

# Narrative of a frequency graph activity in a Louisiana ESL ABE/GED classroom

**Resource:** EMPOWER's *Many Points Make a Point, Data and Graphs: Lesson 1—Countries in Our Closets*

The Literacy Council has open enrollment and attendance in the GED classes vary on a daily basis. Slight modifications to existing lessons and the addition of review sections were necessary to help introduce the lesson to students that missed the first day of the two-day lesson. The modifications were also beneficial to learners with disabilities and those with suspected disabilities because it allowed them a review of the previous class information.

I made sure to read all information for the activities aloud to accommodate the lower reading levels of some of the participating learners. During partner or small group instruction, I tried to assure that all the groups were mixed with various levels, i.e., low, middle, and high reading/math levels.



It was also necessary to adjust our normal math routine to accommodate the TIAN math lesson. A typical math day consisted of journaling, computer work, individual work, and then a forty-five minute whole group lesson. The class routine for this lesson consisted of one-hour of individual work or computer work and two-hours of whole group instruction. An interactive small group activity was added to help provide the learners with additional practice on putting items in categories, creating frequency graphs, and making statements about data.

## What was planned and why

At the end of the lesson, the learner will be able to:

1. Use frequency graphs to organize data
2. Identify the story that the data tells
3. Compare data from various samples
4. Change the categories and articulate the change in the story

According to information from the publication *A Framework for Adult Numeracy Standards: The Mathematical Skills and Abilities Adults Need To Be Equipped for the Future*, being able to read charts and graphs, interpret the data, and make decisions based on the information are mathematical skills adults need to acquire to be an informed citizen and successful in the workplace. Graphs are useful tools in that they organize data so that information becomes clearer. This organized information can then be used to draw conclusions and make decisions.

Adult learners encounter graphs everyday in newspapers, magazines, and on television that are used to express different types of information. To make informed decisions adults need to be able to understand the information presented to them.

The objectives of this lesson address many of the data analysis and graphing skills adults need today. The objectives focus on teaching adults how to create graphs, organize data, manipulate data, and identify the story a graph tells by making data statements about presented data.

The lesson objectives also reflect our state standards and benchmarks. Louisiana benchmark two, data analysis, states that adult learners will apply data collection, data analyzing, and probability to interpret and/or solve real-life problems. The lesson objectives specifically covered Louisiana State Department of Education benchmarks 2.1, 2.2, 2.3, and 2.4.

## Tuesday

The lesson started at 10 am with five adult learners present. We began with an opening discussion where the following questions were asked 1) Are clothes made in this city? 2) In this country? 3) Why or why not? 4) Why would anyone care where his or her clothes were made? One student stated that clothes were made in the United States, three stated that clothes were made in other countries, i.e., Mexico, and one student was unsure.



Those that selected other countries reasoned that it was cheaper to make clothes overseas than here in the United States. The learner who stated the majority of our clothes were made in the United States did so because he remembered growing up in Louisiana cities that had clothing manufacturing plants.

We then proceeded to do Activity 1, *Organizing the Data*. I brought in extra clothes to help us get a good data set. The learners looked at their clothes and the extra clothes and wrote the name of each country on a separate post-it that was then placed on the board. Once we had completed the frequency graph on the board all learners received graph paper so that they could make themselves a copy of the graph. I explained to the class the various components of the frequency graphs as we graphed the data.

Once we had the completed graph, the following terms were introduced to the class; data set, mode, sample, and population. We defined the terms and then discussed how they related to our frequency graphs. Armed with our new vocabulary, we discussed our frequency graphs answering questions such as, 1) From which country did most of our clothes come from? 2) From which country did the least amount of our clothes come from? 3) What is the mode of our data?

I explained Activity 2, *Statements About Data* to the learners. In this activity, a frequency graph of data from a Springfield, MA classroom is displayed and learners are asked to read the graph and finish statements about it. We discussed making statements to describe the data displayed in the frequency graphs. The learners were given 10 minutes (working in groups, if necessary) to complete this activity. As a group we went over the answers and discussed why the answers they selected were correct or incorrect.

Using our new knowledge about making statements regarding displayed data, we compared our class data to the data examples given in the activity. Everyone was asked to make a statement

about the data. Learner statements included various obvious statements such as which countries had the most or least amount of clothes to more complex statements such as Springfield had six times more clothes made in the United States than we did.

