The Eyes Have It

Unit 1: Dealing With Data

Grade Level

Grade 7

Overview

In this task, students will analyze and draw conclusions about data using box-and-whisker plots. Students will collect data to determine how long they can go without blinking their eyes.

*Note: A lesson on creating box-and-whisker plots should precede this task.*

Key Standards

**M7D1. Students will pose questions, collect data, represent and analyze the data, and interpret results.**

b. Construct frequency distributions.

c. Analyze data using measures of central tendency (mean, median, and mode), including recognition of outliers.

d. Analyze data with respect to measures of variation (range, quartiles, interquartile range).

e. Compare measures of central tendency and variation from samples to those from a census. Observe that sample statistics are more likely to approximate the population parameters as sample size increases.

f. Analyze data using appropriate graphs, including pictographs, histograms, bar graphs, line graphs, circle graphs, and line plots introduced earlier, and using box-and-whisker plots and scatter plots.

g. Analyze and draw conclusions about data, including a description of the relationship between two variables

Possible Materials

- The “eyes” have it! handout
- stop watches
- rulers
- paper
- pencils

Task

I. Estimate how long you think that you can go without blinking your eyes. Write down your estimate and share it with your partner.
II. With your partner and using a stop watch, collect data from five experiments to determine how long you can actually go without blinking your eyes.

III. Find the mean of the experimental data.

IV. Collect the estimates and the means of the experiments from exactly 9 other classmates. Use a method of organizing your data. (This gives 10 pieces of data for estimates and 10 pieces of data for means of the experiments.)

V. Find the median of the estimates and the median of the means of the experiment.
1. About what percent of the values in a data set are below the median? Why?
2. About what percent of the values in a data set are above the median? Why?

VI. Find the Upper and Lower Quartiles for the data set. Explain why they are called the upper and lower quartiles and how you found them.
1. About what percent of the values in a data distribution are in each quartile?
2. About what percent of the values fall above the lower quartile?
3. About what percent of the values fall below the upper quartile?
4. Were there any outliers? Justify your answer.
5. Why is it useful to know the outliers of a set of data?
6. If there were any outliers, how did they affect the means, medians, modes, and ranges of the data sets?

VII. Using the collected data, make a double Box-and-Whisker plot that shows the comparison of the estimates and the means of the experiments:
1. Explain the procedures for making a box-and-whisker plot.
2. How do the numbers on a box-and-whisker plot summarize the data and separate the data into standard percent groupings?
3. What are some of the disadvantages of using a box-and-whisker plot?
4. Describe the comparisons of the two Box-and-Whisker plots. Tell what this means.

VIII. Collect all of the class data. Using this data and a graphing calculator, make triple Box-and-Whisker plots that compares the estimates, the actual experiment data, and the means of your individual classmates.
1. How did using the entire data from the class vary from using the data of only ten classmates? Explain why you think this happened.
2. Name at least three situations in which a box-and-whisker plot would be useful. Explain why you named these situations.

Additional Notes

Students practiced constructing box-and-whisker plots prior to completing the task.
Assessment Ideas

Students can collect other interesting data from their lives and create box and whisker plots of that data. Then, explain and analyze their findings.