

Vertical Progression:

4th Grade	<p>4.MD.B Represent and interpret data.</p> <ul style="list-style-type: none"> ○ 4.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit ($1/2$, $1/4$, $1/8$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>
5th Grade	<p>5.MD.B Represent and interpret data.</p> <ul style="list-style-type: none"> ○ 5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit ($1/2$, $1/4$, $1/8$). Use operations on fractions for this grade to solve problems involving information presented in line plots. <i>For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.</i>
6th Grade	<p>ELG 6.10 Summarize and describe distributions.</p> <ul style="list-style-type: none"> ○ 6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots. ○ 6.SP.B.5 Summarize numerical data sets in relation to their context, such as by: <ul style="list-style-type: none"> ○ 6.SP.B.5.a Reporting the number of observations. ○ 6.SP.B.5.b Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. ○ 6.SP.B.5.c Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. ○ 6.SP.B.5.d Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
7th Grade	<p>ELG 7.8 Draw informal comparative inferences about two populations.</p> <ul style="list-style-type: none"> ○ 7.SP.B.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. <i>For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.</i> ○ 7.SP.B.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. <i>For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.</i>

Students will demonstrate command of the ELG by:

- Summarizing numerical data sets by reporting the number of observations.
- Finding measures of center (median and mean) for a numerical data set.
- Finding measures of variability (interquartile range and mean absolute deviation) for a numerical data set.
- Identifying data that are outside the normal pattern of the data.
- Making decisions about which measures of center and variability will best represent the data.
- Displaying data with dot plots, histograms and box plots.

Vocabulary:

- box plot
- categorical data
- data
- dot plot
- histogram
- interquartile range
- mean absolute deviation
- measure of center
- measure of spread
- median
- mode
- numerical data
- outlier
- quartile

Sample Instructional/Assessment Tasks:

1) Standard(s): Standard: 6.SP.B.4, 6.SP.B.5.c

Source: Illustrative Mathematics <https://www.illustrativemathematics.org/content-standards/6/SP/B/4/tasks/2043>

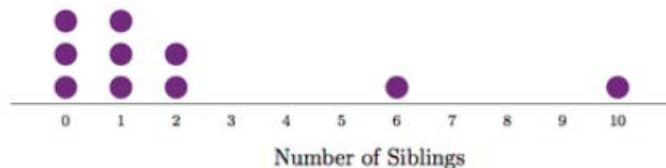
Item Prompt:

The number of siblings for a group of sixth grade students is shown below:

1, 0, 2, 1, 6, 0, 2, 0, 1, 10.

- a. Make a dot plot of the data.
- b. Find the mean and median of the data.
- c. What does the mean tell you about the data? What about the median?
- d. Which measure of average (mean or median) do you think best describes the data? Why?

Correct Answer:



- b. mean: 2.3; median: 1
- c. The mean gives the average number of siblings. The median tells you that at least half of the students have either 1 or 0 siblings.
- d. Because 6 and 10 siblings are far from the other data, the median gives a better description of the data. The mean is affected greatly by the inclusion of 6 and 10.

2) Standard(s): 6.SP.B.5.d

Source: Illustrative Mathematics <https://www.illustrativemathematics.org/content-standards/6/SP/B/5/tasks/2048>

Item Prompt:

Bobbie is a sixth grader who competes in the 100 meter hurdles. In eight track meets during the season, she recorded the following times (to the nearest one hundredth of a second).

18.11, 31.23, 17.99, 18.25, 17.50, 35.55, 17.44, 17.85

- What is the mean of Bobbie's times for these track meets? What does this mean tell you in terms of the context?
- What is the median of Bobbie's times? What does this median tell you in terms of the context?
- What information can you gather by comparison of the mean and median?

Solution:

- Mean = 21.74 seconds. The average time that Bobbi took to complete the race was 21.74 seconds.
- Median=18.05 seconds. Bobbi completed half the races faster than 18.05 seconds, and half the races slower than 18.05 seconds.
- The mean is significantly higher than the median, meaning that there are some times that are much higher than her normal pace. A possible reason is that she stumbles and falls on a hurdle.