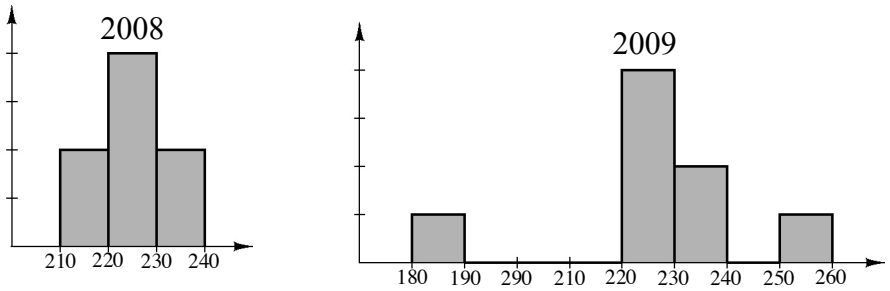
Lesson 1.2.1

1-26. a. A graphical representation allows us to see more connections between and patterns in the data, such as spread and shape.

b. See example histograms below. A histogram, with bin widths of 10 in, is a good choice here because the data is numerical and values are not repeated. In addition, a dot plot would stretch from 185 to 252 with increments of 0.01. There would only be one data value at each of 8 points along this very long dot plot.



c. Observations may include that the 2008 data is more balanced or symmetrical, while the 2009 data has a gap or outliers.

d. No, it is not possible, since the histogram only gives frequency of data in a range of each bin, and does not provide information about the individual data points. A reasonable *estimate* for the mean or median could be calculated from a histogram though, using the midpoints of each bin and the frequencies.

1-27. a. The data for 2008 fall between 216.5 inches and 231.5 inches, so the range is 15 inches. The data for 2009 fall between 185.25 inches and 252 inches, so the range is 66.75 inches. It shows that the frogs jumped more consistently in 2008.

b. See the "Suggested Lesson Activity"; 2008 mean = 224.125, 2008 median = 224.25, 2009 mean ≈ 225.09, 2009 median = 225

c. The 2009 data has two apparent outliers: 185.25 and 252 inches. These are the values, on the histogram, that result in a distinct gap from the central cluster.

d. Sample response: As a group, the frogs in 2009 jumped farther. However, the frogs in 2008 jumped more consistently.

1-28. a. It does not matter because they are both about the same.

b. The new histogram will have a distinct gap.

c. Answers vary. A sample answer might be: "The median will not change very much, but the mean will be noticeably smaller."

d. The mean became much smaller, while the median only changed a bit.

e. The median represents a typical jump better because the mean can be influenced more strongly by the outliers.

f. When there are outliers (or when the data is not symmetrical).

1-29. Because the large and small outliers "balance" each other and make the histogram almost symmetric.

1-30. The mean would increase, but no change to the median.

1-31. a. min = 221 in, max = 256 in

Note: 20 | 1 is 201 inches

20	**4 5 8 9**
21	**2 2**
22	**2**
23	**5**

b. There are no apparent outliers.

c. Yes, because the data is in order. 231 inches

d. Mean = 233.625 inches, the average jump length.

e. The median because the distribution is not symmetrical.

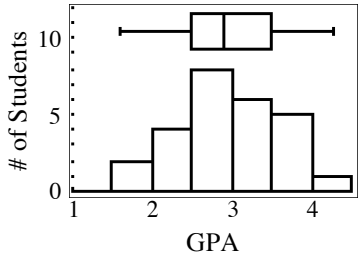
f. See plot above right. The median which is 210.5 inches; without being asked in the problem, students should have considered whether to use the mean or the median and chosen the median because the data is not symmetrical.

1-32. Possible response: 11, 11, 11, 14, 14, 15, 15 meters

1-33. (46.4, 48.5, 50.4, 52.5, 55.9)

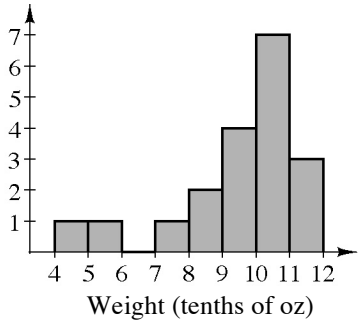
1-34. a. (1.58, 2.50, 2.91, 3.49, 4.29)

b.



c. The median (center) is at 2.91 points. The shape is symmetric. The IQR (spread) is Q3 – Q1 = 3.49 – 2.50 = 0.99 points. There are no apparent outliers.

1-35. The histogram at right shows that the data is not symmetrical; the median is a better choice; median = 0.10 ounces.



1-36. 12 is much lower than the rest of the data; it will make the class mean lower, but will not affect the median much.