Course: 7th Grade Math

Student Objective
(Obj. 5c) TSW... graph and interpret data in a box-and-whisker plot.

Lesson
1-10 Box-and-Whisker Plot (Textbook Page: 58)

Homework
None Tonight.

Last Night's Homework
Study Guide for Central Tendency Test.

Bellwork
Students will review their study guide for their test. Box-and-Whisker Plots will be discussed after the test.

Prior Knowledge
This week, we learned how to find the median of a set of numbers. Remember, median is your middle number.

Anticipatory Set
Today, we will start our unit on Data Analysis. We will use what we have learned about the median to help us interpret data represented in a box-and-whisker plot. Why learn about box-and-whisker plots? Well, when you have a large set of data, sometimes it is useful and easier to interpret if it is broken down into smaller pieces.

Teacher Input
- Pass out Student Notes.
- Define what a Box-and-Whisker Plot is and the five pieces of data that make it up (five number summary): (lower quartile, median, upper quartile, lower extreme, upper extreme)
- Explain and demonstrate how to construct a box-and-whisker plot by first finding the median, lower quartile, and upper quartile.
- Explain and demonstrate how to graph a box-and-whisker plot.
- The box consist of:
  Lower Quartile (Q1)
  Median (Q2)
  Upper Quartile (Q3)
- The whiskers consist of:
  Lower Extreme
  Upper Extreme
- Define the interquartile range (IQR) and how it is calculated. Upper Quartile – Lower Quartile
  \[ \text{IQR} = Q_1 - Q_2 \]

Assessment
Observation and questioning.

Closure
Today we talked about a box-and-whisker plot which presents a way to analyze data.

1. The data in a box-and-whisker plot is sometimes called the five summary data. What are the 5 pieces of data? lower quartile, median, upper quartile, lower extreme, upper extreme
2. When constructing a box-and-whisker plot what do you find first? the median of the entire data set
3. How do you find the lower quartile? Find the median of the lower half of the data
4. How do you find the upper quartile? Find the median of the upper half of the data
5. What is the lower extreme? The lowest number in the data set
6. What is the upper extreme? The highest number in the data set
7. How do you calculate the interquartile range (IQR)? Upper Quartile – Lower Quartile \( \rightarrow \) IQR = Q1 – Q2
What are Box-and-Whisker Plots?

- A box-and-whisker plot can be useful when you have to handle many data values.
- They allow people to explore data and to draw conclusions.
- It shows only certain statistics rather than all the data.
- Five-number summary is another name for the visual representations of the box-and-whisker plot.

The five-number summary consists of:

1) Lower Quartile (Q1)  
2) Median (Q2)  
3) Upper Quartile (Q3)  
4) Lower Extreme  
5) Upper Extreme

Constructing a Box-and-Whisker Plots

The first step in constructing a box-and-whisker plot is to use the given data set to first find the:

- median,
- lower quartile, and
- upper quartile

Example

The following set of numbers is the amount of marbles fifteen different boys own. The numbers are already ordered from least to greatest.

18 27 34 52 54 59 61 68 78 82 85 87 91 93 100

- First find the median. The median is the value in the middle of an ordered set of numbers.

68 is the median

- Next, we consider only the values to the left of the median: 18 27 34 52 54 59 61. We now find the median of this set of numbers. 52 is the median of the scores less than the median of all scores, and therefore is the lower quartile.

52 is the lower quartile

- Now consider only the values to the right of the median: 78 82 85 87 91 93 100. We now find the median of this set of numbers. The median 87 is therefore called the upper quartile.

87 is the upper quartile
Graphing our Box-and-Whisker Plot

18 27 34 52 54 59 61 68 78 82 85 87 91 93 100

- The **Box** is made up of your:
  - Median = 68
  - Lower Quartile = 52
  - Upper Quartile = 87

- The **Whiskers** are made up of your:
  - Lower Extreme = 18
  - Upper Extreme = 100

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Finding the Interquartile Range (IQR)

- The **interquartile range (IQR)** is the difference between the upper quartile and the lower quartile.
- In our case the IQR is \( 87 - 52 = 35 \).
- The IQR is a very useful measurement because it is less influenced by extreme values!

35 is the Interquartile Range
Practice

Directions: Use the following information to answer Numbers 1 through 8.

The following list shows the number of wins that Roger had in each of his twenty years as a baseball pitcher.

9, 7, 24, 20, 18, 17, 21, 18, 18, 11, 9, 10, 10, 21, 20, 14, 13, 20, 13, 17

1. Put the number of wins in order from least to greatest.

2. What is the median number of wins? ________________

3. What is the lower quartile? ________________

4. What is the upper quartile? ________________

5. What is the minimum number of wins (Lower extreme)? ________________

6. What is the maximum number of wins (Upper extreme)? ________________

7. Display the data in a box-and-whisker plot. Draw the plot below the number line.

8. What is the interquartile range (IQR)? ________________

What is the range between the two extremes? ________________
Practice

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The following list shows the number of wins that Roger had in each of his twenty years as a baseball pitcher.

9, 7, 24, 20, 18, 17, 21, 18, 18, 11, 9, 10, 10, 21, 20, 14, 13, 20, 13, 17

1. Put the number of wins in order from least to greatest.

7, 9, 9, 10, 10, 11, 13, 13, 14, 17, 17, 18, 18, 18, 20, 20, 20, 20, 21, 21, 24

2. What is the median number of wins? ________

3. What is the lower quartile? ________

4. What is the upper quartile? ________

5. What is the minimum number of wins (Lower extreme)? ________

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7. Display the data in a box-and-whisker plot. Draw the plot below the number line.

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