

Inquiry Based Lesson #1
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Lesson Plan

Lesson Title: Evaluating Statistical Graphs

Lesson summary: Students will enter given data in spreadsheet application, generate various graphs, and discuss what questions each graph would answer and which graph would best represent the data for each question. Students will orally present arguments to the class supporting their choices.

Key words: Box and whisker plot, histogram, circle graph, stem and leaf plot, line graph, spreadsheets

Background Knowledge: Students should understand the differences between qualitative and quantitative data. Students should also understand how to use basic spreadsheet functions.

NCTM Standards addressed: Data Analysis and Probability, Grades 6-8: Select, create, and use appropriate graphical representations of data including histograms, box plots, and scatterplots. Discuss and understand the correspondence between data sets and their representations, especially histograms, stem and leaf plots, and scatterplots. Data Analysis and Probability, Grades Pre-K to 12: Communicate mathematical thinking coherently and clearly to peers, teachers, and others. Use language of mathematics to express mathematical ideas precisely.

Ohio Standards addressed: Data Analysis and Probability, Grade 7: 1) Read, create, and interpret box and whisker plots, stem and leaf plots, and other types of graphs when appropriate. 2) Analyze how decisions about graphing affect the graphical representation; e.g., scale, size of classes in a histogram, number of categories in a circle graph. Mathematical Processes, Grade 5-7: C) Use more than one strategy to solve a problem, and recognize there are advantages associated with various methods. K) Recognize and use mathematical language and symbols when reading, writing, and conversing with others.

Learning objectives: Students will be able to generate graphs from data with technology and determine which graph(s) best represent the data and what questions each graph will answer.

Materials: Survey data, computers with spreadsheet application (Excel or Appleworks), printers, example graphs (to be used as models by teachers)

Suggested procedures:

Estimated lesson time: 3 or 4 class periods

Student grouping: Teacher selected groups of at most four for the “attention-getter” and two for the technology activities.

Attention-getter: Teacher will give one graph to each group of students (see Appendix 1 for examples). In groups, students will write a title for the graph and write one question that the graph answers. They will also write one question, related to the topic of the graph, that the graph does not answer.

Basic Procedure for Lesson: Students will use technology to enter data and generate graphs. Students will write about generated graphs, discussing the information that each graph provides and which graph best represents the data for given questions. Students will present findings/summary to whole group orally.

Assessment:

Part I: Oral presentation and written arguments. (attention getter activity)

Part II: Technology activity to include printed copy of all graphs and a brief written summation of the information given by each graph and what questions the graph answers. Teacher observation may be included.

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Team members' names: _____

Lesson goals: Given a graph and an explanation of the data, you will formulate an argument supporting or rejecting the use of this type of graph to answer certain questions about the data. Also, given data, you will use technology to create various graphs and decide which graph(s) is (are) most appropriate to display the data to answer given questions, writing and presenting your findings.

Investigation:

Part I: Look at the graph you have been assigned, and answer the following:

1) Write a title for the graph. _____

2) Write one question that the graph answers. _____

3) Write one question (related to the topic of the graph) that the graph does not answer.

4) Would this data be better displayed in a different type of graph? If so, explain what type of graph you would choose and why. If not, explain why not.

Part II:

1. Using Microsoft Excel or AppleWorks, open a new spreadsheet.
2. Enter the following data into the spreadsheet, and highlight the data that will be displayed in a graph.

Below is a summary of 27 student grades from the three projects during a grading period in a math class.

On project 1, there were 4 A's, 6 B's, 10 C's, 5 D's, and 2 F's. On project 2, there were 6 A's, 8 B's, 10 C's, 3 D's, and 0 F's. On project 3, there were 12 A's, 7 B's, 5 C's, 2 D's, and 1 F.

3. Create a graph of the data. Choose the options that you like for the appearance of the graph.
4. Put the graph into the spreadsheet.
5. Create six graphs for this data. (In other words, do step 4 six times.)
6. Once you have the graphs, do the following for each:
 - a) Write a title for the graph.
 - b) Write one question that the graph answers.
 - c) Write one question (related to the topic of the graph) that the graph does not answer.
 - d) Is this graph the best type of graph to display this data? If so, why? If not, what type would you use instead, and why?

Follow up Activity for students: Keeping in mind what you have learned about types of graphs, brainstorm ideas for your own surveys of your classmates. Explain (in writing) what type of graph you would use to represent your survey data, comparing to the other types of graphs. (Discuss why your choice would be the most appropriate representation of the survey results.)

For Instructor (Assessment of Activity):

Expectations upon the completion of this lesson: Students' work should contain the following information:

Spreadsheet containing properly entered data.

At least six types of graphs generated by chart making tool, printed out supporting written discussion.

Written compare/contrast statements between the use of at least one graph and another.

Features of graphs that direct the student's attention to significant aspects of the data.

Appendix 1 (For students' use in Part I)





