 10-12	$16 - 28^{o}$ C.
d 13-15	$19 - 24^{o}$ C.
d 16-18	$16 - 23^{o}$ C.
d 19-21	$23 - 26^{o}$ C.
d 22-24	$16 - 21^{o}$ C.
d 25-27	$19 - 21^{o}$ C.
d 28-30	$21 - 24^{o}$ C.
d 31-33	$22 - 26^{o}$ C.
d 34-36	$24 - 25^{o}$ C.
d 37-39	$21 - 27^{o}$ C.
d 40-42	$22 - 28^{o}$ C.
d 43-45	$19 - 31^{o}$ C.
d 46-48	$18 - 21^{o}$ C.
d 49-52	$18 - 23^{o}$ C.
d 53-56	$14 - 23^{o}$ C.

7) **(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 when you think the beach party should take place. Be sure to support your conclusions by using specific references to the data you analyzed. Suggest other data that might be helpful for further study if you must make this decision regarding the weather at this site.