

Boxplot Detectives

Turn ordered data into a clear five-number picture.

GRADE 8 • 8.PS.2.d

8.PS.2.d "Organize and represent a numeric data set of no more than 20 items, using boxplots, with and without the use of technology."

NAME _____

DATE _____

BUILD A BOXPLOT

A boxplot uses five values: minimum, Q1, median, Q3, and maximum. Order the data first, then find Q1 and Q3 by finding the medians of the lower and upper halves. If there is an odd number of values, do not include the overall median in either half.

WORKED EXAMPLE

Make a boxplot for: 35, 21, 42, 28, 39, 24, 31.

1. Order the data: 21, 24, 28, 31, 35, 39, 42.
2. The median is 31.
3. The lower half is 21, 24, 28, so Q1 is 24.
4. The upper half is 35, 39, 42, so Q3 is 39.

Answer: Five-number summary: 21, 24, 31, 39, 42. Draw whiskers at 21 and 42, a box from 24 to 39, and a median line at 31.

PRACTICE 6 problems

- 1** Make a boxplot for: 3, 4, 7, 8, 10, 13, 15.

ANSWER _____

- 2** Make a boxplot for this ordered data set: 1, 2, 5, 6, 9, 12, 14, 17.

ANSWER _____

- 3** Order the data, then make a boxplot: 4, 11, 6, 9, 3, 12, 7, 10, 8.

ANSWER _____

- 4** A boxplot has the five-number summary 2, 5, 8, 11, 14. Find the range and the interquartile range, or IQR.

ANSWER _____

- 5** A boxplot has the five-number summary 0, 3, 6, 9, 12. State the two whisker endpoints, the box endpoints, and the median line value.

ANSWER _____

- 6** A streamer tracked the number of minutes spent editing 10 short videos: 5, 5, 6, 8, 9, 9, 10, 12, 13, 15. Make a boxplot.

ANSWER _____

APPLY IT Show your work

- 1** At a gaming club, 11 students recorded the number of minutes it took to finish a practice level: 13, 14, 15, 16, 16, 17, 18, 19, 20, 22, 23. Make a boxplot. What interval contains the middle half of the times?

WORK SPACE

ANSWER _____

- 2** A film club counted the number of clips used in 12 student-made videos: 4, 7, 9, 10, 11, 13, 14, 16, 18, 25, 26, 30. Make a boxplot. Then find the range and IQR.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two groups tracked the number of pages they read during a reading challenge. Group A: 10, 11, 12, 12, 12, 13, 14. Group B: 2, 6, 10, 12, 12, 18, 22. Write exactly 2 sentences that give both five-number summaries and explain which group was more consistent.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Make a boxplot for: 3, 4, 7, 8, 10, 13, 15.	Five-number summary: 3, 4, 8, 13, 15. Draw whiskers at 3 and 15, a box from 4 to 13, and a median line at 8.
2	Make a boxplot for this ordered data set: 1, 2, 5, 6, 9, 12, 14, 17.	Five-number summary: 1, 3.5, 7.5, 13, 17. Draw whiskers at 1 and 17, a box from 3.5 to 13, and a median line at 7.5.
3	Order the data, then make a boxplot: 4, 11, 6, 9, 3, 12, 7, 10, 8.	Ordered data: 3, 4, 6, 7, 8, 9, 10, 11, 12. Five-number summary: 3, 5, 8, 10.5, 12. Draw whiskers at 3 and 12, a box from 5 to 10.5, and a median line at 8.
4	A boxplot has the five-number summary 2, 5, 8, 11, 14. Find the range and the interquartile range, or IQR.	Range: 12. IQR: 6.
5	A boxplot has the five-number summary 0, 3, 6, 9, 12. State the two whisker endpoints, the box endpoints, and the median line value.	Whisker endpoints: 0 and 12. Box endpoints: 3 and 9. Median line value: 6.
6	A streamer tracked the number of minutes spent editing 10 short videos: 5, 5, 6, 8, 9, 9, 10, 12, 13, 15. Make a boxplot.	Five-number summary: 5, 6, 9, 12, 15. Draw whiskers at 5 and 15, a box from 6 to 12, and a median line at 9.

PART 2 • APPLY IT

- Five-number summary: 13, 15, 17, 20, 23. Draw whiskers at 13 and 23, a box from 15 to 20, and a median line at 17. The middle half of the times is from 15 to 20 minutes.** The data are already ordered. The lower-half median is 15, the overall median is 17, and the upper-half median is 20.
- Five-number summary: 4, 9.5, 13.5, 21.5, 30. Draw whiskers at 4 and 30, a box from 9.5 to 21.5, and a median line at 13.5. Range: 26. IQR: 12.** The median is the average of 13 and 14. Find Q1 from the first six values and Q3 from the last six values, then subtract minimum from maximum for range and Q1 from Q3 for IQR.

CHALLENGE

Group A has the five-number summary 10, 11, 12, 13, 14, and Group B has the five-number summary 2, 6, 12, 18, 22. Group A was more consistent because its IQR is 2, while Group B's IQR is 12.

Accept correctly scaled horizontal or vertical boxplots that match the stated five-number summaries. Decimal quartiles may be written as equivalent fractions, such as 7.5 or $15/2$.