GRADE 7 · UNIT 13 · LESSON 8–9

# Creating Displays for Numerical and Categorical Data

**MA.7.DP.1.5**

I can create a line plot, a stem-and-leaf plot, a histogram, a box plot and a bar chart from a data set, with titles, labels and a key.

# Warm-Up

1. Best display for the favorite colors of 25 students?
2. Find Q1 and Q3:  2, 4, 7, 9, 10, 13, 15
3. Solve:  $5x - 4 = 31$
4. Histogram bars over 0–9, 10–19, 20–29: which bar holds 19?

# Warm-Up

1. Best display for the favorite colors of 25 students?

   **A bar chart (or a circle graph)**

2. Find Q1 and Q3: 2, 4, 7, 9, 10, 13, 15 **Q1 = 4, Q3 = 13**

3. Solve: $5x - 4 = 31$ $x = 7$

4. Histogram bars over 0–9, 10–19, 20–29: which bar holds 19?

   **10–19**

# Vocabulary

**frequency table**

a table of how many values fall in each category or interval

**interval**

a run of numbers, such as 20–29, that one bar of a histogram counts; the intervals are equal and do not overlap

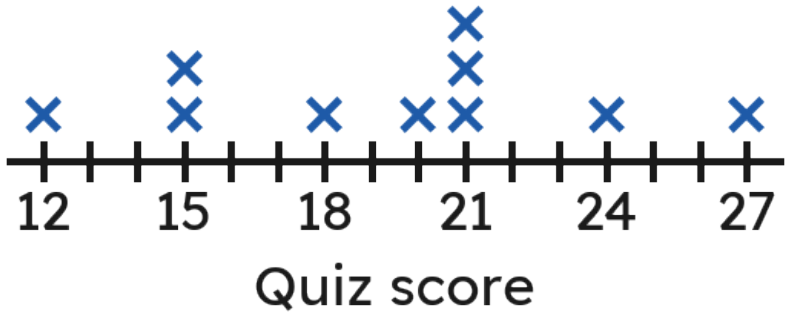
**five-number summary**

the least value, Q1, the median, Q3 and the greatest value — the five numbers a box plot draws

# Notes

## I. Every value shown: a line plot and a stem-and-leaf plot

Quiz scores: 12, 15, 15, 18, 20, 21, 21, 21, 24, 27




Quiz scores

| Stem | Leaf |
|---|---|
| 1 | 2 5 5 8 |
| 2 | 0 1 1 1 4 7 |

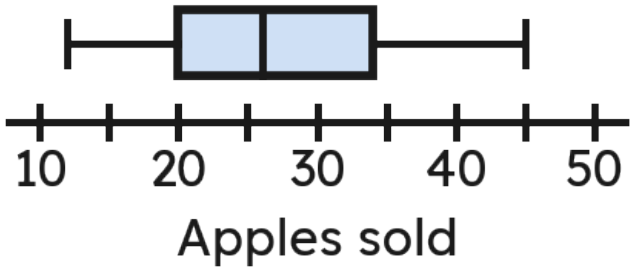
Key: 1 | 2 means 12

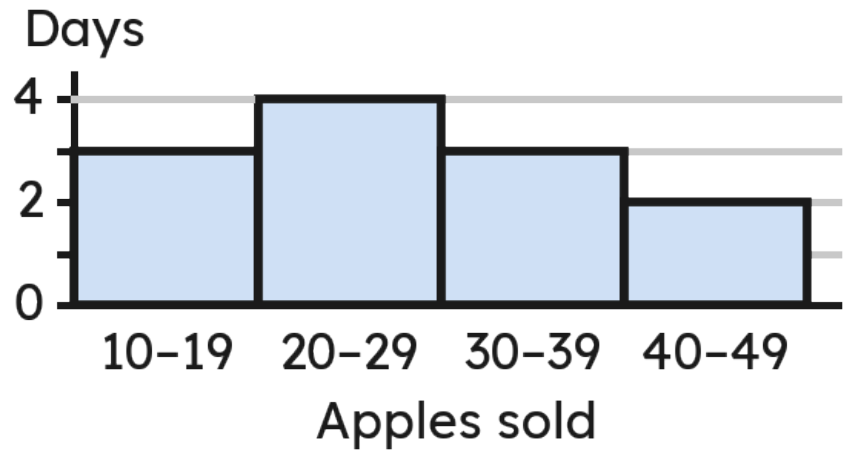
Line plot: one X for each value. Stem-and-leaf: leaves in order, and a key.

