

From Library Data to Displays

Use the whole distribution to support your conclusion.

GRADE 6 • 6.NR.2.2

6.NR.2.2 "Excerpt: Summarize categorical and quantitative (numerical) data sets in relation to the context: display the distributions of quantitative (numerical) data in plots on a number line, including dot plots, histograms, and box plots and display the distribution of categorical data using bar graphs."

NAME _____

DATE _____

Let the question guide the summary

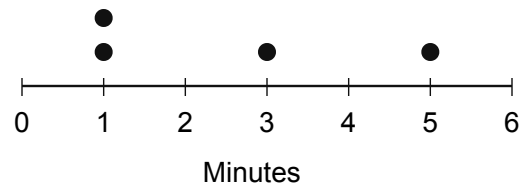
A categorical bar graph compares counts for named groups. Dot plots keep individual measurements, histograms group them into intervals, and boxplots show a five-number summary. Keep the context and units visible.

Worked example

Plot the waits 1, 1, 3, 5 minutes.

Stack two dots at 1. Place one each at 3 and 5. Four separate dots preserve all four observations.

Practice waits



Key: one dot = one wait

Simulated data. Use a pencil and ruler. Keep titles, units and repeated observations clear.

1. Count named categories

Each student chose one book type. Complete the frequency table. Explain why a book type is a category rather than a measured amount.

Twelve students: one preferred book type each

1. Mystery

2. Science

3. Poetry

4. Science

5. Mystery

6. Poetry

7. Science

8. Mystery

9. Science

10. Poetry

11. Mystery

12. Science

Preferred book type

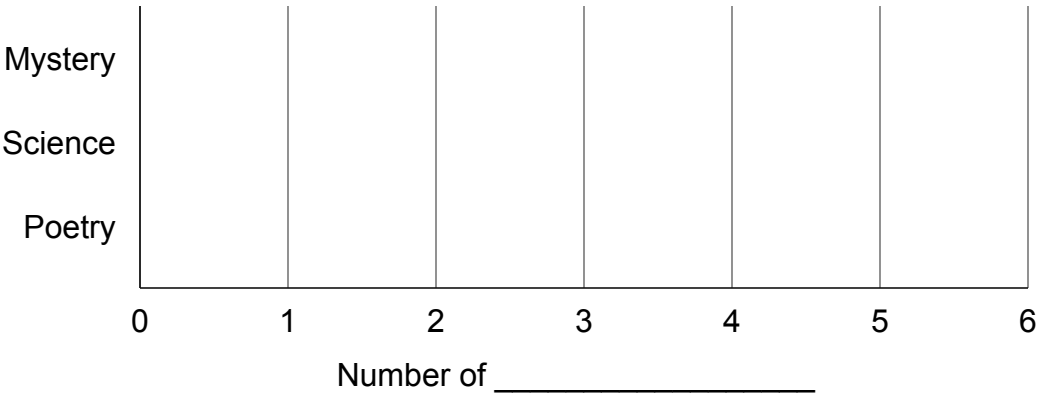
Book type	Count
Mystery	
Science	
Poetry	
Total	

2. Display the categorical distribution

Use task 1 to construct the bar graph. Add a title and label the number axis. Keep separate bars for the named book types.

Graph title: _____

Choice



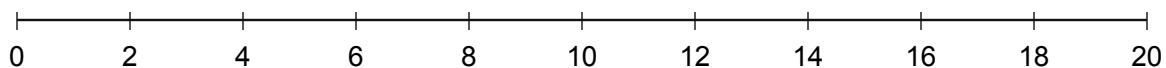
3. Keep every numerical observation

Plot all 12 checkout waits. Add a title, label the axis in minutes and complete the dot key. Stack a separate dot for each repeated wait.

Recorded checkout waits (minutes)

Waits 1-4	Waits 5-8	Waits 9-12
2	6	10
4	6	10
4	8	12
6	8	20

Plot title: _____



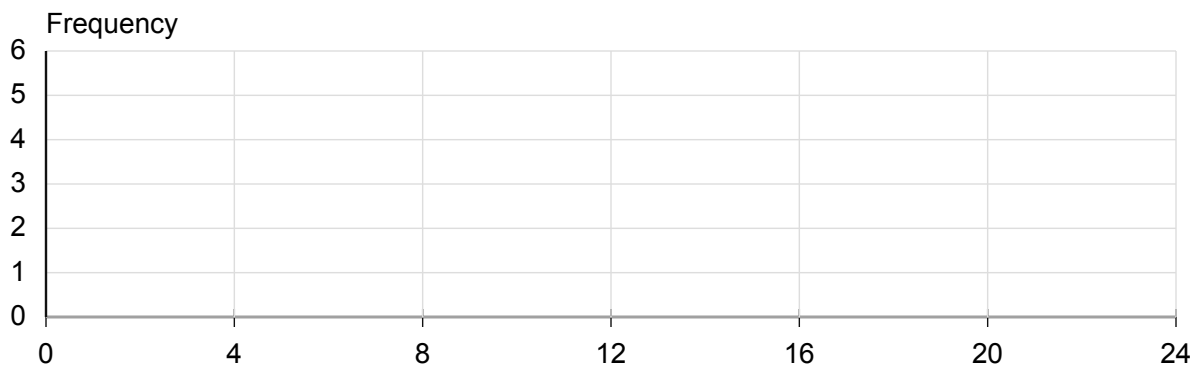
Horizontal axis: _____

Key: one dot = _____

4. Group numerical observations

Use the same waits to construct the histogram. Add a title and axis label. Use the supplied four-minute intervals; include the left endpoint and exclude the right endpoint.

