GRADE 7 · UNIT 13 · LESSON 4

# Comparing Graphical Representations

**MA.7.DP.1.2**

I can compare two groups from their displays — which is typically greater, and which varies more — and say what the comparison means.

# Warm-Up

1. Typical allowance: $8, $9, $10, $10, $12, $75. Mean or median?
2. Least 4, Q1 = 7, median 9, Q3 = 13, greatest 18. Find the IQR.
3. Solve: $4x + 9 = 37$
4. In a box plot, what does the line inside the box mark?

# Warm-Up

1. Typical allowance: $8, $9, $10, $10, $12, $75. Mean or median?

   **Median: the $75 pulls the mean up**

2. Least 4, Q1 = 7, median 9, Q3 = 13, greatest 18. Find the IQR.

   **6**

3. Solve: $4x + 9 = 37$ $x = 7$

4. In a box plot, what does the line inside the box mark?

   **The median**

# Vocabulary

**variability**

how spread out the data are, measured by the range or the interquartile range. More variability means less consistent.

**variation, spread**

other words for variability: the same idea

# Notes

## I. Two questions, always

**Center** — which group is typically greater? Medians or means.

**Variability** — which is more spread out, less consistent? IQRs or ranges.

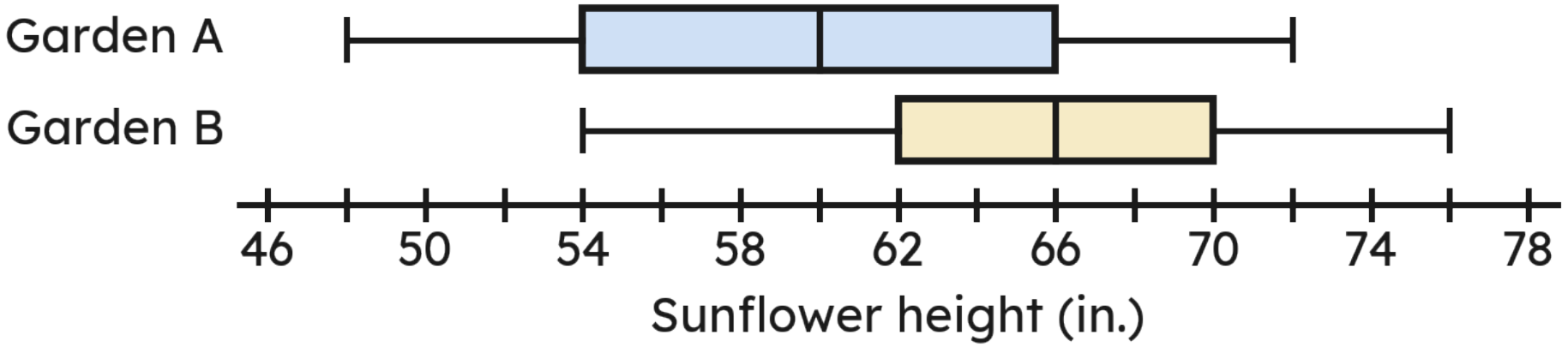
Then one sentence about the two groups, and nothing it cannot show.

# Notes

## II. Two box plots on one scale

Medians, the lines in the boxes: A 60, B 66. Garden B is typically taller.

IQRs, the boxes' lengths: A $66 - 54 = 12$, B $70 - 62 = 8$. Garden A varies more.

