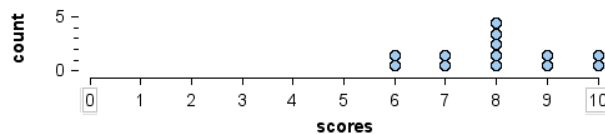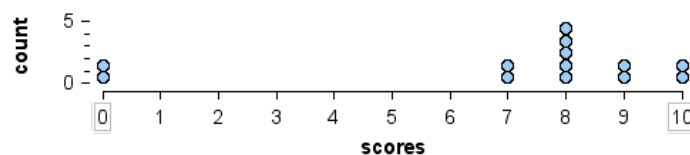**Learning Goal:** For the distribution of a quantitative variable, describe the overall pattern (shape, center, and spread) and striking deviations from the pattern.

**Specific Learning Objective:** Relate measures of center to the shape of the distribution. Choose the appropriate measure for different contexts.

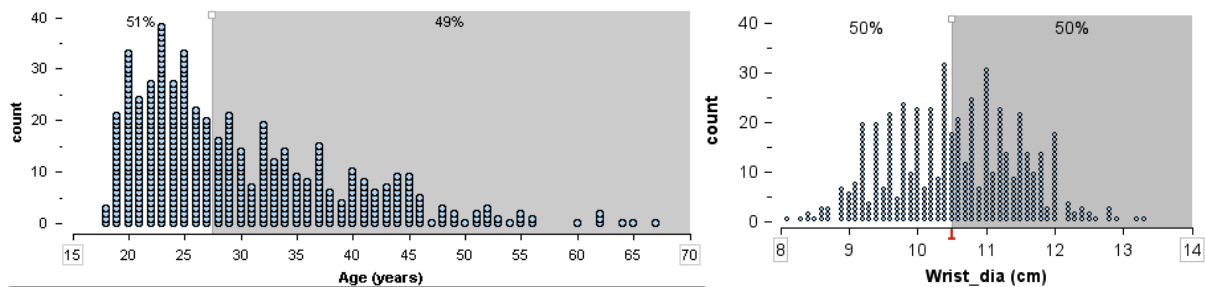1) Here is a dot plot of Hilda's quiz scores in her math class.



a) What is the shape of this distribution?

b) Determine Hilda's median quiz score. Calculate Hilda's mean quiz score.

2) Oops, we made a mistake recording two of Hilda's scores. The two scores recorded as 6 should have been 0. Here's the revised dot plot of her quiz scores.



a) What is the shape of this distribution?

b) Find her revised median quiz score. Is it less than, more than, or about the same as her previous median quiz score? Why does this make sense?

c) Find her revised mean quiz score. Is it less than, more than, or about the same as her previous mean quiz score? Why does this make sense?

d) Which measure of center (mean or median) would best represent her typical performance on the quizzes? Explain.

3) Write a few sentences that explain how the shape of the distribution might influence whether the mean is larger than, smaller than or about the same as the median.

4) For each distribution give an estimate for the median. Then say whether the mean is probably greater than, less than, or about equal to the median. Jot down some notes to explain how you figured this out.



5) Which of the following distributions is likely to have a mean that is smaller than the median? Jot down some notes to explain how you figured this out.

a) scores on the an OLI Checkpoint, where almost all of the grades were A's and B's (scores of 80 to 100), with one student making a zero.

b) repeated weighings of "one-pound" bags of peanut M&M's using a digital bathroom scale that reports weights to the nearest tenth of a pound.

c) salaries of NBA basketball players (This distribution is strongly right skewed by the few superstars who make much more money than the rest of the players.)

6) According to the U.S. Bureau of Census, the median family income in the United States in 2008-2012 was $53,046. Why do you think the median, rather than the mean, was reported by the U.S. Bureau of Census?

7) Summarize what you have learned about how to choose between the mean and median as the best measure of center based on the shape of the distribution.