Plot title: _____



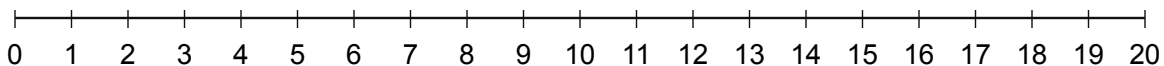
Horizontal axis: _____

Intervals include the left endpoint and exclude the right endpoint.

5. Show the five-number summary

Construct a boxplot for the same waits using minimum 2, Q1 5, median 7, Q3 10 and maximum 20 minutes. Add a title and axis label. Whiskers end at the minimum and maximum.

Plot title: _____



Horizontal axis: _____

6. Summarize the library data

Which book type was most popular, and how many more students chose it than Poetry? Describe a typical checkout wait and the middle half of waits using your boxplot. How many waits were less than 8 minutes?

7. Explain what gets hidden

Using the histogram alone, can a reader tell exactly how many waits were 6 minutes? Explain, then give the exact count from the dot plot. Why would a categorical bar graph be a poor replacement for these numerical displays?

TEACHER NOTES

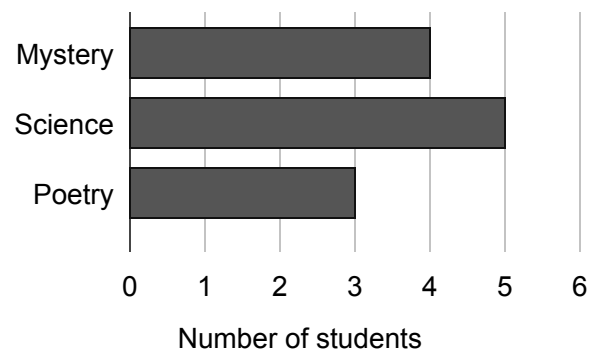
Accept equivalent titles and explanations supported by the data. Count repeated observations separately. Check units and the stated population SD and quartile conventions where applicable.

TASK 1

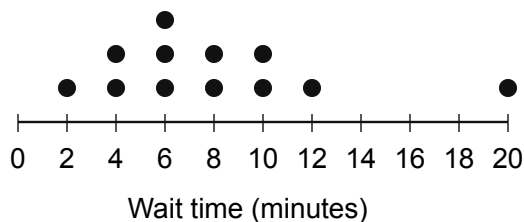
Mystery 4, Science 5, Poetry 3; total 12. Book types name groups, not measured amounts.

TASK 2

Separate bars end at Mystery 4, Science 5 and Poetry 3. Number axis: Number of students. Title: Preferred book types.

Preferred book types**TASK 3**

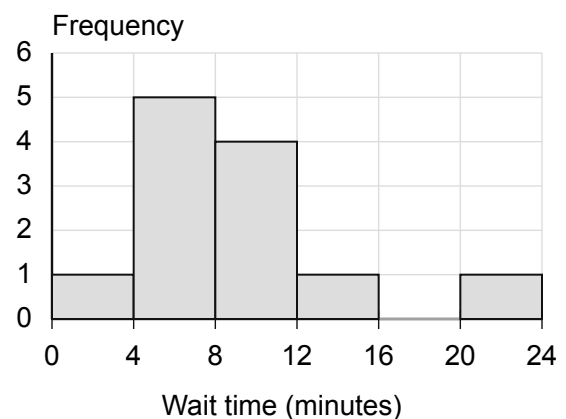
Dots: 2(1), 4(2), 6(3), 8(2), 10(2), 12(1), 20(1). One dot = one wait. Axis: Wait time (minutes). All 12 observations remain visible.

Library checkout waits

Key: one dot = one wait

TASK 4

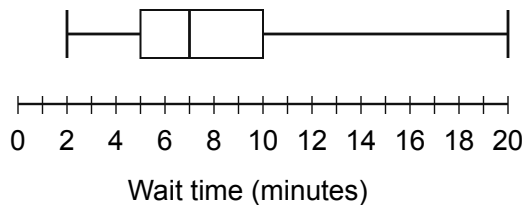
Frequencies for [0,4), [4,8), [8,12), [12,16), [16,20), [20,24): 1, 5, 4, 1, 0, 1. Adjacent interval bars touch; the empty interval has height zero.

Grouped checkout waits

Intervals include the left endpoint and exclude the right endpoint.

TASK 5

Box extends from 5 to 10, with median at 7 and whiskers to 2 and 20 minutes. Axis: Wait time (minutes). Use the named dataset and stated conventions.

Checkout wait summary**TASK 6**

Science is most popular: $5 - 3 = 2$ more students than Poetry. Median wait is 7 minutes; the middle half lies from 5 to 10 minutes. The histogram gives $1 + 5 = 6$ waits less than 8 minutes. Compare numerical evidence with units.

TASK 7

The histogram alone gives five waits in $[4,8)$, not the exact frequency at 6. The dot plot shows three waits at 6 minutes. A categorical bar graph treats groups as separate labels and does not preserve the ordered numerical scale, intervals or five-number summary.