Let's Compare

Students collect numerical data, generate graphs, and compare two data sets. They also find the mean, mode, median, and range of the data sets. Students communicate with each other and the teacher and practice their problem-solving skills.

NGSSS

MA.6.S.6.1 – Determine measures of central tendency.
MA.6.S.6.2 – Select and analyze measures of central tendancy.

Learning Objectives

Students will:

- collect data and display it in line plot and circle graph (pie chart) form
- compare two sets of data
- find the mean, mode, median, and range of the data sets

Materials

Crayons
Index Cards
Looseleaf Paper
Calculators (optional)
Class Notes Recording Sheet
Line Plot Format

Instructional Plan

Pre-Instruction

Before the lesson begins, ask another teacher to have his or her students write their first names on index cards so your students can use the data to make graphs. If the other teacher wishes, arrange for a time for your class to share the graphs and statistics with that teacher's class.

Lesson

To begin the lesson, ask your students to write their first names on index cards. Then help them to collect the cards, sort them by the number of letters in the name, and make a line plot with the actual cards. Ask a volunteer to draw the line plot on the board using Xs. Then ask the class what the line plot should be labeled [for example, "The Length of Our First Names"]. Call on a volunteer to tell what the mode is. Call on other volunteers to name the range and to find the

median and the mean. Ask them which "average" best describes the data—the mean, the median, or the mode.

Now tell the class they will use the data from the other class to make another line plot. Distribute the cards to the students and have each student count the number of letters in the names on the index card(s) he or she has been given. After the students have done so, draw a line on the board for the model line plot, and distribute copies of the Line Plot Format to the students.

Call on each student in turn to tell how many letters is on his or her card(s). As each number is called, place an X in the correct place on the line plot. Encourage your students to simultaneously complete their individual line plots. Now ask the students to find the range and mode of the data. Then ask them to determine the mean. Ask the students to report the statistics that they calculated.

Now display the line plot from your class and the line plot from the other class, side by side. Ask them to compare the line plots in as many ways as they can. Call on volunteers to describe any similarities and differences they see. [If they do not mention the range, mean, median, and mode, prompt these responses.]

Next, ask the students to go to their computers, or use the projection feature from your own computer (depending on the setup of your room.)

Go to the National Library of Virtual Manipulative's Pie Chart. Call on a volunteer to enter the data for the class name lengths, and another to sketch the pie chart on the board. Then print the electronic chart. Repeat the procedure for the data from the other class. Now ask students to compare the two pie charts and then to compare the pie charts with the line plots.

It would also be appropriate to tell students that another name for a pie chart is a circle graph, so they are familiar with the mathematical terminology.

Conclusion of Lesson

To conclude the lesson, ask the students to write in their math journals or on a piece of paper two similarities and two differences they found between the data from the two classes. Encourage them to share their findings with the others in the class. Then collect the papers for the students' unit portfolios. (If the teacher of the other class requested that the data be shared, discuss a time when the class can show the graphs and describe what they found with that class.)

Questions for Students

What length of name was most common in our class? In the other class?
[Answers will depend upon the data collected in class.]

How many different lengths of names were in the other classroom? How did we use this information to help us make a line plot?

[Answers will depend upon the data collected in class.]

What were the range and mode of the data set from the other class?

[Answers will depend upon the data collected in class.]

Suppose a new student named Becky came into the other class. How would that change the graphs that we made? Repeat with other scenarios.

[Answers will depend upon the data collected in class. The line plot would have one more X above the 5. The sector of the pie chart for 5 letters would be larger.]

Suppose a student in that class named Philip moved away. How would that change the graphs we made? Repeat with other scenarios.

[Answers will depend upon the data collected in class. The line plot would have one less X above the 6. The sector of the pie chart for 6 letters would be smaller.]

How many students in the other class had names 10 letters long? Was that the longest name? How can you tell that from looking at the line plot?

[Answers will depend upon the data collected in class. The longest name would have the most X's.]

What is the mode of our data set? The range? How did our mode and range of our name lengths compare with the mode and range of the other class's name lengths? Repeat with mean and median.

[Answers will depend upon the data collected in class.]

What differences did you see between the pie charts? What similarities?

[Answers will depend upon the data collected in class.]

Assessment Options

1. At this stage of the unit, it is important to know whether students can do the following:
    - Collect and display data in line plot and pie chart form
    - Compare two sets of data
    - Find the mean, mode, median, and range of data sets
2. The guiding questions will help both you and the students focus on their current level of understanding. As you add more documentation to the Class Notes recording sheet, you may wish to make special note of their facility with the vocabulary used.
3. Ask students, "Have you made the entries for today in your food diary chart?"

Extensions

1. Students can make bar graphs and other appropriate types of graphs with the data collected in class.
2. Students may also wish to use the NCTM Circle Grapher to create their circle graphs (pie charts). They can compare both graphs created.

Teacher Reflection

- Did the lesson address visual and kinesthetic learners? Did all students have the opportunity to participate in the lesson?
- Were students able to use the line plots to identify the range, median, and mode for the set of data? If not, what steps did you take to guide the students?
- What similarities and differences did students note between the line plot and the circle graph for the same set of data?
- What parts of the lesson went smoothly? What parts should be modified for the future?

NCTM Standards and Expectation

Data Analysis & Probability 3-5

1. Collect data using observations, surveys, and experiments.
2. Represent data using tables and graphs such as line plots, bar graphs, and line graphs.

Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed.