

Graph Detective

Spot display choices that can fool your eye.

GRADE 8 • 8.PS.2.j

8.PS.2.j "Identify components of graphical displays that can be misleading."

NAME _____

DATE _____

CHECK THE DISPLAY

A graph can make a small difference look large when an axis is cut off or spaced unevenly. Check the scale, labels, units, and whether all parts make a complete whole.

WORKED EXAMPLE

Two bars show 14 and 21 points. The y-axis begins at 10 with no break mark. What could mislead a reader?

1. Find the actual difference: $21 - 14 = 7$.
2. The missing part from 0 to 10 makes the bars look farther apart.

Answer: The truncated y-axis can exaggerate a 7-point difference.

PRACTICE 5 problems

- 1** A bar graph shows 43 and 46 votes, but the y-axis starts at 40. What is the actual difference, and what feature is misleading?

ANSWER _____

- 2** A line graph spaces these labels equally: 0, 5, 25, 30. What is misleading?

ANSWER _____

- 3** A circle graph has sections labeled $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{6}$. Does it show a complete whole?

ANSWER _____

- 4** Two equal-height bars each show 18 votes. One bar is 1 cm wide and the other is 3 cm wide. What is misleading?

ANSWER _____

- 5** A graph title says "Most students agree," but the graph shows 18 out of 36 students. Why is the title misleading?

ANSWER _____

APPLY IT Show your work

- 1** A gaming club graph compares 24 students who chose Puzzle Quest and 30 who chose Speed Run. Its y-axis starts at 20 with no break mark. Explain why the graph could be misleading.

WORK SPACE

ANSWER _____

- 2** A screen-time line graph shows Monday, Tuesday, and Friday equally spaced. The values are 28, 32, and 40 minutes. What should be changed to make the time display fair?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Graphs A and B both compare 20 points and 22 points. Graph A has a y-axis from 0 to 24. Graph B has a y-axis from 18 to 24. Which graph makes the difference look larger, and why?

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A bar graph shows 43 and 46 votes, but the y-axis starts at 40. What is the actual difference, and what feature is misleading?	The difference is 3 votes. The y-axis is truncated at 40.
2	A line graph spaces these labels equally: 0, 5, 25, 30. What is misleading?	The intervals are not equal, but they are shown with equal spacing.
3	A circle graph has sections labeled $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{6}$. Does it show a complete whole?	Yes. $\frac{1}{2} + \frac{1}{3} + \frac{1}{6} = 1$.
4	Two equal-height bars each show 18 votes. One bar is 1 cm wide and the other is 3 cm wide. What is misleading?	The unequal bar widths make equal amounts look different.
5	A graph title says "Most students agree," but the graph shows 18 out of 36 students. Why is the title misleading?	18 out of 36 is $\frac{1}{2}$, so it is not most students.

PART 2 • APPLY IT

- The actual difference is 6 students, but the truncated y-axis makes the difference look much larger.**
Subtract 24 from 30, then note that the graph leaves out values from 0 to 20.
- Friday should be farther from Tuesday than Tuesday is from Monday, or the graph should use equally spaced days.** The time from Tuesday to Friday is longer than the time from Monday to Tuesday, so equal spacing is inaccurate.

CHALLENGE

Graph B makes the difference look larger because its y-axis starts at 18, so the 2-point difference fills more of the graph.

Accept equivalent statements about truncated axes, unequal intervals, misleading widths, or inaccurate titles. For the challenge, accept that Graph B visually magnifies the same 2-point difference.