

In this activity you'll investigate some properties of the median and compare its behavior to that of the mean.

## EXPLORE



1. Open **Mean Meets the Median.gsp**. Go to page "Median 5." You should see data points at 1.0, 2.0, 4.0, 7.0 and 8.0, and a thick vertical orange line through 4.0 that represents the median value. Drag the data points. Write down different data sets that have a median of 4.0. What do all these data sets have in common besides having the same median?
2. Press *Reset*. Drag the data point at 8.0 to different locations. Describe all the values that data point can have without affecting the median value.
3. Press *Reset*. Drag the data point at 8.0 so that the median value changes. Why did it change?
4. Create a data set that has two data points on one side of the orange line and only one data point on the other side. Describe what's special about your data set.
5. Some people say that the median value is always in the middle. Why might this be a misleading way to characterize the median?
6. Go to page "Median 6." Drag the data points. Write down three data sets that all have a median of 4.0.
7. Describe a strategy for creating a data set that has a median of 7.5.

## Mean Meets the Median

*continued*



8. In step 1, you found that all your data sets had to contain the value 4.0. Is this still true? Explain.
9. Go to page “Mean and Median.” Try to predict the value of the mean for the given data set. Then press *Show Mean*.
10. Find three different ways of changing the data points so that the mean and the median are equal to each other.
11. Find a data set in which the mean and median values are the same. Predict what will happen to each value if you increase your largest data value. Verify your prediction.
12. In many cases extremely small or large data values are called *outliers*. Will the mean or the median be more affected by outliers? Explain.
13. A doctor’s office wanted to find out how long patients had to wait in order to see whether they needed to hire another doctor. After gathering their “waiting time” data, they learned that some patients had been dropped off first thing in the morning, even though their appointments weren’t until late morning or early afternoon. Which measure of central tendency do you think would be more useful to the doctor’s office?

## EXPLORE MORE

14. Go to page “Median 6.” Press *Show Mean*. Every time you move one of the data points, the mean changes. However, if you could move two data points at once, you could probably keep both the mean and the median the same. Press *Reset*. Select the data points 1.0 and 8.0 and choose **Edit | Action Buttons | Animation**. Set point C to animate in a forward direction and point E to animate in a backward direction. Press the button you just created to verify that your mean value stays the same. Explain why this works.