

## Objective

Find and compare the mean, median, mode, and range of a data set.

## Common Core State Standards

- **6.SP.3** Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
- **6.SP.5c** Summarize numerical data sets in relation to their context, such as by giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

## Statistics and Probability

## Mean, Median, Mode, and Range

Students might be familiar with the meaning of *average*. Here they learn that the average, or mean, is just one of the measures of center that can be ascribed to a set of data. The median and mode are also measures of center. The range is a measure of spread.

**Try It!** Perform the Try It! activity on the next page.

## Talk About It

Discuss the Try It! activity.

- Talk about how a set of data can have more than one mode or no mode.
- **Ask:** *Why is it important to order the data first?* **Say:** *Sometimes there are two middle values, so you have to find the mean, or average, of the two middle values to find the median.* **Ask:** *How can you tell that a data set has two middle values?*
- **Ask:** *Which measures are most likely to change if you remove the least and greatest values from the data set? What are some situations in which you would want to know the mean, median, mode, or range?*

## Solve It

Reread the problem with students. Ask them to describe each measure and how to find it. Then have them compare measures and explain their answers.

## More Ideas

For other ways to teach mean, median, mode, and range—

- Provide data sets with six values such as 9, 6, 1, 10, 9, and 7. Demonstrate how to find the median when there are two middle values. Have students work in pairs using Color Tiles and/or Two-Color Counters to model the data and find the mean (7), median (8), mode (9), and range (9). Have students discuss how each measure represents the data.
- Give students a partial data set of values such as 4, 9, 7. Tell students the data set has five values total. The mean and median are 6, the mode is 4, and the range is 5. Have students use Color Tiles to find that the data set is 4, 4, 6, 7, and 9.

## Formative Assessment

Have students try the following problem.

*Ryan sent the following numbers of e-mails each day last week: 4, 12, 10, 6, 3, 12, and 9. Find the mean, median, mode, and range of the data set. Which measure is the greatest?*

- A. mean      B. median      C. mode      D. range



**Try It!** 20 minutes | Pairs

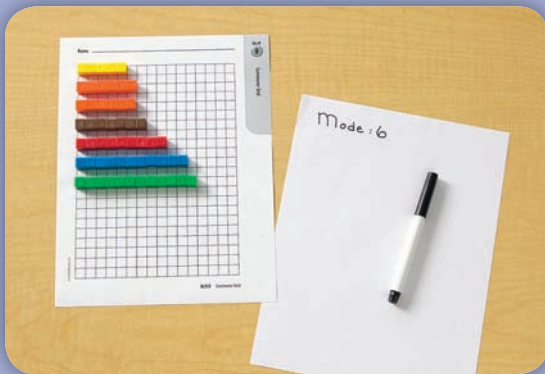
Here is a problem about the mean, median, mode, and range of a data set.

*A pet store has the following numbers of fish in seven different aquariums: 6, 12, 7, 5, 11, 6, and 9. Compare the mean, median, mode, and range of the fish in the aquariums. The pet store owner doesn't want any aquarium to have too many more fish than another. Which data measure would he be interested in?*

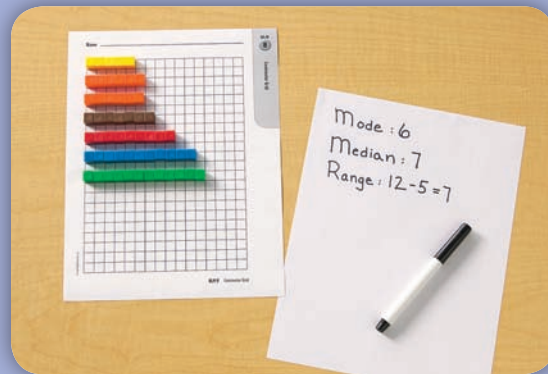
Introduce the problem. Then have students do the activity to solve the problem. Distribute Centimeter Cubes, grid paper, paper, and pencils. Define mean, median, mode, and range.

**Materials**

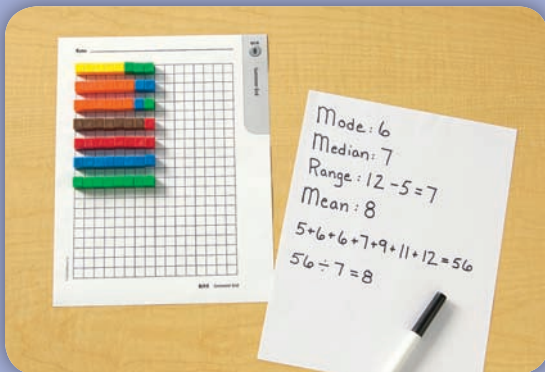
- Centimeter Cubes (60 per pair)
- Centimeter Grid Paper (BLM 10; 1 per pair)
- paper (1 sheet per pair)
- pencils (1 per pair)