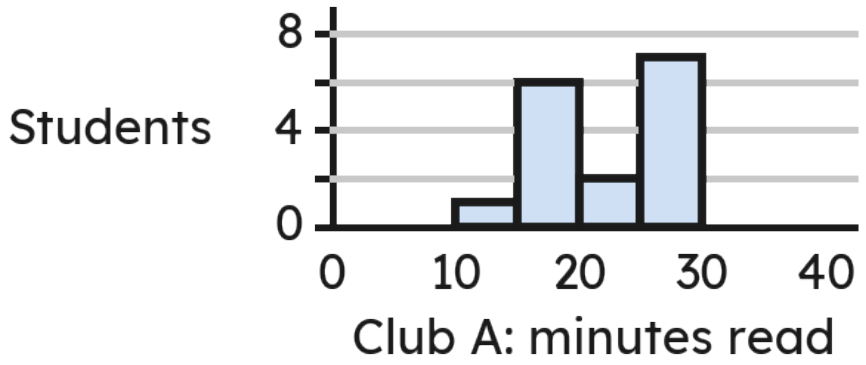


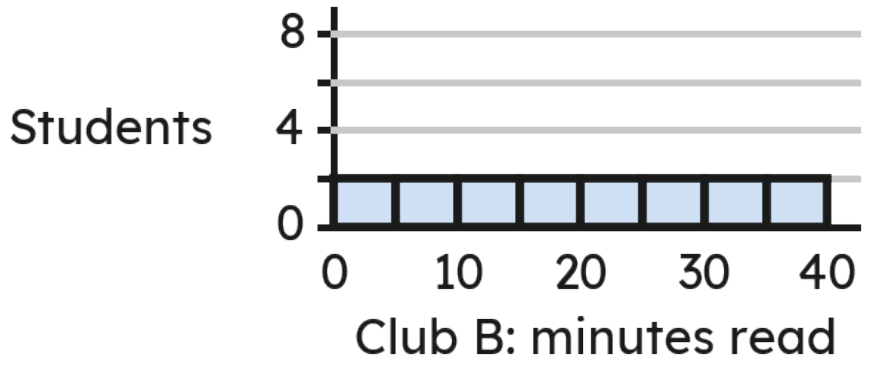
# Notes

## III. Two histograms on one scale

Uneven bars are not spread: look at how much of the scale the data cover.

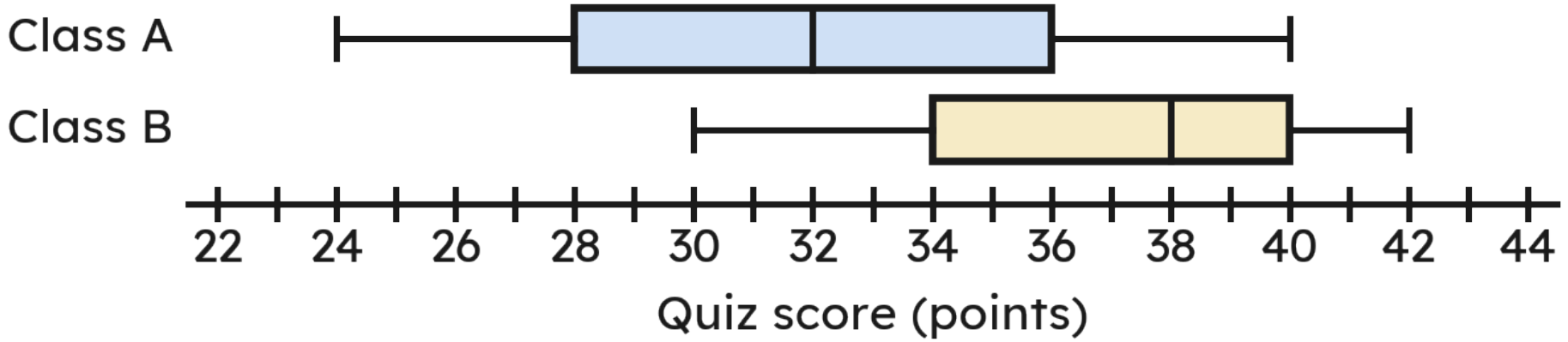
Club A's bars are uneven, but its minutes cover only 10 to 30. Club B's cover 0 to 40: Club B's minutes vary more.



# Example 1

Box plots show two classes' scores on the same quiz.




**Which class typically scored higher? Whose scores vary more?**

# Example 1

Medians: Class A 32, Class B 38

IQRs: Class A $36 - 28 = 8$, Class B $40 - 34 = 6$

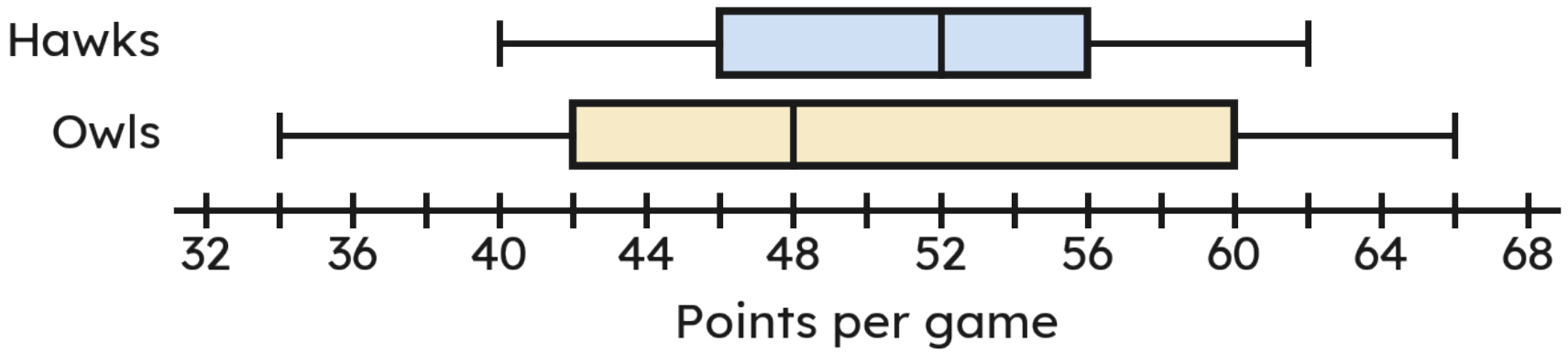
Ranges: Class A $40 - 24 = 16$, Class B $42 - 30 = 12$

**Answer: Class B typically scored higher; Class A's scores vary more.**

# Your Turn

Box plots show two teams' points per game.

