

What the Displays Reveal

Represent the observations, then explain the evidence.

GRADE 6 • TEKS 6.13

6.13 "Excerpt: Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to: interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots; and distinguish between situations that yield data with and without variability."

NAME _____

DATE _____

Make every observation count

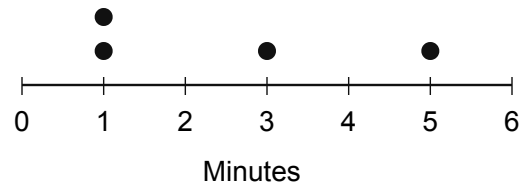
Dot and stem-and-leaf plots preserve observations. Histograms group values; boxplots summarize positions. Data vary when observed values differ.

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



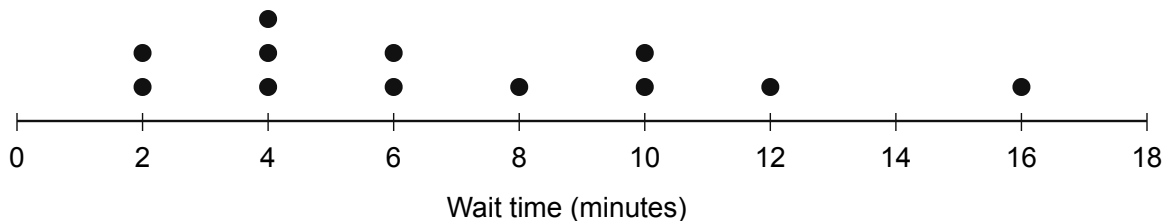
Key: one dot = one wait

Simulated data. Use a pencil and ruler. Show your reasoning.

1. Read every dot

Count the waits and the 4-minute observations. Give the minimum and maximum. Explain whether the waits vary.

Observed waits



Key: one dot = one wait

2. Decode the stems and leaves

This is the same set of waits. How many waits are at least 10 minutes? What does the repeated leaf 4 in the first row mean? Explain why counting only distinct leaves would be wrong.

Observed waits

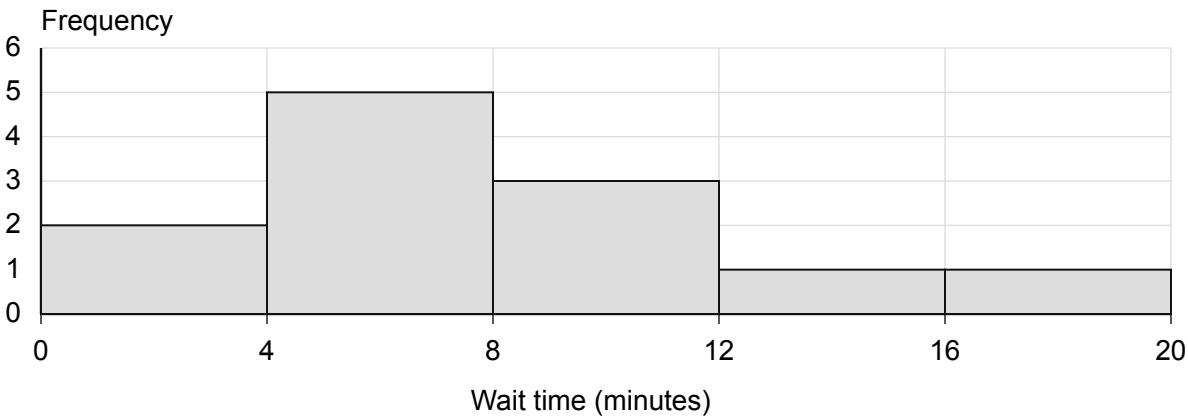
Stem	Leaves
0	2 2 4 4 4 6 6 8
1	0 0 2 6

Key: 1 | 2 = 12 minutes

3. Interpret grouped data

Using this histogram alone, how many waits are less than 8 minutes? Can it tell you exactly how many waits equal 5 minutes? Explain what the interval bars preserve and what they hide.

Grouped waits

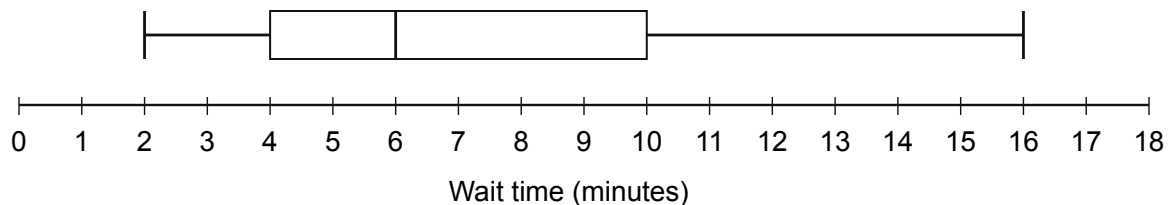


Intervals include the left endpoint and exclude the right endpoint.

4. Interpret a boxplot

Read the median and range. Which quarter occupies the widest interval on the scale? Using the boxplot alone, can you find the exact number of waits equal to 6?