# Notes

## II. Grouped: a histogram and a box plot

Apples sold: 12, 15, 18, 22, 24, 25, 27, 31, 32, 36, 41, 45



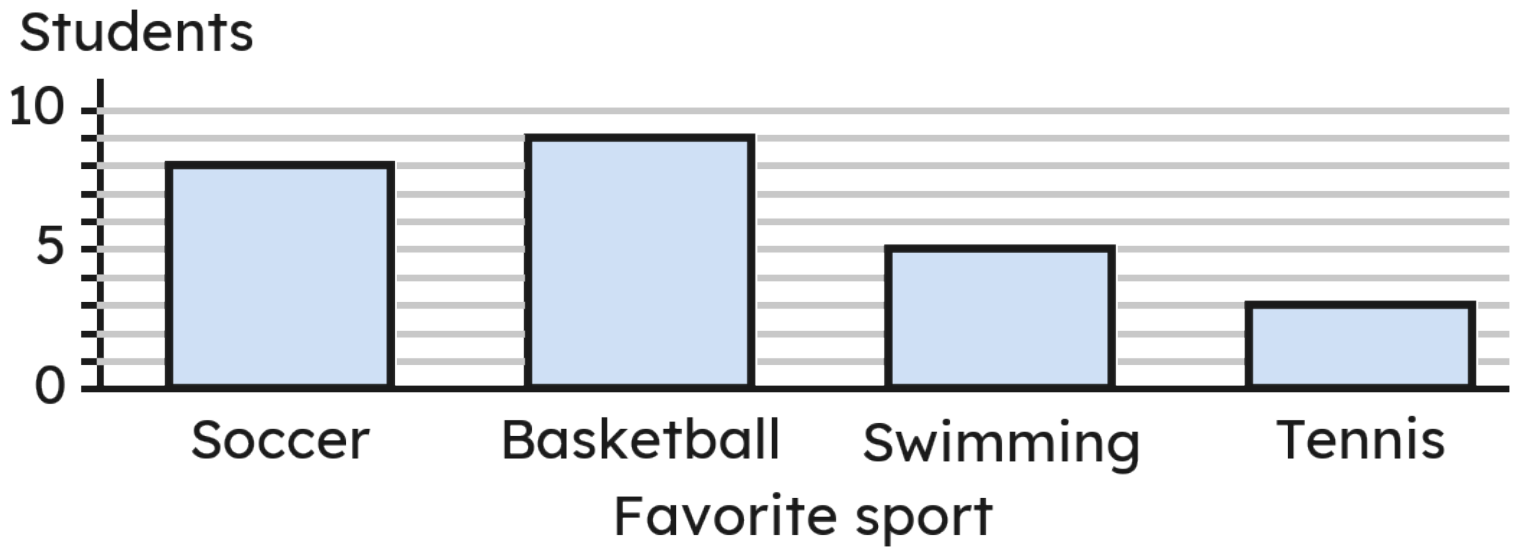

Histogram: counts 3, 4, 3, 2; the bars touch.

Box plot: 12, (18 + 22) ÷ 2 = 20, (25 + 27) ÷ 2 = 26, (32 + 36) ÷ 2 = 34, 45.

# Notes

## III. Categorical: a bar chart

Favorite sport: soccer 8, basketball 9, swimming 5, tennis 3




One bar for each category, with gaps. The count axis starts at 0.

