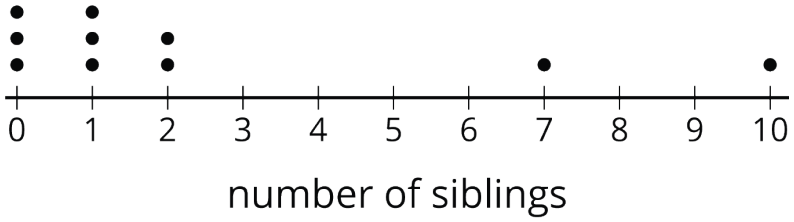
The Median

Let's explore the median of a data set and what it tells us.

6.1 Siblings in the House

Here are data that show the numbers of siblings of 10 students in Tyler's class.

1 0 2 1 7 0 2 0 1 10



1. Without making any calculations, estimate the center of the data based on your dot plot. What is a typical number of siblings for these sixth-grade students? Mark the location of that number on your dot plot.

2. Find the mean. How does the mean compare to the value that you marked on the dot plot as a typical number of siblings? (Is it a little larger, a lot larger, exactly the same, a little smaller, or a lot smaller than your estimate?)

6.2 Finding the Middle

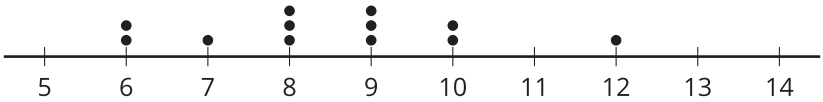
1. Your teacher will give you an index card. Write your first and last names on the card. Then record the total number of letters in your name. After that, pause for additional instructions from your teacher.
2. Here is a data set on numbers of siblings.

   1 0 2 1 7 0 2 0 1 10

   a. Sort the data from least to greatest, and then find the **median**.

   b. In this situation, do you think the median is a good measure of a typical number of siblings for this group? Explain your reasoning.

3. Here is the dot plot showing the travel time, in minutes, of Elena's bus rides to school.



travel time in minutes

   a. Find the median travel time. Be prepared to explain your reasoning.

   b. What does the median tell us in this context?

6.3 Card Sort: Mean or Median?

1. Your teacher will give you six cards. Each has either a dot plot or a histogram. Sort the cards into 2 piles based on the distributions shown. Be prepared to explain your reasoning.
2. Discuss your sorting decisions with another group. Did you have the same cards in each pile? If so, did you use the same sorting categories? If not, how are your categories different?

   Pause here for a class discussion.
3. Use the information on the cards to answer these questions.
   a. Card A: What is a typical age of the dogs being treated at the animal clinic?

   b. Card B: What is a typical number of people in the Irish households?

   c. Card C: What is a typical travel time for the New Zealand students?

   d. Card D: Would 15 years old be a good description of a typical age of the people who attended the birthday party?

   e. Card E: Is 15 minutes or 24 minutes a better description of a typical time it takes the students in South Africa to get to school?

   f. Card F: Would 21.3 years old be a good description of a typical age of the people who went on a field trip to Washington, D.C.?

4. How would you decide which measure of center to use for the dot plots on Cards A–C? What about for those on Cards D–F?

Are you ready for more?

Most teachers use the mean to calculate a student's final grade, based on that student's scores on tests, quizzes, homework, projects, and other graded assignments.

Diego thinks that the median might be a better way to measure how well a student did in a course. Do you agree with Diego? Explain your reasoning.

Lesson 6 Summary

The **median** is another measure of center for a distribution. It is the middle value in a data set when values are listed in order. Half of the values in a data set are less than or equal to the median, and half of the values are greater than or equal to the median.

To find the median, we order the data values from least to greatest and find the number in the middle.

Suppose we have 5 dogs whose weights, in pounds, are shown in the table. The median weight for this group of dogs is 32 pounds because three dogs weigh less than or equal to 32 pounds and three dogs weigh greater than or equal to 32 pounds.

20	25	32	40	55

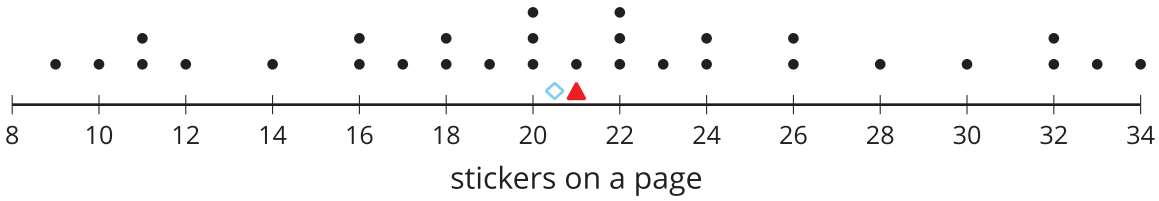
Now suppose we have 6 cats whose weights, in pounds, are listed here. Notice that there are 2 values in the middle: 7 and 8.

4	6	7	8	10	10

The median weight must be between 7 and 8 pounds, because half of the cats weigh less than or equal to 7 pounds, and half of the cats weigh greater than or equal to 8 pounds.

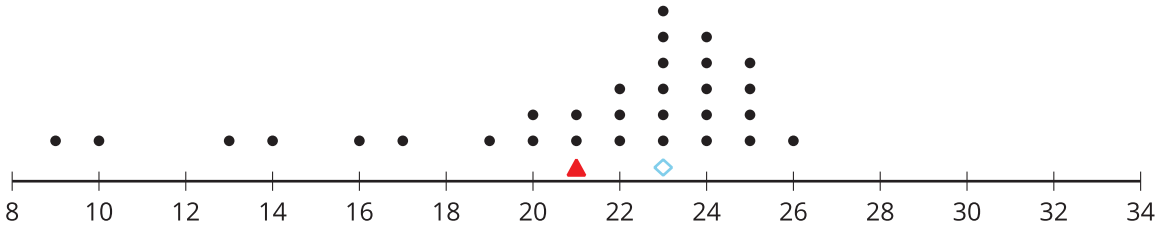
When there are even numbers of values, we take the number exactly in between the two middle values. In this case, the median cat weight is 7.5 pounds because $(7 + 8) \div 2 = 7.5$.

The dot plot shows the number of stickers on 30 pages. The mean number of stickers is 21 (marked with a triangle). The median number of stickers is 20.5 (marked with a diamond).



In this case, both the mean and the median could describe a typical number of stickers on a page because they are fairly close to each other and to most of the data points.

Here is a different set of 30 pages with stickers. It has the same mean as the first set, but the median is 23 stickers.



In this case, the median is closer to where most of the data points are clustered and is therefore a better measure of center for this distribution. That is, it is a better description of the typical number of stickers on a page. The mean number of stickers is influenced (in this case, pulled down) by a handful of pages with very few stickers, so it is farther away from most data points.

In general, when a distribution is symmetrical or approximately symmetrical, the mean and median values are close. But when a distribution is not roughly symmetrical, the two values tend to be farther apart.

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