

Narrative of a line graph activity in a Kansas ABE/PreGED classroom

Resource: EMPOWER's *Many Points Make a Point, Data and Graphs: Lesson 5—Sketch This*

This was the second day of a new session. New students would join returning students. I would be getting the “feel” of the group and would have to be flexible as I gauged which activities to select and the time given for whole group, pair, or solo work. ...On the first day we had done a variety of introductory activities to explore learning preferences. The majority of the new students had shown that they were multi-modal with a slight preference to read/write, but also were kinesthetic. So with the entire group I knew I would want to be multi-modal in presentation and in activities. I found that the EMPOWER lessons lent themselves to that very easily—times for visual display and reading, times of oral input and discussion, and time for a student’s own creating.



What was planned and why

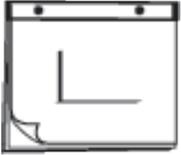
1. Students will sketch a line graph based on a narrative.
2. Students will draw a line graph on graph paper based on a narrative, labeling axes and following a scale along each axis.
3. Students will demonstrate an understanding of how the shape of a line provides information about what is happening over time.
4. Students will compose a short narrative to fit the shape of a given line graph using vocabulary that describes change.

All of these students are studying to prepare for the GED tests. Besides the math test that does include line graphs, the science and social studies tests also contain many kinds of graphs. I hope that students’ confidence and performance will increase with more practice working with any kind of graph. Many of my students are looking at careers in nursing or business. These areas rely heavily on organizing data and relating information. Being able to write a good narrative of an event over the passage of time is a necessary skill. Making a simple sketch of the event that follows the flow can assist in this writing. Building a good descriptive vocabulary facilitates accurate communication.

The CASAS math standards (used in Kansas) look for students to extract information from line graphs, to make generalizations about data, to create graphs, and to identify trends. The objectives of this lesson do tie to those CASAS standards.

The class begins...

I explained to learners that this class period on Wednesdays is devoted to working with graphs, charts, and tables in mathematics, social studies, and science. The GED testing, particularly in math, science, and social studies presents many questions using data and this class time on Wednesdays will give us opportunities to examine and create graphs and tables, becoming comfortable with these formats. This day's focus would be line graphs. I read page 63 from the Students' Text (StT.) to the group.



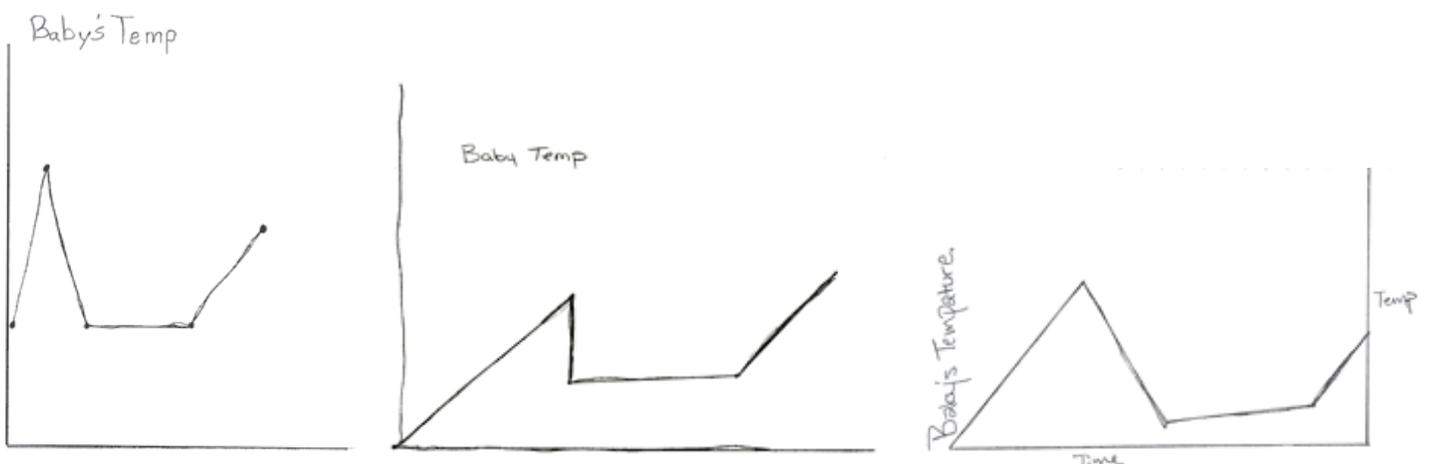
I asked the students to take a piece of paper and using a ruler, draw a large "L" on that paper and explained that this would be the start of a graph. I demonstrated on the board.

