8-2b Teacher Notes

<u>Box-and-Whisker Graphs</u>

<u>Objective</u>: TSW construct a box-and-whisker graph using the appropriate data. M08-S2C1-02

<u>Purpose:</u> Box and Whisker graphs are used in real life situations to break data into quartiles and look at medians.

<u>Vocabulary:</u>

<u>Box-and-Whisker Graph (Plot)</u> – A graph that uses a rectangle, "box" to represent the middle 50% of a set of data and "whiskers" at both ends to represent the extremes of the data. These graphs have four sections which each represent 25% of the total data. They look like this:

Lower Extreme   lower quartile   median   upper quartile   upper extreme
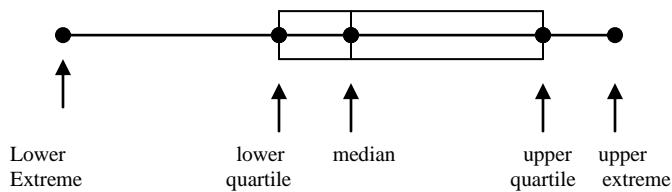
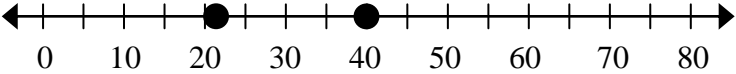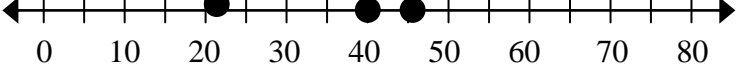<u>Range</u> – The difference between the greatest number and the least number in a set of data.
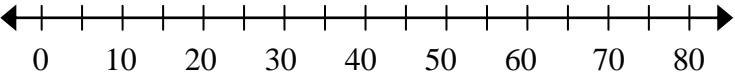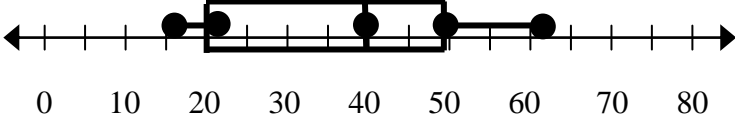
<u>Quartile</u> – Along with the median, the quartiles divide an order set of data into four groups of about the same size.

<u>Median</u>-The middle number of a set of numbers when the numbers are arranged from least to greatest.

<u>Process/Steps:</u>

Example 1: Use the given data to make a box-and-whisker plot:

22, 17, 22, 49, 55, 21, 49, 62, 21, 16, 18, 44, 42, 48, 40, 33, 45

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1. Write the data from *smallest* to *largest*	22, 17, 18, 21, 21, 22, 22, 33, 40, 42, 44, 45, 48, 49, 49, 55, 63
2. Draw a number line that can show the data in equal intervals.	 0 10 20 30 40 50 60 70 80
3. Find the median of all the numbers.	We have 17 pieces of data and the median would be the 9th value-which is "40". Plot it on the number line 0 10 20 30 40 50 60 70 80
4. Find the lower median.	The lower median is the median of the values below the 40-there are 8 values below the 40, so the median will be between the fourth and fifth values, which are both 21. The lower median is 21. Plot this on the number line 0 10 20 30 40 50 60 70 80
5. Find the upper median.	The upper median is the median of the values above the 40-again, there are 8 values. The median is between the thirteenth and fourteenth values, which are 48 and 49. The upper median is 48.5. Plot this on the number line. 0 10 20 30 40 50 60 70 80
6. Find the upper and lower extremes.	The lowest value is 16 and the highest value is 63. Plot these. 0 10 20 30 40 50 60 70 80
7. Connect all points by outlining the middle 50% with a rectangle and using lines to form the whiskers. Split the box by drawing a vertical line through the median You now have 4 *sections* (quartiles). 0 10 20 30 40 50 60 70 80	

Example 2: Interpret box-whisker graphs. Use the graph below to answer questions.

5   12   14   25   28
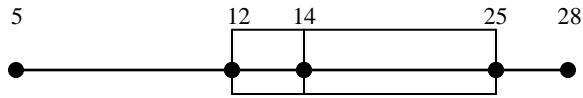
1. What is the median of this data?	1. 14
2. What is the value of the lower quartile?	2. 12
3. What is the value of the upper quartile?	3. 25
4. What percent of the data falls between 5 and 12?	4. 25%
5. What percent of the data falls between 12 and 25?	5. 50%
6. What is the highest value indicated on this graph?	6. 28
7. What percent of the data is less than or equal to 25?	7. 75%

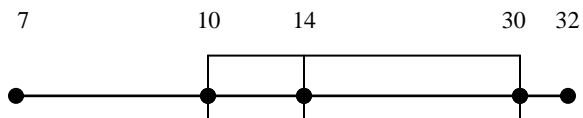Guided Practice: Use the given data to make a box-and-whisker plot.

1. 65, 42, 45, 20, 66, 60, 76

    0   10   20   30   40   50   60   70   80

2. 3, 0, 4, 1, 5, 2, 6, 3, 4, 1, 5, 3

    0   1   2   3   4   5   6   7   8
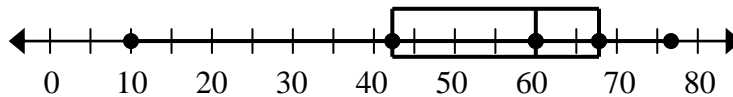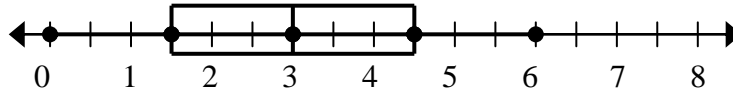
Use this graph to answer problems 3-5:

7   10   14   30   32

3. What percentage of values is more than or equal to 14? **50%**

4. What is the value of the upper extreme? **32**

5. If this graph represents 80 values, how many values are less than or equal to 10? **20**