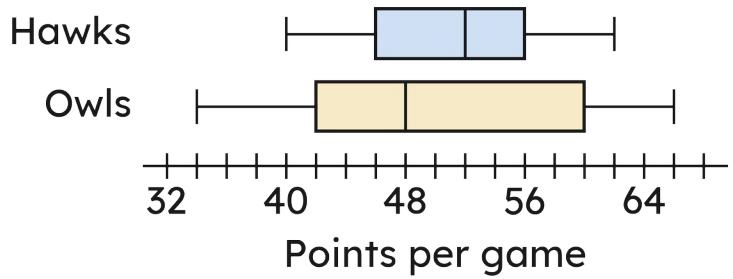
**Which team typically scores more? Whose points vary more?**



# Your Turn

Box plots show two teams' points per game.

**Which team typically scores more? Whose points vary more?**



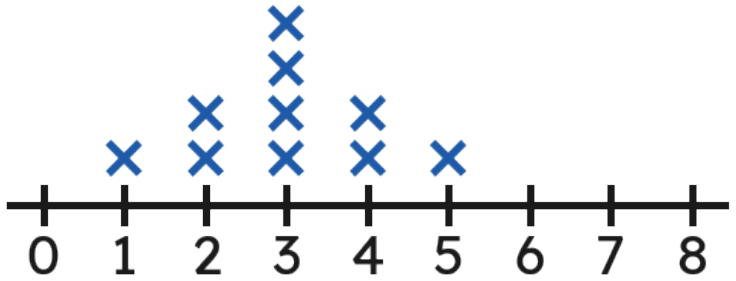

Medians: Hawks 52, Owls 48

IQRs: Hawks $56 - 46 = 10$, Owls $60 - 42 = 18$

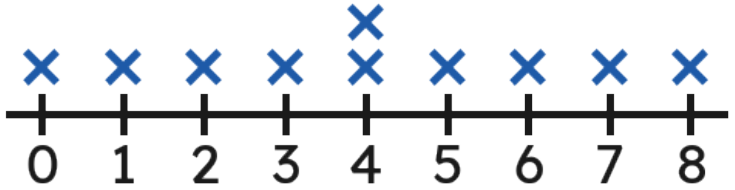
**Answer: The Hawks typically score more; the Owls' points vary more.**

# Example 2

Line plots show the goals two teams scored in 10 games each.




Lions: goals in a game




Tigers: goals in a game

**Which team typically scores more? Whose goals vary more?**

# Example 2

Means: Lions $30 \div 10 = 3$, Tigers $40 \div 10 = 4$

Ranges: Lions $5 - 1 = 4$, Tigers $8 - 0 = 8$

**Answer: The Tigers typically score more, and their goals vary more.**

# Your Turn

Books read this month by Club P: 2, 3, 3, 4, 4, 4, 5, 5, 6

Books read this month by Club Q: 3, 4, 4, 5, 5, 6, 8, 9, 10

**Which club typically read more? Whose numbers vary more?**

# Your Turn

Books read this month by Club P: 2, 3, 3, 4, 4, 4, 5, 5, 6

Books read this month by Club Q: 3, 4, 4, 5, 5, 6, 8, 9, 10

**Which club typically read more? Whose numbers vary more?**

Means: P $36 \div 9 = 4$, Q $54 \div 9 = 6$

Ranges: P $6 - 2 = 4$, Q $10 - 3 = 7$

**Answer: Club Q typically read more, and its numbers vary more.**

# Whiteboards · Question 1 of 9

Box plots show the heights of tomato plants in sun and in shade.

**What is the median height of the plants in sun?**

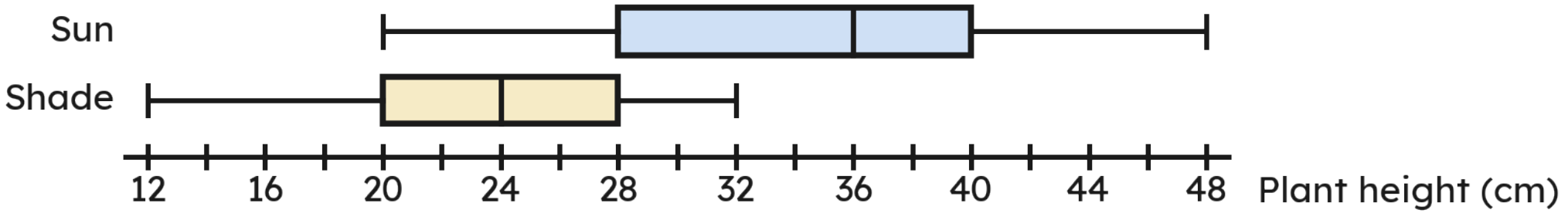



**Answer it.**

# Whiteboards · Question 1 of 9

Box plots show the heights of tomato plants in sun and in shade.

