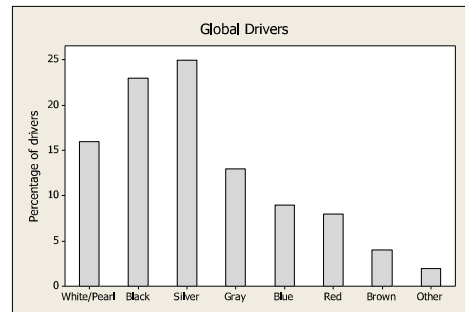
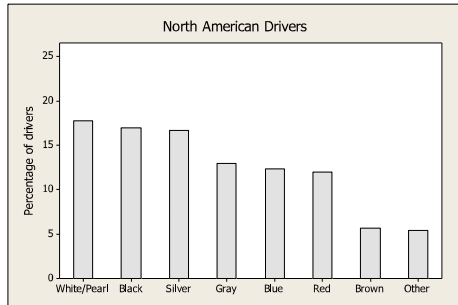


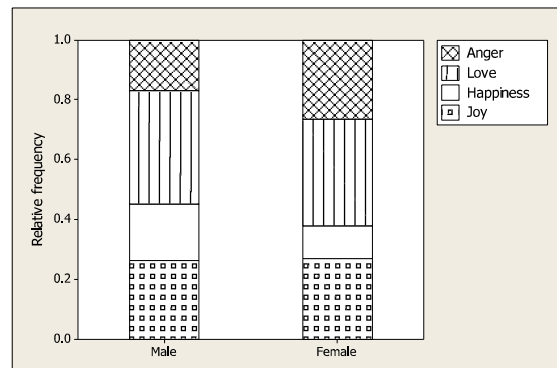
### Quiz 1.1C

1. Answers will vary. Some examples: categorical: diversity, presence of sports teams or musical ensembles; quantitative: unemployment rate, property tax rate, total area of city parks, number of doctors per capita. 2. and 3. see bar graphs below.



4. Black and silver cars are more popular globally. White and gray are about the same globally and in N. America. Blue, red, brown, and other colors are more popular in N. America than they are globally. 5. Student may chose to display either row percentages or a segmented bar graph:

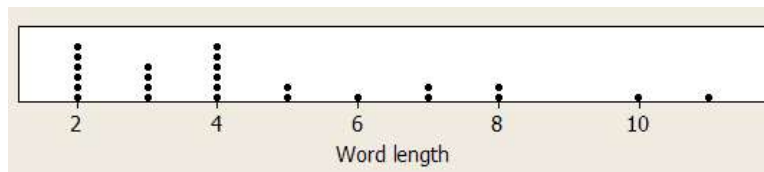
	Joy	Happiness	Love	Anger
Male	26.4%	18.9%	37.7%	17.0%
Female	27.0%	11.1%	35.4%	26.5%



The data suggests that there is a relationship between gender and the emotions children associate with the color red. While roughly equal percentages of males and females associate red with joy and love, a higher proportion of females associate red with anger, and a higher percentage of males associate red with happiness.

### Quiz 1.2A

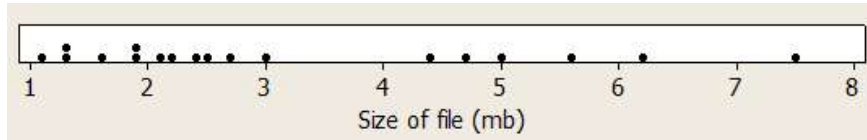
1.



2. The distribution is skewed to the right, with two peaks at 2 and 4 letters in length and a range of  $11 - 2 = 9$  letters. There are two possible outliers of 10 letters and 11 letters in length. 3. The distribution is skewed right and has single peak at 2 hurricanes and a range of 8 hurricanes. 4. Bonds 73-home-run season was clearly an outlier. With the exception of that one year, Bonds' distribution of home runs per year was remarkably similar to Aaron's. Both men's distributions were skewed left, and the center of each distribution was in the mid 30's.

### Quiz 1.2B

1.



2. Answers may vary. Distribution is strongly skewed to the right with a peak near 2 megabytes and a possible outlier at 7.5 megabytes. (Answer might also describe two clusters from 1 to 3 and 4.5 to 6.2 megabytes.) 3. The distribution has a single peak between 5 and 10 votes and is strongly skewed to the right. There is an outlier between 55 and 60 votes. The range is 60 (or 35, without the outlier). 4. The distribution of Atlantic coast acorn volumes is strongly skewed to the right. There is a peak around 10-20 cm<sup>3</sup> and most Atlantic coast acorn volumes are between 0.3 cm<sup>3</sup> and about 3.6 cm<sup>3</sup>. There are three possible outliers at 81, 91, and 105 cm<sup>3</sup>. California acorn volumes seem to fall into two groups. Some are similar in size to Atlantic acorns (0.4 to 2.6 cm<sup>3</sup>) Some are larger than all but the outliers in the Atlantic group (4.1 cm<sup>3</sup> to 7.1 cm<sup>3</sup>). There is also one strong outlier among the California acorns at 17.1 cm<sup>3</sup>. In general, Atlantic coast acorns are smaller than California acorns (Atlantic median is 17 cm<sup>3</sup>, California median is 41 cm<sup>3</sup>).

