

Introduction to Representing and Analyzing Data

Summary

Mobilize background knowledge about data representation and analysis.

Main Core Tie

Mathematics Grade 6

[Strand: STATISTICS AND PROBABILITY \(6.SP\) Standard 6.SP.3](#)

Additional Core Ties

Mathematics Grade 6

[Strand: STATISTICS AND PROBABILITY \(6.SP\) Standard 6.SP.1](#)

Mathematics Grade 6

[Strand: STATISTICS AND PROBABILITY \(6.SP\) Standard 6.SP.5](#)

Materials

Transparencies or projector images: various graphs and plots, [Data Mind Map](#), "[Some Ways To Represent Data](#)"

Foldable: [Types of Graphs and Plots](#)

30-sided dice for Meanest Mean or TI-73's

- [Data Word Sort](#)

for each Team

Worksheets: [Team Challenge Questions and Answers](#), [Choice Board](#)

Journal: [Questions From Tables, Graphs, and Plots](#). [Constructing Graphs on the TI-73](#)

Background for Teachers

Enduring Understanding (Big Ideas):

Data can be represented graphically. Data helps us recognize central tendency

Essential Questions:

How can graphs and plots be used to represent data?

What does it mean to find a central tendency of data?

What questions can be used to help us represent and interpret data?

Skill Focus:

Data related vocabulary Find mean, median, mode, minimum and maximum

Vocabulary Focus:

data, bar graph, histogram, scatter plot, circle graph, box and whisker plot, line plot, stem and leaf plot, frequency, categorical data, inference, analyze, central tendency, mean, median, mode, range, minimum, maximum

Ways to Gain/Maintain Attention (Primacy):

sorting, coop structures, graphic organizer, music, games, choice

Instructional Procedures

Starter: No calculators Review

Find the product of $\frac{1}{2}$ and $\frac{1}{3}$.

Find the percent equivalent to 0.125

solve this equation $3x - 4 = -34$

Lesson Segment 1: How can graphs and plots be used to represent data? Students in Pre-Algebra should have had experiences with graphs in plots in elementary school. Still, a review to help them

mobilize and connect ideas is a good idea to begin a data unit. Have students copy the Graphic Organizer into their journal. Tell students they have seen these ideas in past years and you want to help them remember ways we represent and analyze data.

Many examples of data representations can be found online at the following sites. You will need a couple examples for each of the 8 types of representations listed below. Here are some sites for great representations:

- <http://www.usatoday.com/snapshot/news/snapndex.htm>
- <http://www.42explore.com/graphs.htm>
- <http://cstl.syr.edu/fipse/TabBar/CONTENTS.HTM>
- <http://www.edhelper.com/graphs.htm>

The Granite District's Math site also has some awesome links to data sites. One example of each type of representation is shown on, "Some Ways To Represent Data" overhead (attached).

As you show the students an example of each of the following representations, suggest the example question for collecting data that could be represented this way. Students should title an assignment paper, "Some Ways To Represent Data". They should sketch each representation just to show the general shape and look of it. They should also label each type and write the data question that could be represented.

Categorical representations:

- a) Bar Graph Q. Which is a more popular TV show, Dancing With The Stars, American Idol, or Survivor?
- b) Line Plot Q. How many people have 1 pet, 2 pets, 3 pets, 4 pets, 5 pets, 6 pets, 7 pets 8 pets?
- c) Circle Graph Q. How M&M's of each color are in a bag?
- d) Stem and Leaf plot Q. How many pound of hamburger do fast foods restaurants cook in a week.
- e) Histogram Q. Which score range did most people earn on a test? 90-100, 80-89, 70-79, 60-69, 50-59, 40-49, 30-39?
- f) Box and Whisker Plot Q. What is the minimum, maximum, and median number of movies seen by our class members this year?

Representations showing trend or change:

- g) Scatter Plot Q. Does our height affect to our shoe size?
- h) Line Graph Q. By how many points did our basketball team win or lose each game during the season?

Sing This Song

The Magic-8 foldable (attached) can be used to review the advantages and disadvantages of each of the eight types of graphs or plots. Students really like making this one.

Steps to make foldable:

Looking at the side of the page showing the circle graph, notice there are four columns each showing a type of graph at the top of the column. Cut a flap across the center two columns by cutting along the dotted lines.