**What is the median height of the plants in sun?**




The median of the Sun plants is the line inside the Sun box: 36

**Answer: 36 cm**

# Whiteboards · Question 2 of 9

Box plots show the heights of tomato plants in sun and in shade.

**What is the IQR of the heights of the plants in shade?**

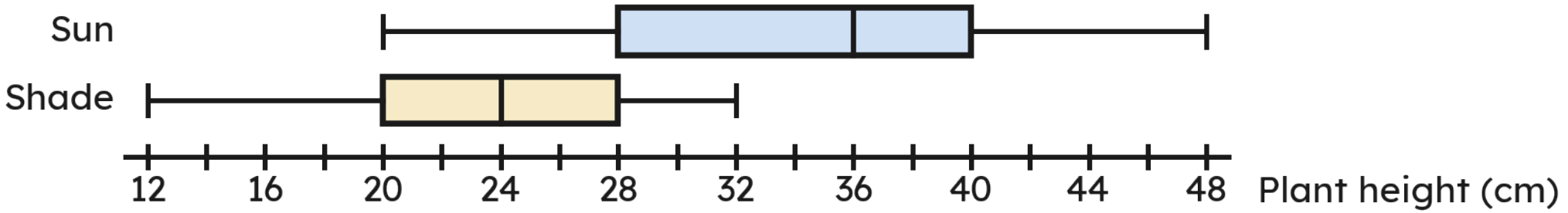



**Answer it.**

# Whiteboards · Question 2 of 9

Box plots show the heights of tomato plants in sun and in shade.