**1.** Have students use Centimeter Cubes to show the number of fish in each aquarium and arrange the cubes on the grid in rows using one color of cube for each value. Then have them order the values from least to greatest.  
**Say:** *The mode is the value that occurs most often.* **Ask:** *What is the mode of this data set?*



**2. Say:** *The median is the middle value.*  
**Ask:** *What is the median of this data set?*  
**Say:** *The range is the difference between the greatest value and the least value.* **Ask:** *What is the range of this data set?*



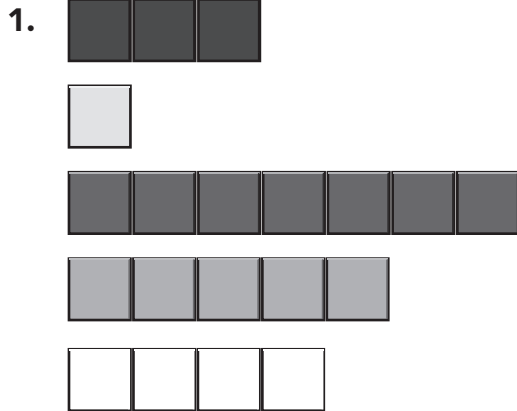
**3.** Have students arrange the cubes so that there is an equal number in each row. Explain how this number is the mean, or average.  
**Say:** *You can also compute the mean. Add all of the values in the data set and divide the sum by the total number of data values.* Help students compute the mean.

**! Look Out!**

Watch for students who confuse median and mean. Emphasize that when the data items are listed in order according to size, the median is the middle number. The mean is the average. Have students arrange two sets of cubes for the data set 3, 5, 5, 8, and 9, with one set of cubes arranged to determine the median and the other arranged to demonstrate the mean. Then have them compare and contrast the mean and median of the data set.

Use Centimeter Cubes to model the set of data shown. Write the numbers in the set. Determine the mode, median, and range. Rearrange your cubes to find the mean.

(Check students' work.)



Data: 3, 1, 7, 5, 4

Mode: no mode

Median: 4

Range: 6

Mean: 4

Using Centimeter Cubes, model the set of data. Sketch the set of data. Determine the mode, median, and range. Rearrange the cubes to find the mean. Sketch the set of data.

2. 9, 8, 3, 2, 3

Mode: 3                      Median: 3

Range: 7                      Mean: 5

Find the measure of central tendency named for each set of data.

3. 4, 7, 3; range

4

4. 6, 4, 2, 8, 5; mean

5

5. 15, 9, 3; median

9

6. 3, 2, 7, 9, 6, 3; mode

3

7. 14, 3, 8, 4, 1; mean

6

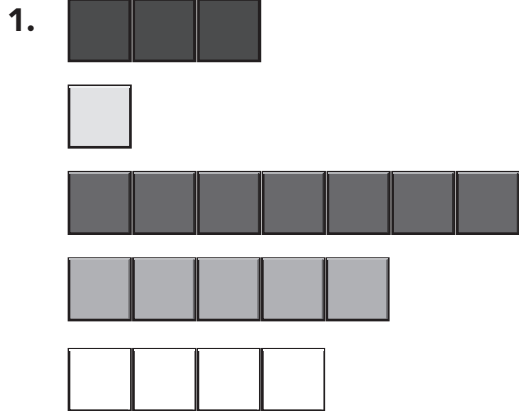
8. 16, 12, 13, 5; median

12.5





Use Centimeter Cubes to model the set of data shown. Write the numbers in the set. Determine the mode, median, and range. Rearrange your cubes to find the mean.



Data: \_\_\_\_\_

Mode: \_\_\_\_\_

Median: \_\_\_\_\_

Range: \_\_\_\_\_

Mean: \_\_\_\_\_

Using Centimeter Cubes, model the set of data. Sketch the set of data. Determine the mode, median, and range. Rearrange the cubes to find the mean. Sketch the set of data.

2. 9, 8, 3, 2, 3

Mode: \_\_\_\_\_ Median: \_\_\_\_\_

Range: \_\_\_\_\_ Mean: \_\_\_\_\_

Find the measure of central tendency named for each set of data.

3. 4, 7, 3; range

\_\_\_\_\_

4. 6, 4, 2, 8, 5; mean

\_\_\_\_\_

5. 15, 9, 3; median

\_\_\_\_\_

6. 3, 2, 7, 9, 6, 3; mode

\_\_\_\_\_

7. 14, 3, 8, 4, 1; mean

\_\_\_\_\_

8. 16, 12, 13, 5; median

\_\_\_\_\_



Name \_\_\_\_\_

