

Grade 6 · Statistical Questions and Data Displays · Lesson

Common Core 6.SP.A.1, 6.SP.A.2, 6.SP.B.4, 6.SP.B.5a, 6.SP.B.5b · mathovore.fr

A statistical question is one that expects different answers, so the data vary. The data form a distribution described by its center, spread, and shape. Dot plots, histograms, and box plots display a distribution, and a full description also gives the number of observations, the attribute, and the unit.

Grade 6 Common Core: 6.SP.A.1 · 6.SP.A.2 · 6.SP.B.4 · 6.SP.B.5a · 6.SP.B.5b

Key facts:

- A statistical question expects varying answers from a group.
- Describe a distribution by its center, spread, and shape.
- Dot plots show every value, histograms show counts in intervals, and box plots show five numbers.
- A box plot uses the minimum, Q_1 , median, Q_3 , and maximum.
- Always state the number of observations, the attribute, and the unit.

What is a statistical question?

A statistical question is a question that expects different answers from different people or things, so the data vary. "How many pets does each sixth grader own?" is statistical. "How many pets does Maya own?" has one answer, so it is not.

Statistical question	Not statistical
How many pets does each sixth grader own?	How many pets does Maya own?
Answers vary: 0, 1, 2, 3, 5, ...	One answer: 2

Figure 1. A statistical question has variability in its answers.

How do you describe a distribution?

A distribution shows how data values are spread out. Describe its center (the typical value), its

spread (how far the values range), and its shape (peaks, clusters, gaps, and values far from the rest). Figure 2 shows the number of books 12 students read in one month. The dot at 8 is far from the others.

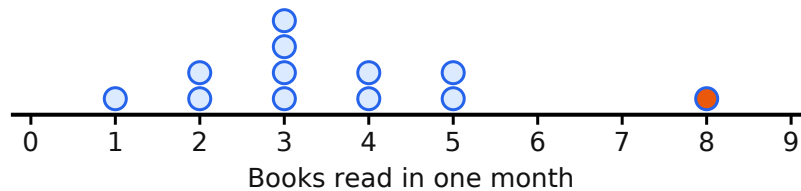


Figure 2. Most students read 2 to 5 books; one student read 8.

Also describe the data set itself: the number of observations (here $n = 12$), the attribute measured (books read), the unit (books), and how it was collected (a class survey).

Three data displays

Display	What it shows	Best for
Dot plot	every value as a dot	small data sets
Histogram	how many values fall in each interval	large data sets
Box plot	minimum, quartiles, median, maximum	comparing spread and center

How do histograms and box plots work?

A histogram groups data into equal intervals. The height of each bar is the number of values in that interval, and an interval includes its left endpoint but not its right endpoint. Figure 3 shows daily reading minutes for 20 students.

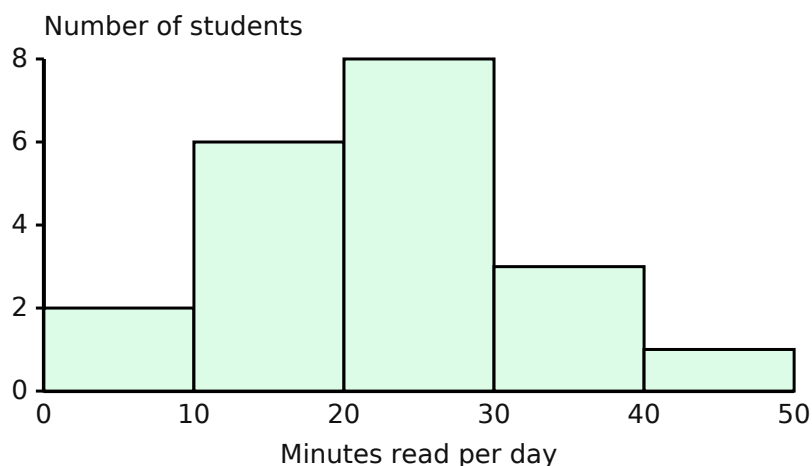


Figure 3. The tallest bar, 8 students, is the interval 20 to 30 minutes.

How do you draw a box plot?

1. Order the data from least to greatest.
2. Find the median. It splits the data into a lower half and an upper half.
3. Find the first quartile Q_1 , the median of the lower half, and the third quartile Q_3 , the median of the upper half.
4. Mark the minimum and maximum, draw a box from Q_1 to Q_3 with a line at the median, and draw whiskers to the ends.

Example. For the 12 book counts, the median is 3, $Q_1 = 2.5$, and $Q_3 = 4.5$. The minimum is 1 and the maximum is 8.

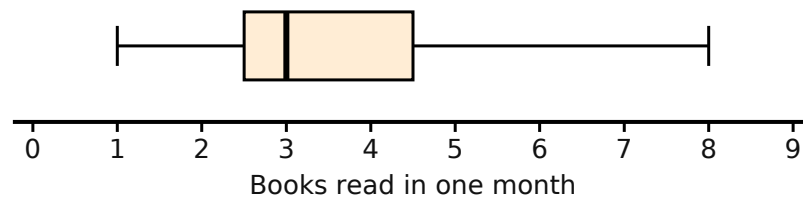


Figure 4. The box holds the middle half of the data.

Statistical Questions and Data Displays: frequently asked questions

How can you tell if a question is statistical?

Ask whether the answers would be different for different people or things. If the answers vary, the question is statistical. A question with one answer is not.

What are center, spread, and shape?

Center is a typical value, such as the median. Spread tells how far apart the values are. Shape describes peaks, clusters, gaps, and values far from the rest.

When should you use a histogram instead of a dot plot?

Use a histogram for a large data set with many different values. It groups values into intervals. A dot plot works best for small data sets.

What does a box plot show?

A box plot shows five numbers: the minimum, first quartile, median, third quartile, and maximum. The box holds the middle half of the data.

What should a description of a data set include?

State the number of observations, the attribute that was measured, the unit, and how it was

measured. Then describe the center, spread, and overall shape.