Statistics and Data Displays

Lesson 10 Box Plots and Five Number Summaries

Standards 6.SP.B.4, 6.SP.B.5c

Learning target I can create a box plot from a five-number summary.

Materials Grid paper, rulers, colored pencils, data tables.

Lesson Flow 50 Minutes

0–5 Activate prior knowledge. Read the learning target. Ask students what they already know about box plots and five number summaries. Use a quick model or estimate to make their starting ideas visible.

5–17 Teach and model. Find minimum, Q1, median, Q3, and maximum. Draw a box from Q1 to Q3 with a median line and whiskers to the endpoints. Use an equally spaced number line with units. Work through the two examples on the attached instruction page. Have students name the first step before showing it.

17–22 Guided practice. Revisit worked Example 2 with its solution covered. Students propose the next step and explain why it is valid; uncover and compare with the worked solution.

22–45 Independent classwork. Assign the attached 10 questions in order. Check items 1–3 for entry-level understanding, 4–6 for connected procedures, 7–8 for representation and explanation, and 9–10 for application or justification. Ask students to use the instruction-page notes area or extra grids for longer work.

45–50 Check understanding. Use classwork question 10 as an exit discussion: Reading times in minutes are 3, 4, 4, 5, 6, 15. Find the five-number summary and draw a labeled box plot. State the IQR. Compare the result with the answer key and ask a student to defend the method.

Support and Extension

Support Model item 1 together with the listed tools, then have students attempt item 2 independently. Watch sorting before finding medians, quartile conventions, counting every observation once, and mean versus variability.

Extension Ask students to solve a final item another way, draw a second representation, or create a related problem with a checked answer.

Next step Record which students can explain the target independently. Begin the next teaching session with a brief correction for any recurring error.

Name _____ Date _____

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Learning target I can create a box plot from a five-number summary.

Learn and Discuss

Find minimum, Q1, median, Q3, and maximum. Draw a box from Q1 to Q3 with a median line and whiskers to the endpoints. Use an equally spaced number line with units.

Example 1 Reading times in minutes are 4, 5, 5, 6, 6, 7. Find the five-number summary and draw a labeled box plot.
Solution (4, 5, 11/2, 6, 7). Box runs from 5 to 6, median line at 11/2, whiskers to 4 and 7.
Example 2 Reading times in minutes are 7, 8, 8, 9, 10, 19. Find the five-number summary and draw a labeled box plot. State the IQR.
Solution (7, 8, 17/2, 10, 19); IQR 2 min. Box runs from 8 to 10, median line at 17/2, whiskers to 7 and 19.

Classwork Show Your Work

Complete the 10 problems on the following page. Refer to the examples, draw models, and check your results.

My Notes or Second Method

Lesson 10 Box Plots and Five Number Summaries

Name _____ Show calculations, models, and units.

1. Reading times in minutes are 8, 9, 9, 10, 10, 11. Find the five-number summary and draw a labeled box plot.

2. Reading times in minutes are 4, 5, 5, 6, 6, 7. Find the five-number summary and draw a labeled box plot.

3. Reading times in minutes are 6, 7, 7, 8, 8, 9. Find the five-number summary and draw a labeled box plot.

4. Reading times in minutes are 2, 5, 5, 8, 8, 11. Find the five-number summary and draw a labeled box plot.

5. Reading times in minutes are 2, 6, 6, 10, 10, 14. Find the five-number summary and draw a labeled box plot.

6. Reading times in minutes are 8, 11, 11, 14, 14, 17. Find the five-number summary and draw a labeled box plot.

7. Reading times in minutes are 7, 8, 8, 9, 10, 19. Find the five-number summary and draw a labeled box plot. State the IQR.

8. Reading times in minutes are 5, 6, 6, 7, 8, 17. Find the five-number summary and draw a labeled box plot. State the IQR.

9. Reading times in minutes are 8, 9, 9, 10, 11, 20. Find the five-number summary and draw a labeled box plot. State the IQR.

10. Reading times in minutes are 3, 4, 4, 5, 6, 15. Find the five-number summary and draw a labeled box plot. State the IQR.

Box Plots and Five Number Summaries

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1. (8, 9, 19/2, 10, 11)
Reasoning Box runs from 9 to 10, median line at 19/2, whiskers to 8 and 11.

2. (4, 5, 11/2, 6, 7)
Reasoning Box runs from 5 to 6, median line at 11/2, whiskers to 4 and 7.

3. (6, 7, 15/2, 8, 9)
Reasoning Box runs from 7 to 8, median line at 15/2, whiskers to 6 and 9.

4. (2, 5, 13/2, 8, 11)
Reasoning Box runs from 5 to 8, median line at 13/2, whiskers to 2 and 11.

5. (2, 6, 8, 10, 14)
Reasoning Box runs from 6 to 10, median line at 8, whiskers to 2 and 14.

6. (8, 11, 25/2, 14, 17)
Reasoning Box runs from 11 to 14, median line at 25/2, whiskers to 8 and 17.

7. (7, 8, 17/2, 10, 19); IQR 2 min
Reasoning Box runs from 8 to 10, median line at 17/2, whiskers to 7 and 19.

8. (5, 6, 13/2, 8, 17); IQR 2 min
Reasoning Box runs from 6 to 8, median line at 13/2, whiskers to 5 and 17.

9. (8, 9, 19/2, 11, 20); IQR 2 min
Reasoning Box runs from 9 to 11, median line at 19/2, whiskers to 8 and 20.

10. (3, 4, 9/2, 6, 15); IQR 2 min
Reasoning Box runs from 4 to 6, median line at 9/2, whiskers to 3 and 15.