# Example 1

Points a team scored in 10 games:

34, 27, 41, 38, 29, 45, 33, 27, 36, 40

**Make a stem-and-leaf plot of the points.**

# Example 1

Points in a game

| Stem | Leaf |
|---|---|
| 2 | 7 7 9 |
| 3 | 3 4 6 8 |
| 4 | 0 1 5 |

Key: 2 | 7 means 27

Order: 27, 27, 29, 33, 34, 36, 38, 40, 41, 45

Stems: the tens digits, 2, 3 and 4.

Key: 2 | 7 means 27

# Your Turn

Siblings of 9 students:

1, 2, 0, 3, 1, 2, 1, 4, 2

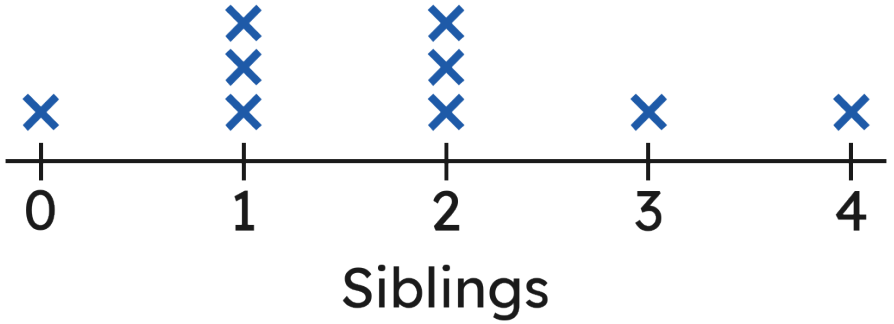
Make a line plot of the siblings.

# Your Turn

Siblings of 9 students:

1, 2, 0, 3, 1, 2, 1, 4, 2

Make a line plot of the siblings.




Number line from 0 to 4

X's over 0, 1, 2, 3, 4: 1, 3, 3, 1, 1

Check: $1 + 3 + 3 + 1 + 1 = 9$ X's

**Answer: 1, 3, 3, 1 and 1 X's over 0 to 4**

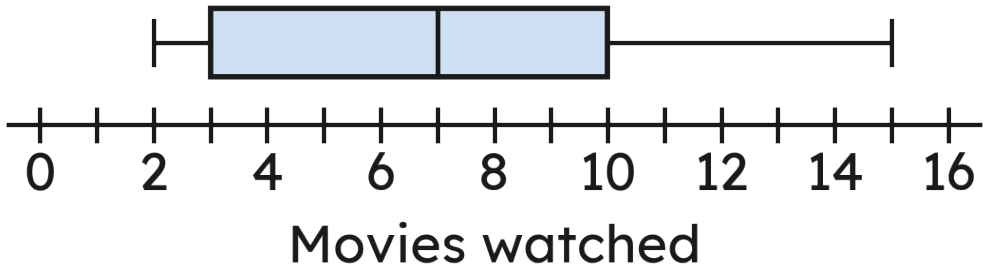
# Example 2

Movies 11 students watched last month:

2, 3, 3, 5, 6, 7, 8, 8, 10, 12, 15

**Find the five-number summary. Then draw the box plot.**

# Example 2




Median: the 6th of 11 values, 7

Lower half 2, 3, 3, 5, 6: Q1 = 3

Upper half 8, 8, 10, 12, 15: Q3 = 10

Least 2, greatest 15

**Answer: 2, 3, 7, 10, 15**

# Your Turn

Bananas sold on 12 days:

8, 14, 21, 17, 33, 25, 12, 28, 15, 36, 19, 26

Make a frequency table: count 0–9, 10–19, 20–29, 30–39.

# Your Turn

Bananas sold on 12 days:

8, 14, 21, 17, 33, 25, 12, 28, 15, 36, 19, 26

Make a frequency table: count 0–9, 10–19, 20–29, 30–39.