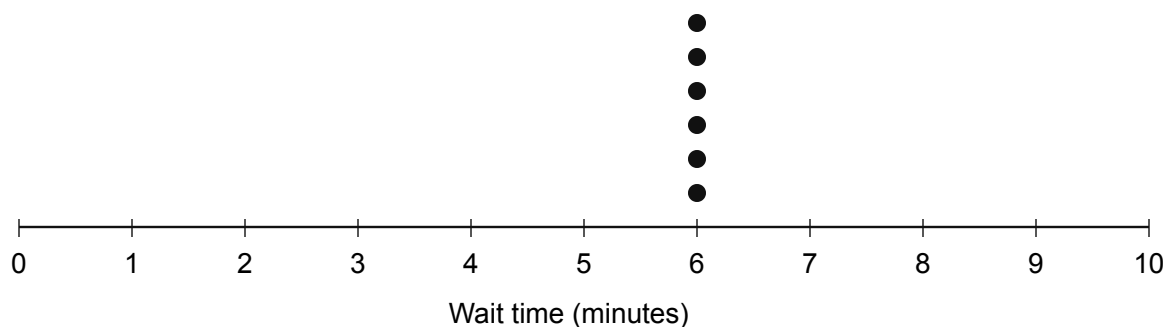
Five-number wait summary



5. Compare with a constant set

How many observations are in this second dot plot? Compare its variability with the first plot. Is having many observations the same as having variability?

Scheduled waits



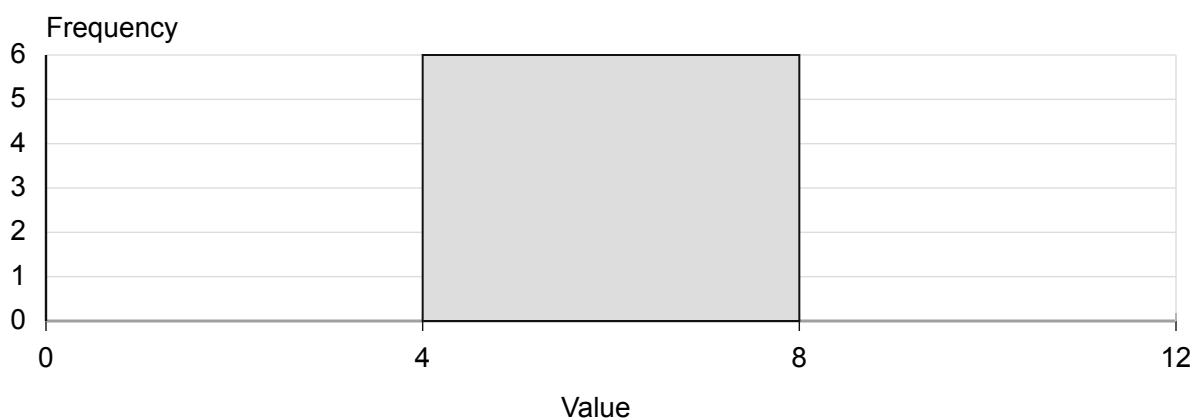
Key: one dot = one wait

6. Distinguish two situations

A fixed-price ticket costs \$4 for each of six visitors. Their travel times to the venue are 5, 8, 8, 10, 12 and 15 minutes. Which variable has no variability in these observations? Which has variability? Support each statement numerically.

7. Same histogram, different variability

This histogram describes six whole-number observations. Write one possible list with no variability and another with variability that both fit it. Explain why a single occupied bin does not prove that all observations are equal.

Six hidden observations

Intervals include the left endpoint and exclude the right endpoint.

TEACHER NOTES

Accept equivalent titles and units. Check repeated observations, ordered leaves and the stated dataset. Predictions need evidence, not certainty. Keep completed plots in this key.

TASK 1

12 waits; three are 4 minutes. Least 2 and greatest 16 minutes. It has variability because the observed waits are not all equal.

TASK 2

Four waits are at least 10: 10, 10, 12, 16. Three leaves 4 in stem 0 mean three separate waits of 4 minutes. Repeated leaves represent separate observations.

TASK 3

$2 + 5 = 7$ waits are less than 8 minutes. The histogram alone cannot tell the exact number equal to 5: it groups all waits from 4 up to but not including 8 in one bin.

TASK 4

Median 6; range $16 - 2 = 14$ minutes. The upper quarter, from Q3 10 to maximum 16, spans the widest interval (6 minutes). A boxplot alone does not give the frequency of exactly 6 minutes.

TASK 5

Six observations, all 6 minutes. It has no variability (range 0), unlike the first set. Many observations can all have the same value; count and variability describe different things. Use the named data and scale.

TASK 6

Ticket prices are all \$4, so their range is 0 and there is no variability. Travel times vary from 5 to 15 minutes, with range 10 minutes; these observations have variability. Show numerical evidence.

TASK 7

No variability: 5,5,5,5,5,5. With variability: 4,4,5,5,6,7. Both put all six values in [4,8). One bin can contain several different values, so the grouped display hides within-bin variability.