

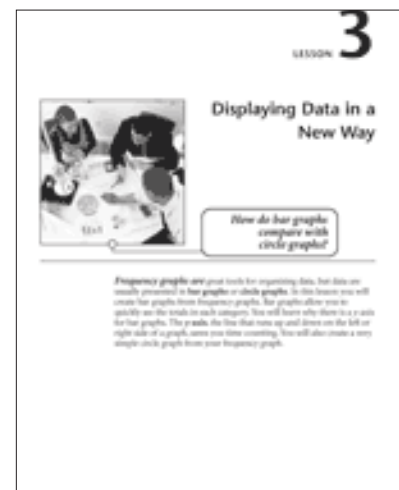
Narrative of two lessons on organizing, labeling, and analyzing data in a Rhode Island ABE/PreGED classroom

Resource: EMPower's *Many Points Make a Point, Data and Graphs: Lesson 2—Most of Us Eat, and Lesson 3—Displaying Data in a New Way*

This year, for this ABE-GED class that was targeted for participating in the research, there have been 2 significant limiting conditions: (1) Open/rolling enrollment and (2) a difference in the immediate goals of the students.

(1) Open entry: This factor has been a significant deterrent in general to building skills, meeting student needs in a coherent fashion, and, especially, conducting research in an organized and statistically significant fashion. The initial group of 9 students (out of 15 enrolled in the class but not there the day we discussed and signed agreements) who signed the contract to permit their work to be used did not all continue to attend regularly throughout the semester. Therefore, after engaging in initial activities (from the first lesson, Countries in Our Closets), we waited to follow up with the same group on next steps. It just did not happen. The attendance factor prohibited it. That said, subsequent Lessons 2 and 3, which were done with some of the same students plus others present those days, worked well.

(2) Differing immediate goals: Some of the students in the ABE-GED class were focused on passing the GED Exam in short order; they did not tolerate well deviating from what they perceived as activities directly connected to passing the tests. "Too easy...I can do this stuff already." Others knew that the exam was a long-term goal and were more likely to be willing to engage in activities that would build skills for the long run.



What was planned and why

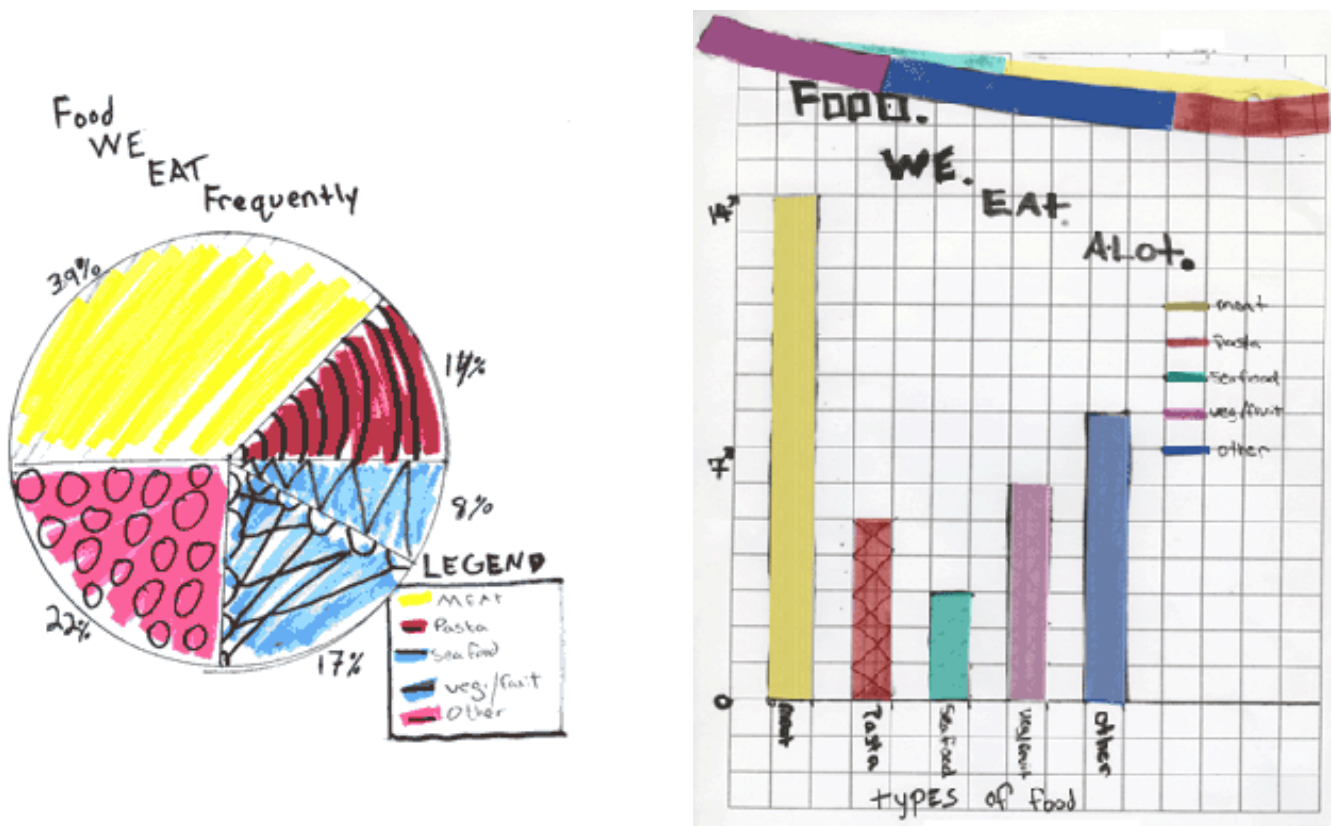
Students will:

1. Respond to a survey question
2. Examine the results of the survey and decide how to organize the responses: N various ways to organize the data, decide on best labels for categories, and sort the data
3. Display data in 3 ways: a frequency graph, a bar graph, and a circle graph
4. Analyze the conclusions that can be drawn from each of the graphs the language of fractions and percents. They will compare what is communicated, or not communicated (hidden) by each type of graph, as well as discuss what the results mean in terms of significance: Who cares? How accurate are the conclusions beyond the sample group?

Lesson 2

We started by listing some vocabulary on the board and going over each term and then introduced the survey question "What Foods Do You Frequently Eat?" (write down 4 foods that you eat frequently on 4 stickies). This gave us 36 pieces of data (both teachers participated in the survey as well.) All stickies were scattered on table.

"How do we make sense of all this data?" Lots of discussion followed about how to arrange and label the results. We had to make some decisions and discussed the pros and cons of our choices, readjusting where we put the data a few times. Making a frequency graph with the stickies on the rectangular table was easy. Speaking about the sizes of the categories in terms of more than, less than, each other and as parts of the whole ensued. Students made some conclusions about what the sizes of categories meant about us as "eaters" and about whether this was a sample that "meant anything" beyond our particular group. If so, who would be interested and why.



We then used pages in the student workbook addressing the contents of a category and labeling them, and who to ask for a sample survey and why. Reflecting after the lesson, we (teachers) agreed that several of the 7 students in the first session could definitely benefit by more critical thinking exercises regarding category creations and sorting what things do and do not belong in a category.

During a break, we (teachers) had the brainstorm to invite students to transfer the stickies and their labels to a circular table in the room. As luck would have it, the 36 stickies were easily

space-able around the circumference of that particular table. Again, as luck would have it, we had colored popsicle sticks to provide the radii separating the categories. After students returned to the classroom, they formed pairs and did the arranging, spacing, and labeling of the data. It was a simple and satisfying transformation. Several students were surprised and “impressed.”



We made more observations about the data in this arrangement. We formed fractions, for example, to answer the question: What part of 36 did each category contain? Another serendipitous factor: since we had 36 pieces of data we could relate 36 to the 360 degrees in the circumference of the circle and, if time warranted, could have challenged some of the high achievers to use protractors to create circle graphs by turning fractions of category data into degrees, $1/36$ being 10 degrees, etc.

At this point our time was up. The table with the stickies-circle graph stayed intact for two weeks. During that time, the display generated a lot of curiosity and conversation by others (students and staff) in the learning center. What's that? How did you make it? Why? etc.

Lesson 3

Two weeks later, we segued into Lesson 3 using the same data. We began the second session with a front page article along with bar graph that graced that day's USA Today. We analyzed what we could and could not learn – main idea and details – from the graph. We identified questions we had that were not answered by the graph, but could be found in the accompanying article. We created bar graphs and then transformed them into circle graphs. It was fun and satisfying. Students worked easily side by side, observing, and learning from, each other's production of graphs. Probably more critical thinking (about graph components, design, sample sizes, 'truth in presentation and labeling', etc.) was engendered at that time due to the “relaxing” atmosphere.

The Teacher's Reflection

In Lessons 2 and 3, done over two different sessions (two weeks apart due to scheduling limitations), everyone participated enthusiastically, though not with the same understanding as the previous lesson. The hands-on nature of the activities engaged everyone. It was easy for students to have "something to contribute" to discussion as the questions were open-ended and "answers" were debatable – everything from coming to decisions on how to name categories, to acceptable ways to compare sizes: i.e., the amount of data in these two categories is about the same as the amount of data in this one category; they are both more than 25% but less than...

As far as representing the frequency graph made with stickies to using labels, lines, and X's on graph paper, some students needed a lot of guidance (from other students) as to how to label and represent the data. Others did it by themselves and went further by adding keys and could easily write down fractions that described and compared categories. They had obviously had past experiences with graphing.

LESSON 3: Displaying Data in a New Way
List what you know about bar graphs and circle graphs.

they give you a precise
look at the info gathered
by the surveyors weather in
bar graph or presents

What do you still wonder about?

why they have to be so
Darn complicating at times.