Fold flap across the paper toward the left.

Fold the flap with the column on the left (circle graph) backward so it is behind the page. And poke the flap up through the center hole.

Fold the far right column (bar graph) across the front.

Fold the flap to the right and attach with a small piece of tape.

Fold vertically to form the two columns. Look for how the center separates to allow you to open and fold columns to review an 8 page book showing each of the eight graphs or plots.

Four Corners: Once the foldable is made, send students to a corner of the room to meet with other students according to their number. In the corner, the students read the advantages and disadvantages of their two assigned types and discuss what they think some of that means. The teacher moves to each corner to answer questions and show examples as needed. Assign types as follows:

Student # 1 looks at bar and circle graphs

Students # 2 look at line plots and box and whisker plots

Students # 3 look at stem and leaf plots and histograms

Students # 4 look at scatter plots and line graphs.

They should discuss these questions

What type of graphic is it?

When and where have they seen this graphic before?

What are some advantages for using this graphic to represent data?

What are some disadvantages in using this graphic?

After 10 minutes of discussion in the corners, students come back to their home teams and take turns reviewing the ideas from the corner with their team.

(Students do not need to memorize this material, but the more they are exposed to the ideas, the broader their background knowledge will be.)

Lesson Segment 2: Review finding mean, median, mode, range, minimum, maximum

Write this data on the board and ask students 1, 6, 10, 4, 5, 4, 3, 7

Q. What is the minimum? The maximum?

Q. How could I arrange this data to better see the minimum and maximum?

Sing "Mean, Mode, Median and Range (attached), stopping between verses to have students find the mean, mode, median and range for this data:

Game: Meanest Mean, Median, Mode

Meanest Mean (Median, Mode)

Players: 2 Materials needed: 30-sided die or TI-73 calculator to generate numbers 1-30

Procedure:

Teacher chooses a number between 1 and 30 as the target mean number. Players take turns rolling a 1-30 die (or using the TI-73). On a turn, the player rolls the die twice (or generates two integers) and chooses only one of the numbers to "keep". The student writes this keeper number down. The idea is to keep the number that will work to get target mean number. Players take turns generating their own *two* numbers and selecting a keeper number until each player has had five turns. Players find their own mean. The player with the mean closest to 15 wins.

Next, have each student find their median and their mode(s). Teacher again rolls the die or uses the calculator to generate a number to be the target median number. The student(s) with a median closest to is also declared a class winner. Teacher again rolls the die or uses the calculator to generate a number to be the target mode number. The student(s) with a median closest to is also declared a class winner. Finally, the student with the greatest range of keeper numbers is declared a winner as well.

Discuss the meaning of central tendency

Think-Team-share: Q. Which measure of central tendency would have been the best to choose for each to win? Why? Have them write the answer for this question on their paper.

Lesson Segment 3: What questions can be used to help us represent and interpret data?

Data is important to help us make decisions in our lives. When we see data represented or when we hear about issues in our lives where someone has collected data, we need to ask some questions to help us understand the data better.

Give each student a Questions From Graphs, Tables, and Plots page for their journals. Put a graph or plot on the overhead and discuss with the students what the answers to these essential questions might be for the graph.

Game: Team Challenge

Give each team an overhead transparency or data representation you have prepared ahead of time which they can look at and which the whole class will be able to see. You might use representations from a text, the websites listed above, transparencies from texts, etc. Play Team Challenge by using the worksheets attached for the activity. The procedures are on the worksheets.

Lesson Segment 4: Summarize and review representing and analyzing data

Give each team a word sort (attached). Have them quickly cut out the words. For the first sort, they will make two categories: "Words we know" and "Words we have no idea about". Have the team speaker read each word to the team asking, "Does anyone know *anything* about this?" If someone does, they explain what they know and the word is put into the "Words We Know" pile. Otherwise it is put into the "Don't Know About" pile.

For the second sort, have the materials manager spread the words out from the "Words We Know" pile so all can see. The team work together to sort the words they know into two or more piles *based on their meaning*.

Refer students to the graphic organizer they copied in their journals.

Extension: Have students chose one option from the choice board. Give the students the journal page for constructing graphs to be used for future reference.

Assessment Plan

questions, performance tasks, word sort

Bibliography

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Authors

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