Next, I asked them to listen to a short story and imagine the flow of the happenings. I read "Giselle's Baby," Teachers' text (TT.) p.72. I read it again and we then listed the significant happenings on the board. I asked them to draw a sketch within that "L" to illustrate the story's events.

They proceeded to do that and then tried to insert gridlines, scales, etc. on that paper. I asked them to stop and told them we would get to the specifics of the graph but for now just to draw the general flow of the story. Each started again on another sheet of paper to illustrate the narration.

Since I had a small group I asked if each were willing to draw her sketch (yes, 6 women) on the board. All six agreed. They drew them at the same time. One young woman, after looking at the other sketches, declared hers to be stupid. I told her that there were no right or wrong answers with this; each one had a correct piece of the story. I retold the events of Giselle's Baby three more times while tracing the lines of the graphs.

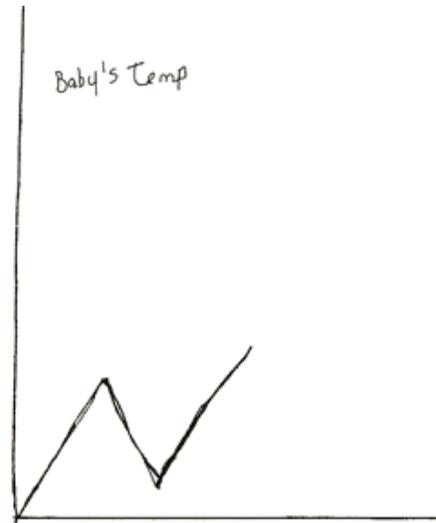
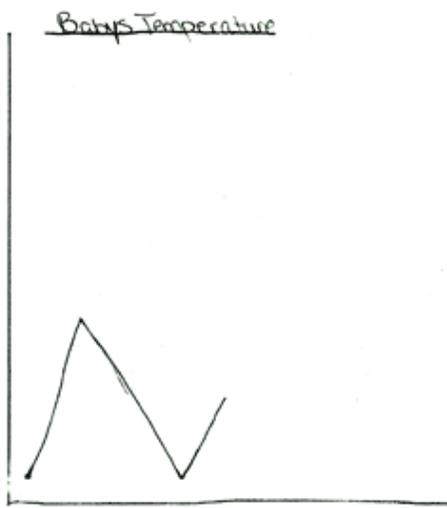
Three sketches were quite similar to each other:



Giselle's Baby

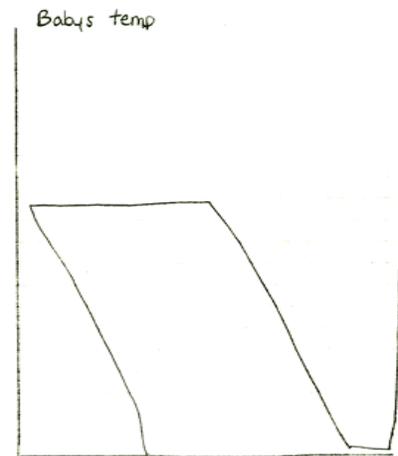
Giselle's baby's temperature rose sharply between 6:00 p.m. and midnight; Giselle gave her baby aspirin, and the baby's temperature dropped rapidly and stayed close to normal for most of the next day. At 6:00 p.m., however, it began to rise again, and Giselle was worried.

another two were similar...



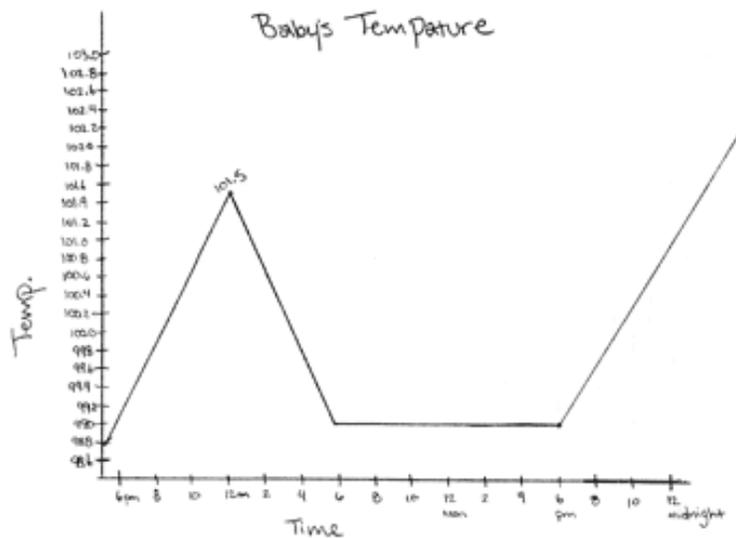
...and one stood alone.