0–9: 8

10–19: 14, 17, 12, 15, 19

20–29: 21, 25, 28, 26

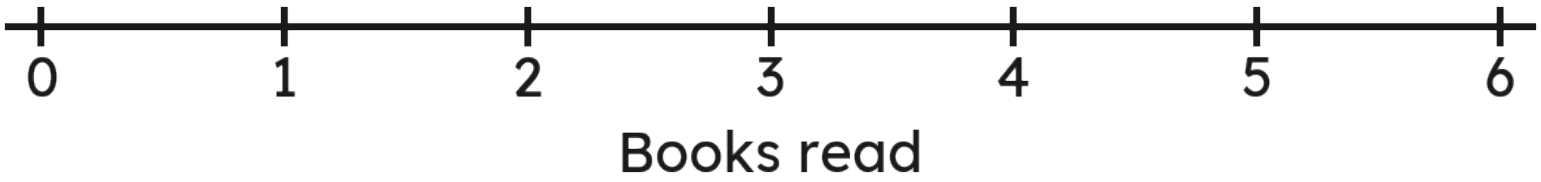
30–39: 33, 36

**Answer: 1, 5, 4 and 2 days — the four bars**

# Whiteboards · Question 1 of 9

Books read by 12 students: 3, 4, 2, 4, 5, 1, 4, 3, 6, 4, 2, 3

**How many X's go above 4 on a line plot of the books?**

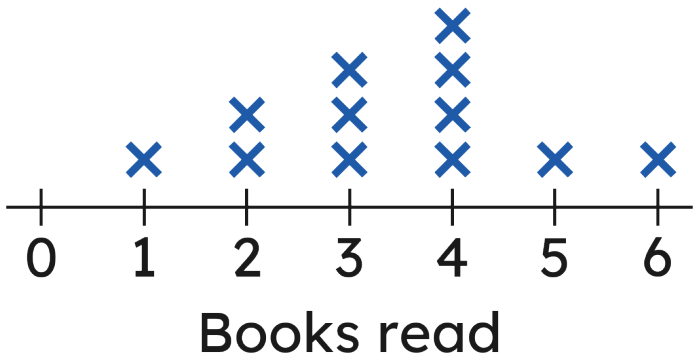



**Answer it.**

# Whiteboards · Question 1 of 9

Books read by 12 students: 3, 4, 2, 4, 5, 1, 4, 3, 6, 4, 2, 3

**How many X's go above 4 on a line plot of the books?**




The 4s in the list: 4, 4, 4, 4

One X for each: 4 X's

**Answer: 4**

# Whiteboards · Question 2 of 9

Minutes 10 students read: 18, 24, 31, 22, 29, 15, 24, 36, 27, 20

**What are the leaves on stem 2 of a stem-and-leaf plot?**

**A.** 4, 2, 9, 4, 7, 0

**B.** 0, 2, 4, 4, 7, 9

**C.** 2, 4, 4, 7, 9

**D.** 0, 2, 4, 7, 9

**Answer it.**

# Whiteboards · Question 2 of 9

Minutes 10 students read: 18, 24, 31, 22, 29, 15, 24, 36, 27, 20

**What are the leaves on stem 2 of a stem-and-leaf plot?**

Minutes read

| Stem | Leaf |
|---|---|
| 1 | 5 8 |
| 2 | 0 2 4 4 7 9 |
| 3 | 1 6 |

Key: 1 \| 5 means 15

Stem 2: 20, 22, 24, 24, 27, 29

Leaves in order: 0 2 4 4 7 9

**Answer: B — 0, 2, 4, 4, 7, 9**

# Whiteboards · Question 3 of 9

Oranges sold on 12 days: 14, 22, 30, 27, 19, 25, 33, 20, 29, 11, 38, 24

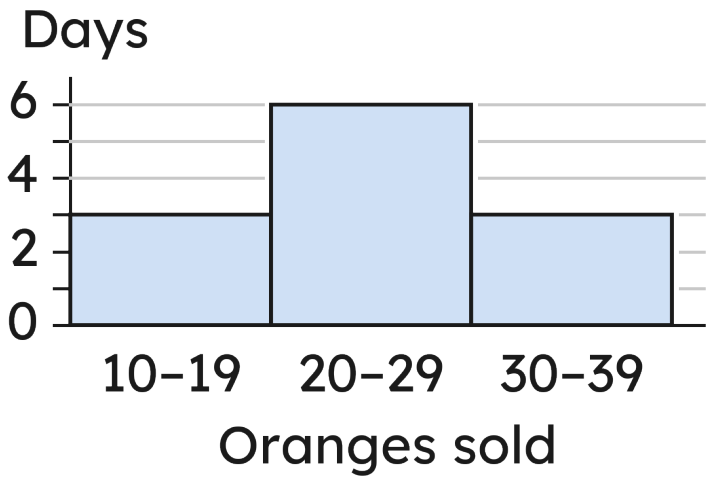
**How many days go in the interval 20–29?**