**What is the IQR of the heights of the plants in shade?**

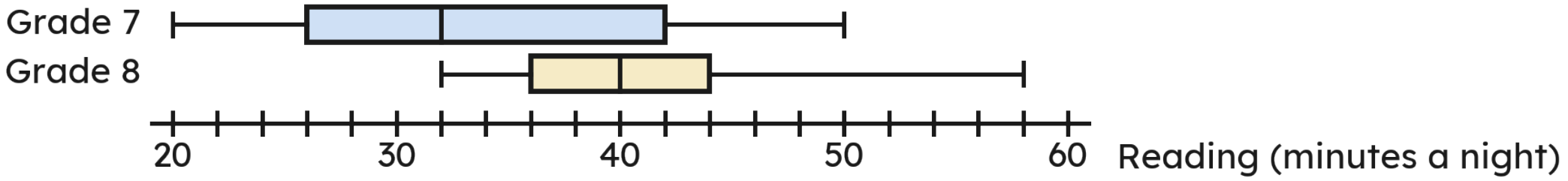



Shade box: Q1 = 20, Q3 = 28, so the IQR is $28 - 20 = 8$

**Answer: 8 cm**

# Whiteboards · Question 3 of 9

**Which grade's nightly reading minutes vary more?**




**A.** Grade 7: longer box

**B.** Grade 8: higher median

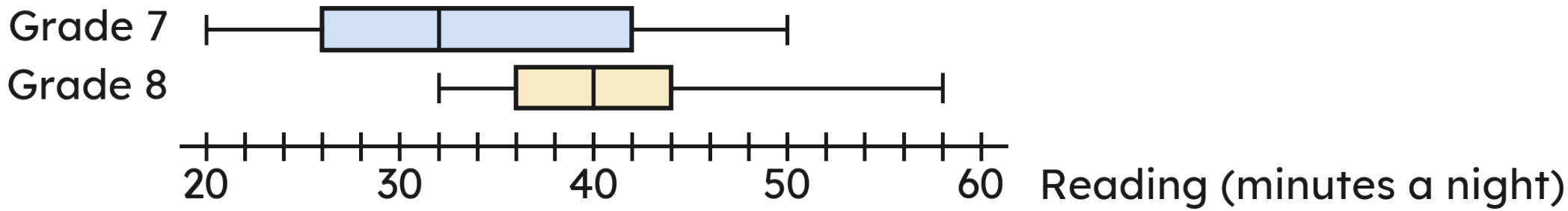
**C.** Grade 8: longer whisker

**D.** Same: equal box heights

**Answer it.**

# Whiteboards · Question 3 of 9

**Which grade's nightly reading minutes vary more?**



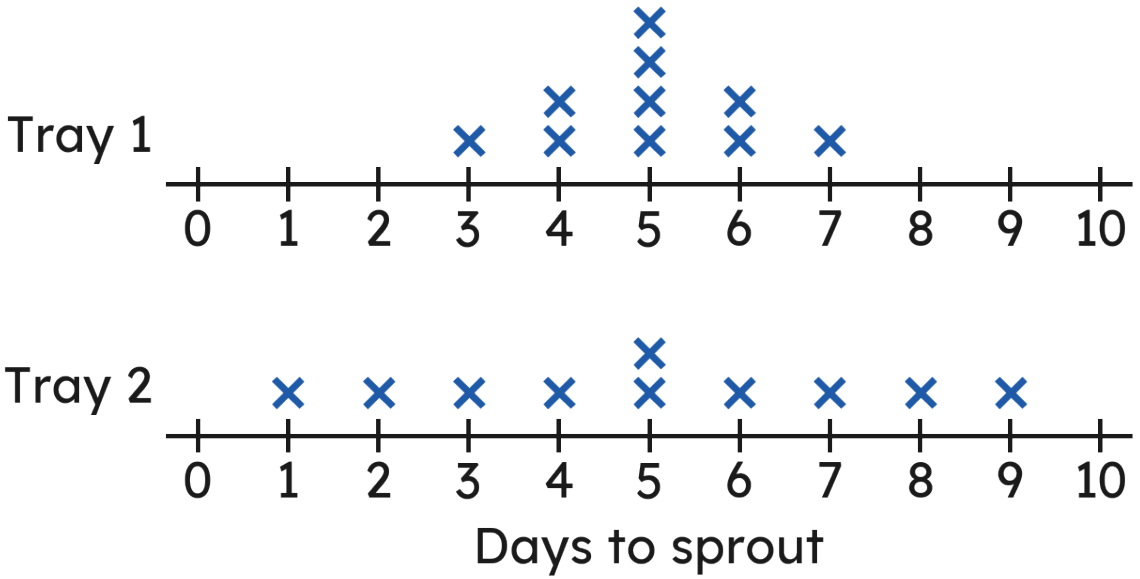

IQRs: Grade 7 $42 - 26 = 16$, Grade 8 $44 - 36 = 8$: longer for Grade 7

Ranges: Grade 7 $50 - 20 = 30$, Grade 8 $58 - 32 = 26$

**Answer: A — Grade 7: its box is longer**

# Whiteboards · Question 4 of 9

**Which statement about the days to sprout is true?**




**A.** Tray 1 varies more

**B.** Tray 2 varies more

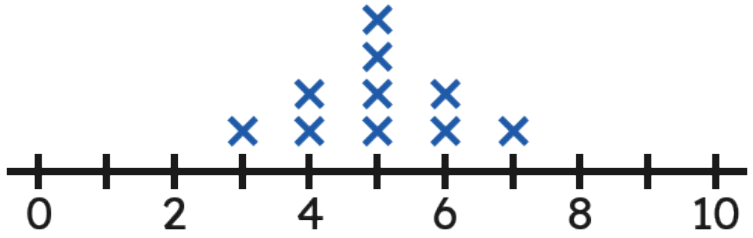