On the last one we could see that "time had gone backwards" and how the line needed to flow left to right to indicate the passage of time.



Next the women took a sheet of graph paper to draw a more precise line graph of the "Giselle's Baby" narrative. We discussed where one might want to start the temp scale and how one might want to count up that scale. We also talked about different ways to label the time axis.

The women completed their graph using the scales they chose and the fever temps they chose. They did label the axes and give the graph a title, as seen here:

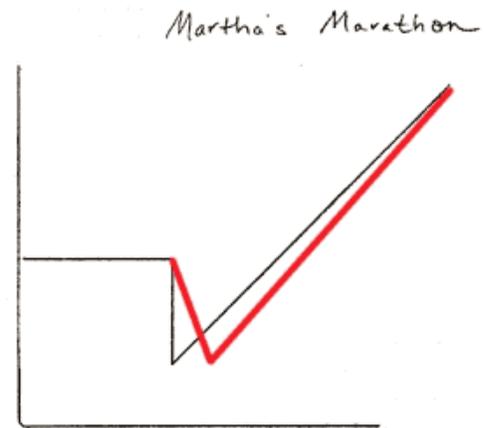


Martha's Marathon

Martha ran a marathon. In the first hour and a half, she ran at a steady pace. Then she slowed down for the next hour, saving her energy for a push in the last half hour when she ran faster than at any other time.

We tried this sketching activity again using the narrative "Martha's Marathon" (TT. p.72). Each woman agreed to draw her sketch on the board. We retold the story while looking at the sketches.

All were quite comparable except that one drew a vertical line to show a decrease. We discussed how a slanted line was probably more accurate since the change happened over time, not in a split second. We also talked about whether the story might start at the corner of the axes since a runner would be begin at 0 speed and 0 time.



Finally I gave each person a copy of StT. p. 69. I asked them to choose one of the graphs and compose a story to go along with the graph sketched. Someone remarked that they were now doing English in math class!

Each went right to the task and wrote. Each chose a different context and attempted to use descriptive words to fit the sketch. Students had varying degrees of success with this task. One student used the context of a monthly paycheck. She was able to label the axes of the sketched graph (money and months) and used descriptive words such as "higher", "decreasing", "rapidly increased" and, "another decrease" as well as sequence words such as "after" and "then". Other students created other interesting stories such as the number of customers decreasing and increasing, depending on the day of the week and the availability of strawberries in a store during certain times of the year.

Earlier that morning some of the students had played Scrabble in Language Arts class. They remarked that they had done math in language class as they added up their scores. So, as we proceeded with the math lesson, someone noted that we were doing writing in math class. That tied to a previous day's discussion about math as a language and all the means and symbols we use to communicate in a mathematical way. I hope that they are beginning to see math as a language and that it uses regular communication skills.

The Teacher's Reflection

I believe the lesson was successful in that it was fun, instructive, and engaging. The activities were non-threatening, but informative. Students brought a knowledge of reading line graphs. They also brought knowledge of childcare when it came to numbers for a child's normal temperature and for a fever. One student had run cross-country when in high school. She related to the "Martha's Marathon" narrative.

The initial sketching activities gave students a feel of a line graph without worrying about the precision yet. Also, their sketches improved as the students had more experience. The sketching activity was valuable in that it related an event or information changing over time.

In doing this lesson, students saw that mathematics is not always about being precise. Sometimes a simple sketch is all that is needed to communicate information. My experience with line graphs had been with precise plotting of points. Using a flowing sketch was a stretch for me. I can see its value in helping to identify the flow of activity over time. It helped to consider the vocabulary needed for describing the activity shown in a graph. Since my tendency is toward the math rather than language, it was a good experience for me to have to combine math and communication skills.