**Answer it.**

# Whiteboards · Question 3 of 9

Oranges sold on 12 days: 14, 22, 30, 27, 19, 25, 33, 20, 29, 11, 38, 24

**How many days go in the interval 20–29?**




20–29: 20, 22, 24, 25, 27, 29

The 30 goes in 30–39

**Answer: 6 days**

# Whiteboards · Question 4 of 9

Quiz scores of 9 students: 9, 4, 10, 7, 6, 8, 10, 7, 9

**Which is the five-number summary?**

**A.** 4, 7, 8, 9, 10

**B.** 4, 7, 8, 9.5, 10

**C.** 4, 6.5, 8, 9.5, 10

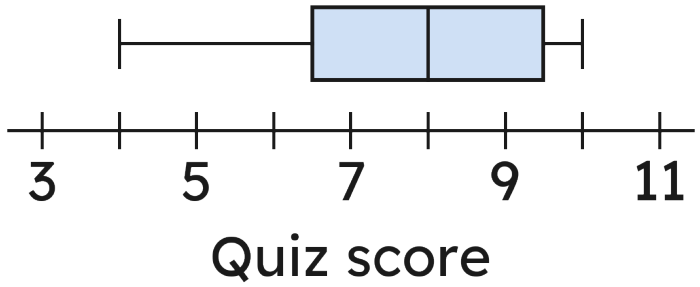
**D.** 4, 6, 8, 9.5, 10

**Answer it.**

# Whiteboards · Question 4 of 9

Quiz scores of 9 students: 9, 4, 10, 7, 6, 8, 10, 7, 9

**Which is the five-number summary?**




In order: 4, 6, 7, 7, 8, 9, 9, 10, 10