**C.** Tray 2's mean is greater

**D.** Same: 10 seeds each

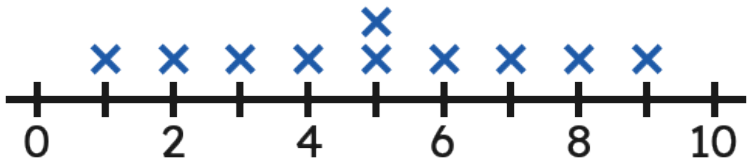
**Answer it.**

# Whiteboards · Question 4 of 9

**Which statement about the days to sprout is true?**



Tray 1: days to sprout



Tray 2: days to sprout

Means: Tray 1 $50 \div 10 = 5$, Tray 2 $50 \div 10 = 5$: the same

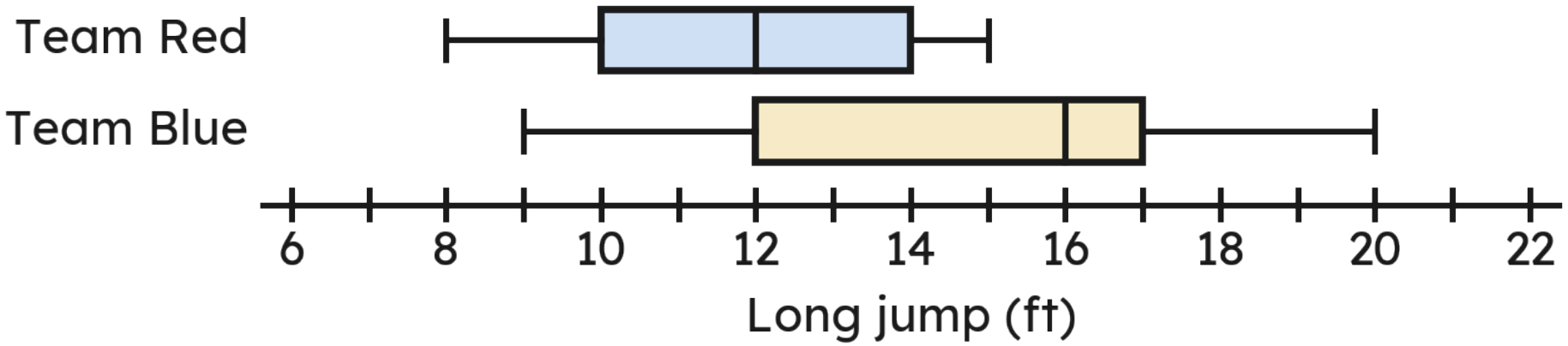
Ranges: Tray 1 $7 - 3 = 4$, Tray 2 $9 - 1 = 8$: Tray 2 spreads farther

**Answer: B — Tray 2 varies more**

# Whiteboards · Question 5 of 9

Box plots show the long-jump distances of two teams.

**How much greater is Team Blue's median than Team Red's?**

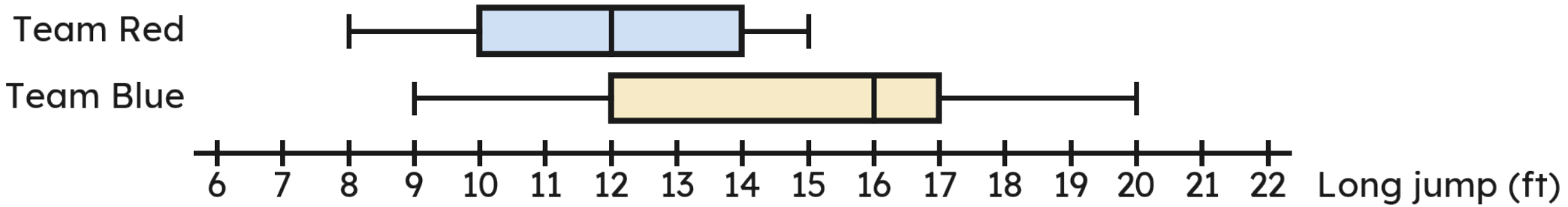



**Answer it.**

# Whiteboards · Question 5 of 9

Box plots show the long-jump distances of two teams.