### Quiz 1.2C

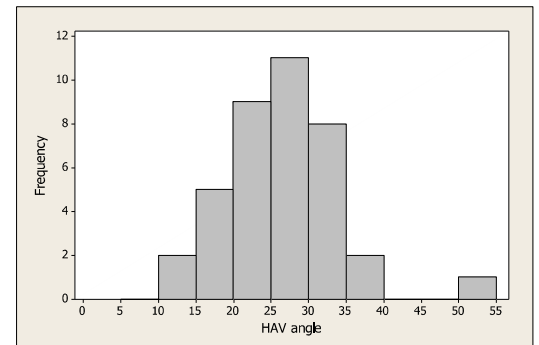
1. Histogram will vary with bin width. One possibility:

2. The distribution is approximately symmetric, centered around an angle of 25 to 30 degrees, with a range of 30 degrees. There is one outlier at 50 degrees.

3. Stemplot with split stems:

```

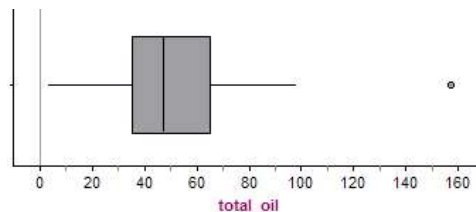
4 | 8           Key: 6|5 = 65
5 |
5 | 5
6 | 01234
6 | 5668
7 | 0011244
7 | 567789
8 | 1
8 | 6
    
```



4. Most households in New Jersey and Indiana are centered around an income of about \$40,000, and have a minimum near \$0 and a maximum between \$75,000 and \$80,000. While Indiana's distribution is symmetric with one outlier at about \$160,000, New Jersey's distribution is skewed right, and there are 8 households (18%) with incomes higher than all but one of the Indiana households.

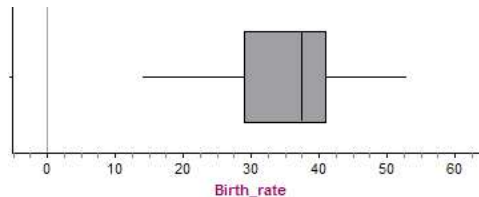
### Quiz 1.3A

1. Use median and interquartile range, since the distribution is skewed, there is a strong outlier, and these measures are resistant to outliers. 2. Min. = 3 Q1 = 35 Med. = 47 Q3 = 65 Max. = 157 3.  $1.5 \times \text{IQR} = 1.5 \times 30 = 45$ ;  $35 - 45 = -10$  (no low outliers);  $65 + 45 = 110$  so 157 is an outlier. 4. See boxplot below. 5. Since the mean is not resistant to the strong outlier to the right, it will be higher than the median, which is not influenced by the outlier. 6. Mean = 60, Standard deviation = 13.69 7.  $C < A < B$ . B is largest since none of the scores are near the mean. C is less than A because the extra scores that are equal to the mean have a deviation of 0 from the mean and thus reduce the average deviation.



### Quiz 1.3B

1. Answers may vary. Some students will say that there is enough skew to the left to justify using median and interquartile range; others will say that the distribution is close enough to being symmetric to justify using the mean and the standard deviation. 2. Min. = 14 Q1 = 29 Med. = 37.5 Q3 = 41 Max. = 53 3.  $1.5 \times \text{IQR} = 1.5 \times 12 = 18$ ;  $29 - 18 = 11$  so no low outliers;  $41 + 18 = 59$  so no high outliers. 4. See boxplot below. 5. The distribution is skewed to the left enough so that the mean is pulled toward a lower value by the longer tail on that side of the distribution. 6. Mean = 32 grams, Standard deviation = 2.55 grams. 7.  $C < B < A$ . A has the highest standard deviation. C's standard deviation is 0, and the extra scores in B that are equal to the mean have a deviation of 0 from the mean and thus reduce the average deviation.



### Quiz 1.3C

1. Mean = 7.309 hours; Standard deviation = 0.977 hours. 2. Min. = 5 Q1 = 7 Med. = 7.25 Q3 = 8 Max. = 9. 3.  $1.5 \times \text{IQR} = 1.5 \times 1 = 1.5$ ;  $7 - 1.5 = 5.5$  so 5 is a low outlier;  $8 + 1.5 = 9.5$  so no high outliers. 4. The new values would have deviations of 0 from the mean. Since the standard deviation is a measure of the average deviation from the mean, it would be reduced by the inclusion of 4 more 0's into the calculation. 5. We are looking for 5 numbers whose sum is  $5 \times 7 = 35$  and that have a middle score of 10. One such set of numbers is 1, 3, 10, 10, 11. 6. IQR for Classical is about 5, IQR for Rap is about 3. Since there are outliers in both sets of data and standard deviation is exaggerated by outliers, IQR is a better measure of spread to use. 7. Students listening to rap are typically able to recall more words: the median for rap is about 17 words, which is higher than for classical, which has a median of about 12 or 13 words. Both distributions are slightly skewed to the right. The smaller IQR for rap suggests less variability than for classical, but there are 3 low outliers and 3 high outliers for rap and only one high outlier for classical, suggesting considerable variability in both groups.