Median: the 5th value, 8

Q1 of 4, 6, 7, 7: $(6 + 7) \div 2 = 6.5$

Q3 of 9, 9, 10, 10: $(9 + 10) \div 2 = 9.5$

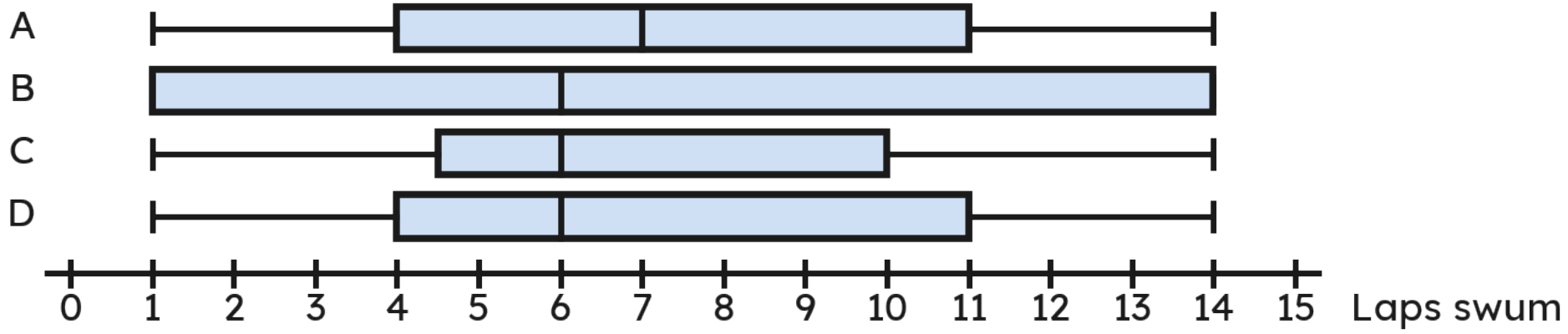
Least 4, greatest 10

**Answer: C — 4, 6.5, 8, 9.5, 10**

# Whiteboards · Question 5 of 9

Laps 11 swimmers swam: 1, 2, 4, 5, 5, 6, 8, 9, 11, 12, 14

**Which box plot shows the laps: A, B, C or D?**

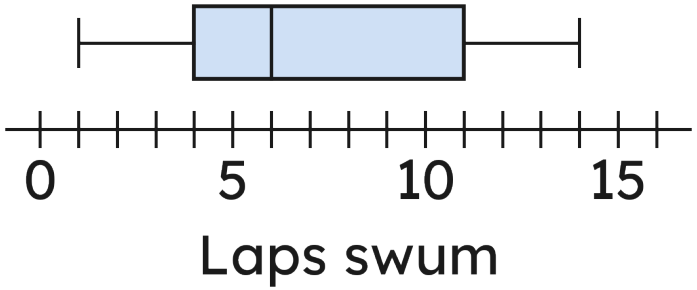



**Answer it.**

# Whiteboards · Question 5 of 9

Laps 11 swimmers swam: 1, 2, 4, 5, 5, 6, 8, 9, 11, 12, 14

**Which box plot shows the laps: A, B, C or D?**




Median: the 6th value, 6

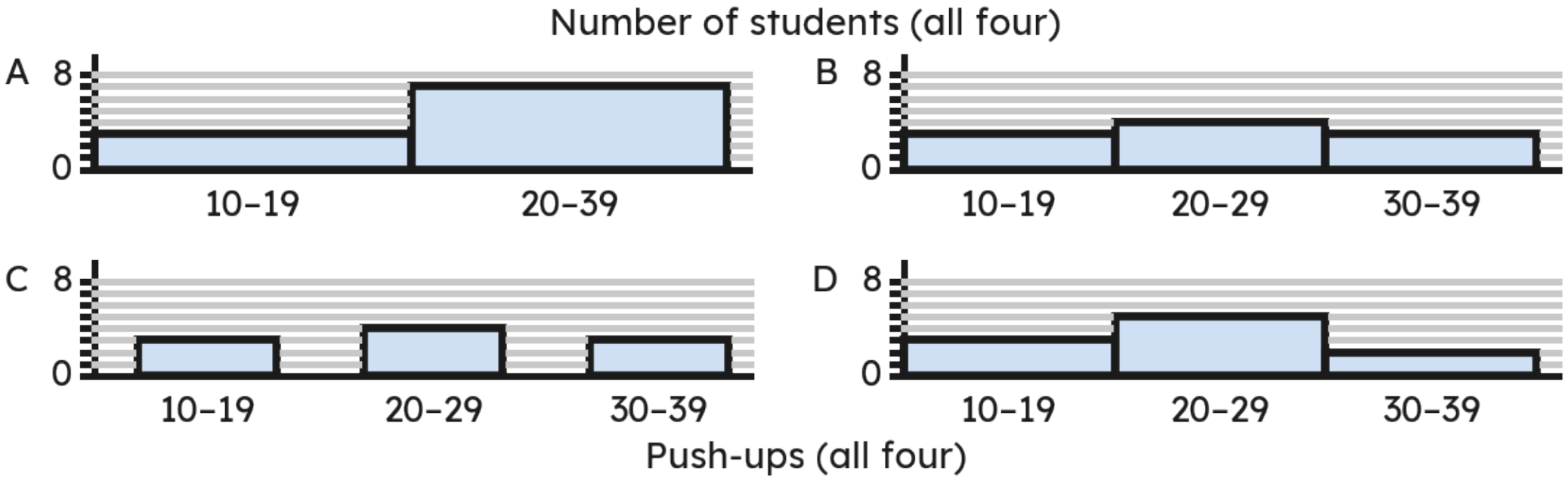
Q1 = 4, Q3 = 11