**How much greater is Team Blue's median than Team Red's?**

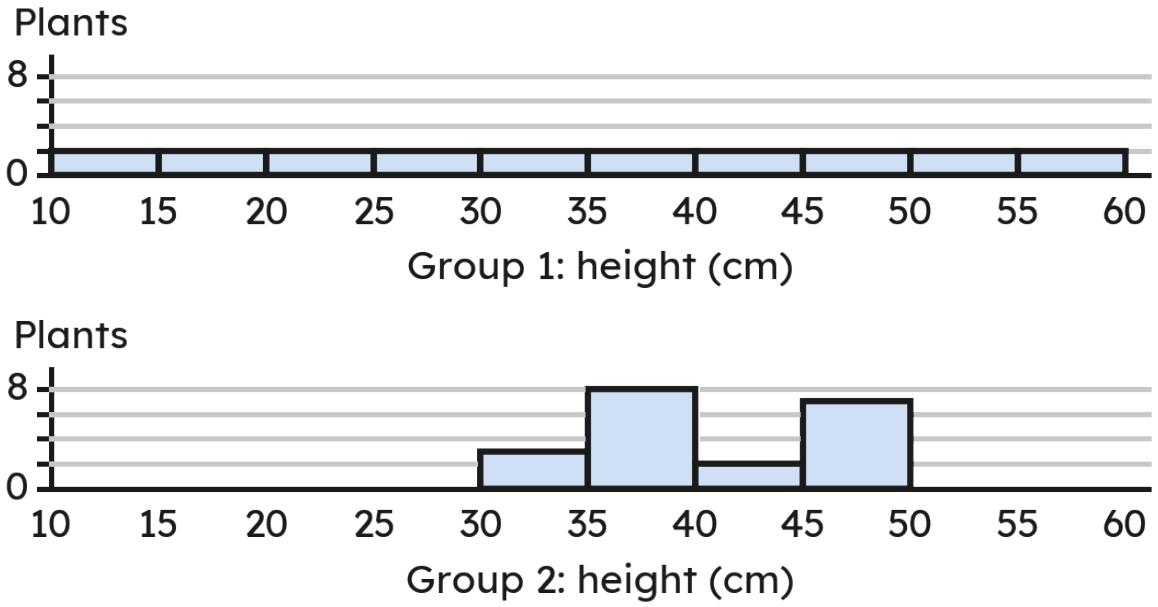



Medians, the lines in the boxes: Blue 16, Red 12; $16 - 12 = 4$

**Answer: 4 ft**

# Whiteboards · Question 6 of 9

## Which group of bean plants varies more in height?




**A.** Group 2: uneven bars

**B.** Group 2: tallest bar

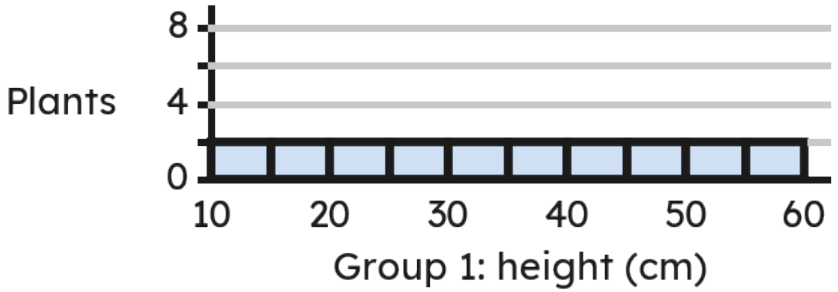
**C.** Neither: 20 plants each

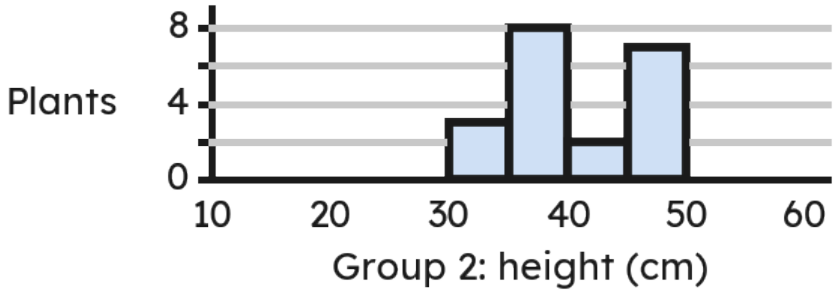
**D.** Group 1: covers more

**Answer it.**

# Whiteboards · Question 6 of 9

**Which group of bean plants varies more in height?**



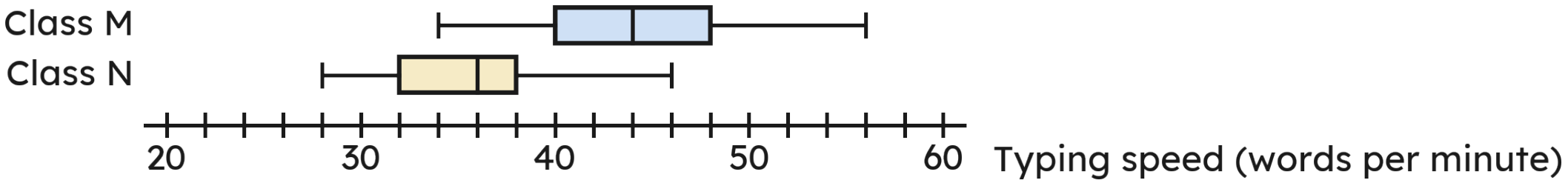

Group 1 covers 10 to 60 cm; Group 2 only 30 to 50 cm

A bar's height counts plants; it is not the spread

**Answer: D — Group 1 covers more of the scale**

# Whiteboards · Question 7 of 9

**Which conclusion do the typing-speed box plots support?**




**A.** All of M beat all of N

**B.** N varies more

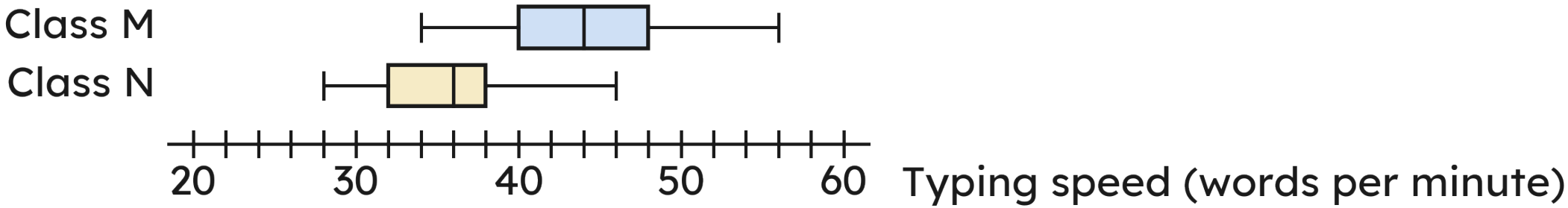
**C.** M typically types faster

**D.** M is faster every year

**Answer it.**

# Whiteboards · Question 7 of 9

**Which conclusion do the typing-speed box plots support?**




Medians: M 44, N 36, and $44 - 36 = 8$ words per minute

The plots overlap: N's fastest, 46, beats M's slowest, 34

**Answer: C — Class M typically types faster**

# Whiteboards · Question 8 of 9

Swim times at Pool A have an IQR of 4 seconds, and at Pool B an IQR of 9 seconds; both pools are 25 meters long.

