

## Vocabulary Review Sheet

### Lesson – Box Plots & Histograms: Standardized Test Scores Across Groups

#### How to Use

- Review each definition and example before your quiz.
- Connect **math vocabulary** to **real-world fairness in education**.
- Keep this page in your *Equity in Numbers Student Journal*.
- Remember: *Graphs don't just show data — they reveal patterns of opportunity.*

#### Histogram

- **Definition:** A bar graph showing how many data values fall into different ranges (bins).
- **Math Example:** For scores 50–95 with bins of 10 → bars for 50–59, 60–69, 70–79, etc.
- **Real-Life Example:** Showing how many students scored in each range on a standardized test.
- **Fairness Example:** If one group's bars cluster lower, it may show fewer opportunities, not lower ability.

#### Bin (Interval)

- **Definition:** The range of values grouped together in a histogram.
- **Math Example:** 50–59, 60–69, 70–79.
- **Real-Life Example:** Grouping student scores to make patterns visible.
- **Fairness Example:** Using consistent bin widths ensures comparisons between groups are fair and accurate.

#### Box Plot (Box-and-Whisker Plot)

- **Definition:** A graph showing the minimum, Q1, median, Q3, and maximum of a data set.
- **Math Example:** Min = 50, Q1 = 61.25, Median = 72.5, Q3 = 83.75, Max = 95.
- **Real-Life Example:** Comparing how student test scores spread across schools or groups.
- **Fairness Example:** Overlapping boxes mean outcomes are similar; separated boxes may show inequities.

### Five-Number Summary

- **Definition:** The five key values that describe a data set → *Minimum, Q1, Median, Q3, Maximum*.
- **Math Example:** (50, 61.25, 72.5, 83.75, 95).
- **Real-Life Example:** Used to create box plots showing score ranges.
- **Fairness Example:** Helps identify if one group's test scores are consistently lower than others.

### Median

- **Definition:** The middle number when data is ordered from least to greatest.
- **Math Example:** 50, 55, 60, 65, 70 → Median = 60.
- **Real-Life Example:** The typical test score for a group.
- **Fairness Example:** Median shows a “typical” experience, free from extremes that can distort averages.

### Quartile

- **Definition:** Values that divide a data set into four equal parts (Q1, Q2 = median, Q3).
- **Math Example:** Q1 = 61.25, Q3 = 83.75.
- **Real-Life Example:** Used to see where most scores fall in a group.

- **Fairness Example:** Quartiles show how evenly learning opportunities are distributed.

### Interquartile Range (IQR)

- **Definition:** The range between Q3 and Q1 → shows where the middle 50% of data lies.
- **Formula:**  $IQR = Q3 - Q1$
- **Math Example:**  $Q3 = 83.75, Q1 = 61.25 \rightarrow IQR = 22.5$ .
- **Real-Life Example:** A wide IQR shows varied performance among students.
- **Fairness Example:** A wider IQR might mean inconsistent support or unequal resources.

### Outlier

- **Definition:** A value much higher or lower than the rest of the data.
- **Rule:** Outside  $1.5 \times IQR$  from Q1 or Q3.
- **Math Example:** If  $IQR = 16$  and  $Q3 = 78 \rightarrow$  any score above 102 or below 44 is an outlier.
- **Real-Life Example:** A single very low score might reflect a missing test or barrier to access.
- **Fairness Example:** Outliers help identify when a student or group's situation needs special attention.

### Distribution

- **Definition:** The way data values are spread out or grouped.
- **Math Example:** Histogram shape can be symmetric, skewed left, or skewed right.
- **Real-Life Example:** Test scores may cluster around 70–80 or spread unevenly.
- **Fairness Example:** Uneven distributions show where achievement gaps exist.

### Skewed Data

- **Definition:** Data that leans more toward one side of the scale.
- **Math Example:** Scores 50–70 more frequent than 80–100 → skewed right.
- **Real-Life Example:** Most students scoring lower can indicate systemic barriers.
- **Fairness Example:** Skewed data can reflect inequity in preparation or access.

### Equity Gap

- **Definition:** The difference in performance between groups due to unequal opportunity.
- **Math Example:** Median score for Group A = 74; Group B = 69 → Gap = 5 points.
- **Real-Life Example:** Comparing test outcomes between different student populations.
- **Fairness Example:** Closing the equity gap means ensuring all students have resources to succeed.

### Interpretation

- **Definition:** Explaining what the data means in context.
- **Math Example:** “Group A’s higher median and smaller IQR mean their scores are higher and more consistent.”
- **Real-Life Example:** Turning graphs into insights about schools and learning conditions.
- **Fairness Example:** Interpretation connects math results to real change for educational justice.

### Summary of Math + Fairness Connections

Concept	Math Focus	Fairness Connection
<b>Histogram</b>	Frequency of data	Reveals score patterns across groups

<b>Concept</b>	<b>Math Focus</b>	<b>Fairness Connection</b>
<b>Box Plot</b>	Medians & quartiles	Highlights opportunity gaps
<b>IQR</b>	Spread of middle 50%	Shows score consistency
<b>Outlier</b>	Extreme values	Identifies areas needing support
<b>Equity Gap</b>	Median differences	Measures fairness in results