Least 1, greatest 14

**Answer: D**

# Whiteboards · Question 6 of 9

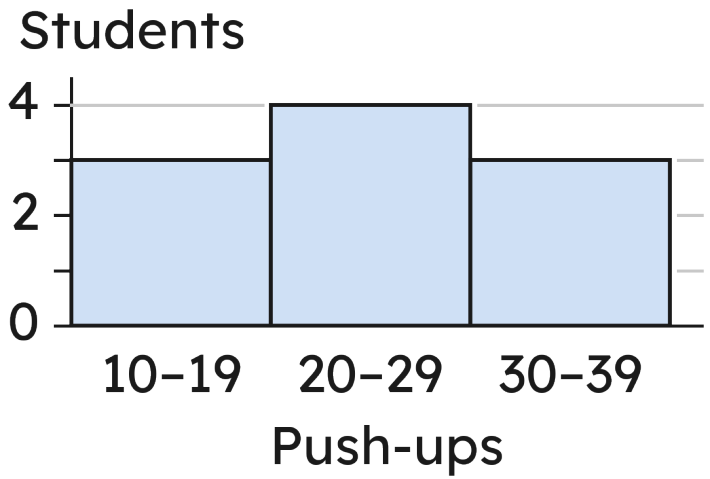
**Which histogram shows 12, 15, 17, 21, 24, 26, 28, 30, 35, 38?**




**Answer it.**

# Whiteboards · Question 6 of 9

**Which histogram shows 12, 15, 17, 21, 24, 26, 28, 30, 35, 38?**




Counts: 3, 4, 3

The 30 is in 30–39

Equal intervals; bars touch

**Answer: B**

# Whiteboards · Question 7 of 9

A fruit stand sold 6 apples, 2 pears, 8 bananas and 4 plums.

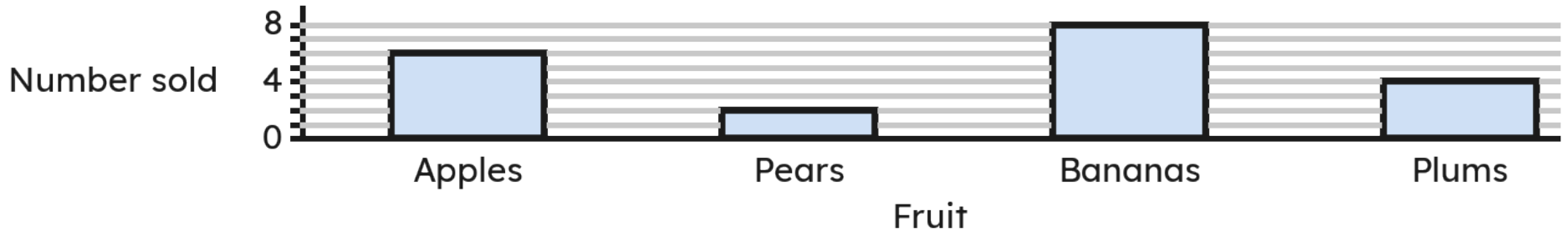
**Draw a bar chart. Which bar is tallest, and how tall?**

**Answer it.**

# Whiteboards · Question 7 of 9

A fruit stand sold 6 apples, 2 pears, 8 bananas and 4 plums.

