

## Human Box Plot

This activity reinforces the process of constructing a box plot and provides a vivid exercise to help students remember it. And it gives you a chance to reinforce general ideas about distributions: shape, center, and spread.

You should know how to find quartiles and how to construct a box plot using pencil and paper. Note that you can do this activity in the same class session in which you first learn about box plots.

In this activity, your class is going to construct a box plot of the age in months of the students in your class. (You may use other data, this is just one idea.) Each person should compute their age in months. As a group, find out who is the oldest and who is the youngest.

Place evenly spaced marks on the floor to represent the youngest and oldest person. That is, make a continuous axis. Position yourselves at the appropriate points along the axis, according to your ages. If two students are the same age, then one should be behind the other.

Have the median person step forward, then the first quartile person, and then the third quartile person. Compute the interquartile range. Determine if there are any outliers and have them turn sideways to make them look different from the nonoutliers.

Below are data from the violent crime rates, as of 1999, of 23 of the largest cities in the United States (in incidents per year per 100,000 population; data from the FBI's Uniform Crime Reporting System, found at

<http://www.fbi.gov/ucr/99cius.htm>)

| City            | Violent Crime Rate | City                 | Violent Crime Rate |
|-----------------|--------------------|----------------------|--------------------|
| Austin          | 529                | Milwaukee            | 1043               |
| Boston          | 1302               | Minneapolis-St. Paul | 1161               |
| Columbus        | 855                | Nashville            | 1607               |
| Dallas          | 1414               | New York             | 1063               |
| Detroit         | 2254               | Philadelphia         | 1604               |
| El Paso         | 686                | Phoenix              | 832                |
| Honolulu County | 254                | San Antonio          | 561                |
| Houston         | 1187               | San Diego            | 598                |

|              |      |               |     |
|--------------|------|---------------|-----|
| Indianapolis | 1016 | San Francisco | 866 |
| Jacksonville | 1034 | San Jose      | 581 |
| Las Vegas    | 665  | Seattle       | 767 |
| Los Angeles  | 1283 |               |     |

1. Create a box plot of these data.
2. Describe the distribution shown by the box plot.
3. Based on these data, how large or how small would a crime rate have to be to be an outlier?
4. Portland, Oregon, had a rate of 1236. Add this city to the 23 cities listed above and construct a box plot of the 24 data values.
5. Does the box plot change for the added data value? Explain whether or not there is a change. If so, what is the change?