Activity 3, *Changing the Categories* began with the learners trying to list the seven continents and then, as a group, defining what a continent was and locating where the continents were located on a map. The previous post-it notes were removed from the board. Seven card-stock printouts with the seven continents were placed on the board. We then worked as a group, using the internet (if necessary) to place the items in the correct category. The ESL students were a big help because they had a better understanding of geography and maps and were able to help the ABE students.



All students graphed the new information on graph paper at their desk. The group discussed how our statements about the data had changed and everyone stated one statement aloud about the newly displayed data.

## Wednesday

The lesson started at 10 am with seven adult learners present for the lesson. The lesson began with a review of frequency graphs, key terms, and data statements. On the board, I had the data displayed for "Countries in Our Closets" Springfield, MA and "Continents in Our Closets" Springfield, MA. The learners were asked to make four statements about the Springfield data. An example was provided to the students to help guide them. Each student then read one of their statements aloud. As a group we discussed how the statements were correct or incorrect and how we could modify an incorrect statement to make it into a true statement about the displayed data.

For additional practice, I created an exercise that would provide the learners more hands-on time in the creation of frequency graphs. For the activity, the learners were placed in three groups. Each group was given a stack of cards with information such as "Twenty-eight year old Mormon white female with a bird". The learners were then asked to create four frequency graphs from five possible choices (religion, sex, race, pets, and age) and then graph them on graph paper. Learners were instructed to lay the frequency graphs out on the table to help them construct the graph on the graph paper. After completing the graph, each student was then asked to write one statement about their frequency graph.

I also created a supplemental exercise for the practice Reporting Data 1. The learners worked in pairs to complete questions 1-3. The supplement for the lesson resulted in a slight modification to questions 4 and 5. We looked at question four as a group. A small portion of the class felt that the data would be the same in any city in the U.S. while some felt the data would be different. Their reasoning was that different cities would have different numbers of races. To help them come to a final decision for problem 5, I gave everyone a different city with 20 patients listed by race that I created. They were told to create a frequency graph with the data on graph paper. As a group we reviewed all of the cities. We first predicted what race would have the highest amount of HIV/

AIDS cases in that city and then the learner shared their results as determined by their frequency graph. We discussed how data collected from one small area cannot adequately predict the data in another area. We looked back at our class data and the Springfield data for further clarification of how data is not representative of all groups.

## **The Teacher's Reflection**

After looking at the lesson I determined it would be easy to make adjustments for varied math levels because the students were not required to calculate anything. I was even prepared to deal with the small language difficulties that might arise from having ESL learners in the ABE classroom. I saw the various reading levels of the learners as the biggest challenge in teaching this lesson to adult learners. It looked like the lesson was going to require a lot of reading and typically, half the learners in the math class are reading below a sixth grade level.

Students learned to take basic information, organize it into categories, and then tell a story about the data. They learned how to create and read frequency graphs. Learners made predictions and then worked to see if their predictions were valid. The lesson taught learners how to compare data within the same data set and compare data from different data sets.

Understanding how to organize data and create frequency graphs was by far the class' strongest emerging skill. Everyone could also make basic statements about a graph and could articulate changes in data caused by reorganizing categories (without numbers). Everyone could benefit from more practice making more complex statements about the graph. Some learners struggled to reorganize data into categories when numbers were used. The learners really struggle with being able to compare data across different data sets.

I was amazed at how much everyone contributed and how well everyone worked together. All learners participated in creating the frequency graphs on the board, at their table, and on graph paper. When asked a question, all learners responded and some were more eager than others to contribute information to the group. All of the learners shared their work and worked successfully in small groups and pairs despite the different levels, language barriers, and personality differences.

The activities worked well. The hands-on interactive activities were a hit with the learners. The length of the lessons was an issue. In an adult education facility with varying daily attendance, lessons should be one hour in length. If it is necessary to extend the lesson over multiple days then basic review material should be provided for use in the classroom. I was able to modify my lesson times to complete the lessons, but many of the people in my region did not have that luxury because they met with their adult learners as a group once a week. If I change anything it would be the length of the lesson. I feel that I should have been better prepared for the first day of the lesson. I wish I had an atlas and a globe in the classroom to help us locate the countries and continents.

I am learning that slight adjustments to lessons can make a lesson suitable for low, middle, and high learners. I have also learned that small group work and paired activities are sometimes more effective in teaching a concept than whole group. Low level learners are able to learn concepts from their peers and higher level adults are able to teach or reinforce basic concepts to the learners in their group. Most importantly, this lesson illustrated how when teaching math we sometimes unknowingly bring in economics, geography and writing skills that can either be addressed in the math class as an extension activity or doing reading/language class.