**Which pool's swim times are more consistent?**

**Answer it.**

# Whiteboards · Question 8 of 9

Swim times at Pool A have an IQR of 4 seconds, and at Pool B an IQR of 9 seconds; both pools are 25 meters long.

**Which pool's swim times are more consistent?**

IQRs: Pool A 4 s, Pool B 9 s

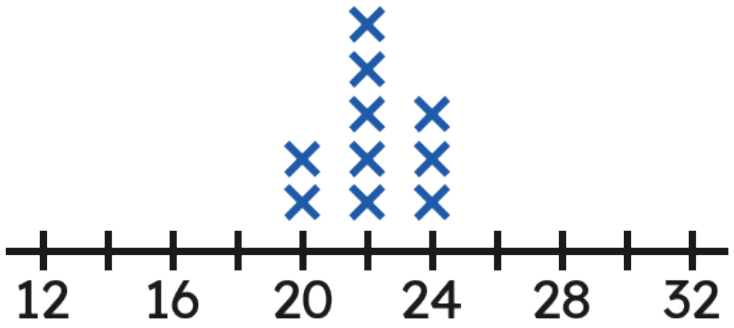
$4 < 9$: Pool A's times vary less

**Answer: Pool A**

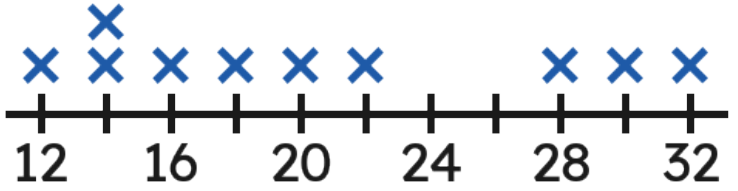
# Whiteboards · Question 9 of 9

You must get to school within 26 minutes.

**Which bus route should you take? Explain.**




Route 1: ride (minutes)



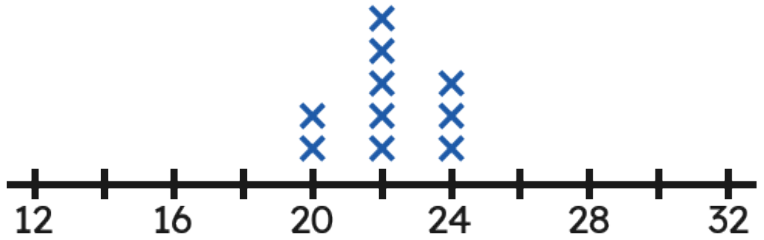

Route 2: ride (minutes)

**Write your answer in sentences.**

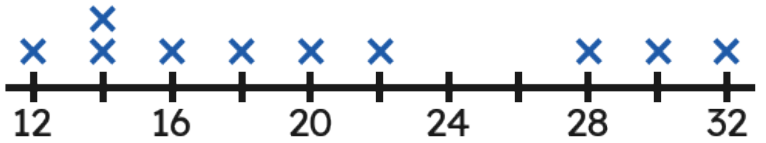
# Whiteboards · Question 9 of 9

You must get to school within 26 minutes.

**Which bus route should you take? Explain.**



Route 1: ride (minutes)



Route 2: ride (minutes)

Ranges: Route 1 $24 - 20 = 4$, Route 2 $32 - 12 = 20$; Route 2: 3 late

**Answer: Route 1: it varies less; never late**

# Independent Practice

1. Box plot A: least 6, Q1 = 10, median 13, Q3 = 17, greatest 24. Box plot B: least 9, Q1 = 12, median 16, Q3 = 18, greatest 21. Which median is greater?

2. In question 1, find the IQR of each box plot.

3. In question 1, find the range of each box plot.

4. In question 1, which data set varies more? Name the measure you used.

5. Line plot C shows 23, 24, 25, 25, 25, 26, 27. Line plot D shows 20, 22, 24, 25, 27, 28, 29. Compare their means and their ranges.

6. Club R's heights: median 150 cm, IQR 8 cm. Club S's heights: median 156 cm, IQR 4 cm. Write one sentence comparing the clubs.

# Before You Go

Center: which group is typically greater?

Variability: how spread out, by the range or the IQR — not how uneven the bars are.

Friday: we compute both pairs of measures from lists and two-sided stem-and-leaf plots.

# IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 60. Due by the Unit 13 test.

**Today's skills — all required**

Compare populations using measures of center and spread (JQW)