Guidelines for Reading Interim Assessment Reports
Box and Whisker Plots

The box and whisker plot is one way the scores of your students will be displayed in the interim assessment score reports. A box and whisker plot efficiently shows the distribution of the scores of your students.

The Numbers Used to Build a Box and Whisker Plot
The five elements displayed in a box and whisker plot are the highest and lowest scores, the median, and the first and third quartiles. Each of these is described with text and examples below.

The Median
To properly interpret box and whisker plots, you need to understand the term, **median**. The median is equal to the location of the middle number in a list of numbers (like student test scores) that are arranged in order from least to greatest. If the number of scores in a list is odd, then the median is equal to the middle score in that list, as shown below.

Median in an odd number of scores

10, 12, 15, 22, 22, 26, 26, 26, 30

If, however, the number of scores in the list is even, then the median is equal to the average of the two middle scores. Therefore, in the case of an even number of scores, it is possible for the median to equal a score that no one received.

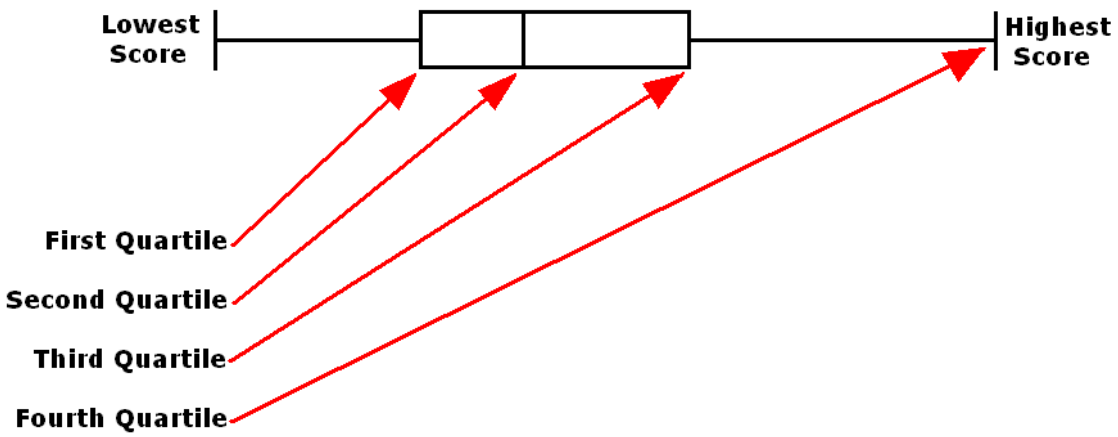
Median in an even number of scores

10, 12, 15, 22, 22, 26, 26, 26, 30, 34

Median = 24

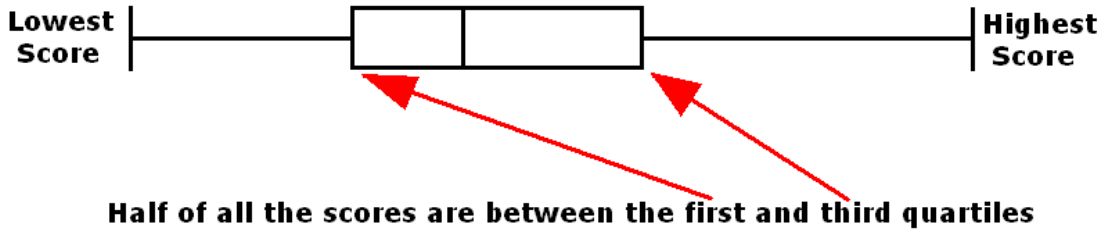
The First and Third Quartiles

Two other essential values for building box and whisker plots are the first (lower) quartile and the third (upper) quartile. While the lowest and highest scores set the boundaries for a set of data, the medians and quartiles divide the data into four sections, each of which contains 25% of the scores. The first quartile is the median of the numbers that lie below the median value. The third quartile is the median of the numbers that lie above the median value. These sections are pictured below.



Because the box and whisker plot is divided into quartiles, we can make these six generalizations about data displayed in this way.

- The lowest 25% of the student scores are between the lowest score and the first quartile.
- The lowest 50% of the student scores are located between the lowest score and the median.
- The highest 25% of the student scores are located between the third quartile and the highest score.
- The highest 50% of the student scores are located between the median and the highest score.
- The distance between the highest and lowest scores represents the range of student scores.
- The width of box in the plot represents the central 50% of the student scores.



EXAMPLE

Creating a Box and Whisker Plot

Let's create a simple box and whisker plot and see what it would look like in a KCA report. For this sample plot, we have eight students with the scores listed to the right.

56, 36, 65, 30, 35, 70, 40, 40

First, the list of scores should be ordered from least to greatest.

30, 35, 36, 40, 40, 56, 65, 70

For an even numbered set of data like this, the median lies between the two middle values (in this case the two 40s).

Median = 40

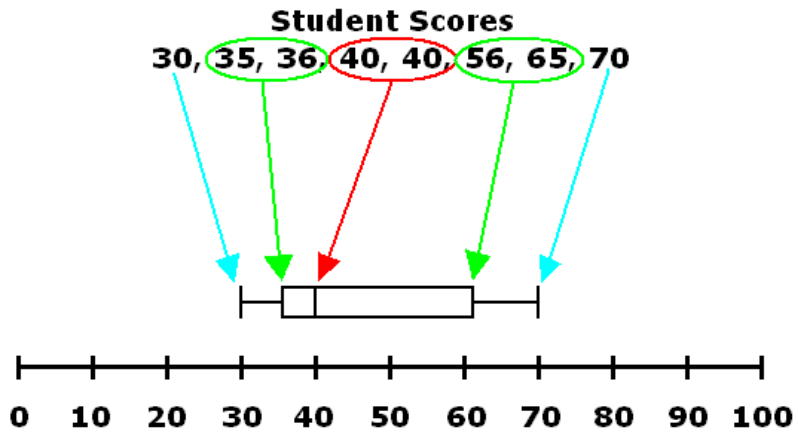
The first and third quartiles (Q1 and Q3) are calculated using the four values on either side of the median value. The first quartile is the median of the scores 30, 35, 36, and 40.

Quartile 1 = 35.5

The third quartile is the median of the scores 40, 56, 65, and 70.

Quartile 3 = 60.5

On your interim assessment class report, the positions of the whiskers, box, and median are aligned with their respective values on a number line as shown below.



Facts based on this box and whisker plot

- The lowest 25% of scores are between 30 and 35.5.
- The lowest 50% of scores are between 30 and 40.
- The highest 25% of scores are between 50.6 and 70.
- The highest 25% of scores are between 40 and 70.
- The middle 50% of scores are between 35.5 and 60.5.
- All scores are between 30 and 70.

Interpretations of these data

- These scores are relatively widely spread; they are not tightly clustered.
- Students who took this test demonstrated quite different amounts of knowledge about the material that was tested.
- The student whose score was 56 performed better than more than half of the rest of the class.