**Draw a bar chart. Which bar is tallest, and how tall?**




Four bars, with gaps; count axis from 0; tallest: bananas, 8

**Answer: Bananas, 8 tall**

# Whiteboards · Question 8 of 9

A bakery sold 41, 35, 52, 47, 38, 44, 56, 49, 40, 33 loaves on 10 days, at $4 a loaf.

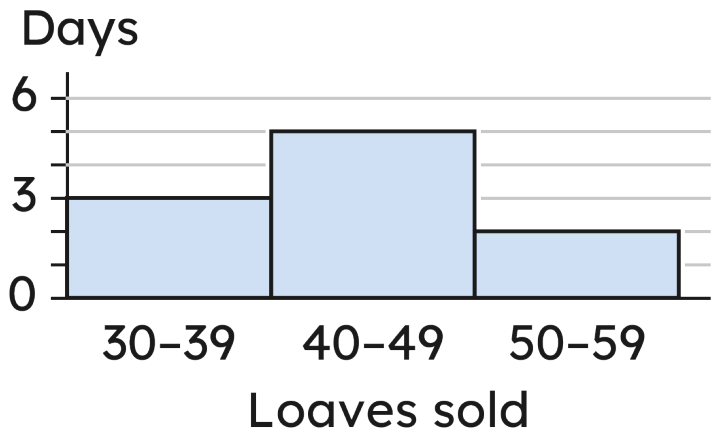
**How many days go in the 40–49 bar of a histogram?**

**Answer it.**

# Whiteboards · Question 8 of 9

A bakery sold 41, 35, 52, 47, 38, 44, 56, 49, 40, 33 loaves on 10 days, at $4 a loaf.

**How many days go in the 40–49 bar of a histogram?**




40–49: 40, 41, 44, 47, 49

That is 5 days

**Answer: 5 days**

# Whiteboards · Question 9 of 9

Jay made this stem-and-leaf plot of 10 test scores.

**What is missing, and why does it matter?**

Test scores

| Stem | Leaf |
|---|---|
| 6 | 2 8 |
| 7 | 1 5 5 9 |
| 8 | 3 6 |
| 9 | 0 4 |

**Write your answer in sentences.**

# Whiteboards · Question 9 of 9

Jay made this stem-and-leaf plot of 10 test scores.

**What is missing, and why does it matter?**

Test scores

| Stem | Leaf |
|---|---|
| 6 | 2 8 |
| 7 | 1 5 5 9 |
| 8 | 3 6 |
| 9 | 0 4 |

Key: 6 | 2 means 62

Missing: the key

Without it, 7 | 5 could be 7.5 or 75

With it: 7 | 5 means $7 \cdot 10 + 5 = 75$

**Answer: The key: no one can tell the values**

# Independent Practice

1. What are the leaves on stem 3 of a stem-and-leaf plot of 28, 35, 31, 42, 39, 33, 26, 37?

2. How many X's go above 5 on a line plot of 5, 3, 2, 5, 4, 5, 1, 3, 5, 2?

3. How many of 23, 17, 30, 9, 26, 19, 20, 35, 11 go in the interval 10–19?

4. Find the median of 11, 5, 14, 3, 9, 12, 6, 8.

5. Find Q1 and Q3 of 11, 5, 14, 3, 9, 12, 6, 8.

6. A tally of favorite fruit: apple 7, grape 11, mango 6, pear 4. Which bar of its bar chart is tallest, and how tall?

# Before You Go

Order the data first, every time.

Histogram bars touch; bar chart bars stand apart. Every display is titled; a stem-and-leaf plot has a key.

The practice test goes home today. The Unit 13 test is Thursday and Friday.

# 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 test.

**Today's skills — all required**

Create dot plots (22B)
Create stem-and-leaf plots (8AP)
Create histograms (LGG)
Create bar graphs (E76)
Box plots (SKN)
Create and interpret dot plots with fractions (SHS)