

Display Data: Box Plots

Lesson 8-5

Name: _____ Date: _____ Class: _____

Key Vocabulary Level 1 support

Picture first, then the word, then a plain-language meaning. Say each word out loud.

A box from Q_1 to Q_3 with a line at the median, and whiskers from min to max

Box Plot

A graph that shows how data is spread using five key numbers.

Data: 10, 15, 20, 25, 30 → median is 20 (the 3rd value)

Median

The middle number that splits the data in half.

Data: 2, 4, 6, 8, 10, 12, 14 → $Q_1 = 4$ (median of lower half), $Q_3 = 12$ (median of upper half)

Quartile

Numbers that split the data into four equal parts.

If $Q_1 = 12$ and $Q_3 = 20$, then $IQR = 20 - 12 = 8$ — the middle 50% spans 8 units

Interquartile Range

The spread of the middle half of the data ($Q_3 - Q_1$).

A box plot where the median is centered in the box shows symmetric distribution

Data distribution

How the data looks: where it sits and how spread out it is.

*Small IQR = low variability in the middle 50%.
Large IQR = high variability*

Variability

How spread out the numbers are.

Key Ideas & Notes

- The basketball league wants to compare scoring across teams.
- Here are the points scored by each player on the Wildcats in their last game: 4, 6, 8, 10, 12, 14, 15, 18, 22, 24, 28.
- The league needs a quick visual that shows the spread, the middle 50%, and any high or low scorers.
- Time to build a box plot!

Think About It

- What are the lowest and highest scores?
- What score is in the middle of the data?
- Are the scores bunched together or spread out?

My Notes

Guided Examples

Example 1

A box plot shows: Min = 10, Q1 = 15, Median = 20, Q3 = 28, Max = 35. What is the interquartile range (IQR)?

Solution: $IQR = Q3 - Q1 = 28 - 15 = 13$.

Answer: A. 13

Example 2

On a box plot, what does the line inside the box represent?

Solution: The line inside the box of a box plot always represents the median.

Answer: A. The median

Example 3

What percentage of data falls between Q1 and Q3 on a box plot?

Solution: The box in a box plot contains the middle 50% of the data (from Q1 to Q3).

Answer: A. 50%

Write About the Math

The Writing Revolution

I can explain my box plot using the words box plot, median, quartile, and interquartile range.

1. Kernel Sentence subject + verb

Model: Box Plot is a graph that shows how data is spread using five key numbers.

Diagrama de caja es una gráfica que muestra cómo se reparten los datos con cinco números clave.

Write a kernel sentence about box plot. Use a subject and a verb.

Escribe una oración base sobre diagrama de caja. Usa un sujeto y un verbo.

2. Sentence Expansion because · but · so

Kernel: Box Plot matters in math

Diagrama de caja importa en matemáticas

Expand the kernel three ways. Add a reason, a contrast, and a result.

because
porque

Box Plot matters in math because ____.

Diagrama de caja importa en matemáticas porque ____.

but
pero

Box Plot matters in math, but ____.

Diagrama de caja importa en matemáticas, pero ____.

so
entonces

Box Plot matters in math, so ____.

Diagrama de caja importa en matemáticas, entonces ____.

3. Sentence Types 4 ways to write a math idea

Statement
Afirmación

Tell one true fact about box plot.
Di un hecho verdadero sobre box plot.

Box plot ____.

Question
Pregunta

Ask a question about box plot.
Haz una pregunta sobre box plot.

How does ____ ?

¿Cómo ____ ?

Exclamation
Exclamación

Show excitement about box plot.
Muestra entusiasmo sobre box plot.

Wow, ____ !

¡Guau, ____ !

Command
Mandato

Tell a partner what to do with box plot.
Dile a un compañero qué hacer con box plot.

First, ____ .

Primero, ____ .

4. Explain Your Reasoning use a sentence starter

The box shows ____ .

La caja muestra ____ .

The median is ____ .

La mediana es ____ .

I would compare ____ **using box plots.**

Compararía ____ *usando diagramas de caja.*

Try It

Solve on your own. Check the answer key when you are done.

1. Find the range of: 14, 22, 8, 31, 17

- A. 23
- B. 31
- C. 8
- D. 18

Show your work:

2. Two box plots show: Team A has IQR = 8, Team B has IQR = 22. What does this tell you?

- A. Team A's middle 50% is more consistent; Team B's is more spread out
- B. Team B is a better team
- C. Team A has a higher median
- D. The IQRs don't tell you about consistency

Show your work:

Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

Two basketball teams played 9 games each. Team A: 40, 42, 44, 46, 48, 50, 52, 54, 56. Team B: 30, 35, 40, 45, 48, 50, 55, 60, 65. Find the five-number summary and IQR for each team. Which team is more consistent? Which has a wider spread in the middle 50%?

Sentence starter: Team A: Min=____, Q1=____, Median=____, Q3=____, Max=____, IQR=____. Team B: Min=____, Q1=____, Median=____, Q3=____, Max=____, IQR=____. Team ____ is more consistent because its IQR is ____.

Show your work:

Reflect — Exit Ticket

A box plot has $Q1 = 20$ and $Q3 = 36$. What is the IQR and what does it represent?

- A. IQR = 16; it is the spread of the middle 50% of the data
- B. IQR = 56; it is the total of $Q1$ and $Q3$
- C. IQR = 28; it is the median between $Q1$ and $Q3$
- D. IQR = 36; it is the value of $Q3$

Your answer:

Answer Key & Teacher Guide

1. **Try It 1:** A. 23 — $\text{Range} = \text{max} - \text{min} = 31 - 8 = 23$.
2. **Try It 2:** A. Team A's middle 50% is more consistent; Team B's is more spread out — *A smaller IQR means the middle 50% of data is more tightly clustered. Team A's scoring is more consistent in the middle range.*
3. **Exit Ticket:** A. $\text{IQR} = 16$; it is the spread of the middle 50% of the data — $\text{IQR} = Q3 - Q1 = 36 - 20 = 16$. *The IQR tells you the range of the middle 50% of the data.*

Writing (TWR) — what to look for

- **Kernel sentence:** A complete sentence needs a subject and a verb. Example: Box Plot is a graph that shows how data is spread using five key numbers.
- **Expansion:** *because* gives a reason, *but* shows a contrast or exception, *so* shows a result. Answers vary; each must keep the kernel idea and add the correct kind of detail.
- **Sentence types:** Statement ends with a period, question with "?", exclamation with "!", and a command starts with an action verb (a "bossy" verb).