# Bar Charts, Frequency Distributions, and Histograms

Frequency Distributions, Bar Graphs, and Circle Graphs

The *frequency* of a particular event is the number of times that the event occurs. The *relative frequency* is the proportion of observed responses in the category.

Example: We asked the students what country their car is from (or no car) and make a tally of the answers. Then we computed the frequency and relative frequency of each category. The relative frequency is computed by dividing the frequency by the total number of respondents. The following table summarizes.

Country	Frequency	Relative Frequency
US	6	0.3
Japan	7	0.35
Europe	2	0.1
Korea	1	0.05
None	4	0.2
Total	20	1

Below is a bar graph for the car data. The height represents the frequency. Notice that the widths of the bars are always the same.
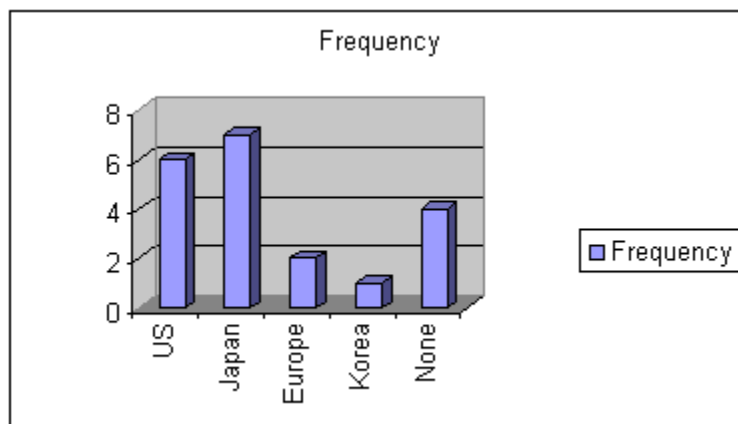
We make a *circle graph* often called a **pie chart** of this data by placing wedges in the circle of proportionate size to the frequencies.

Below is a **pie chart** the shows this data.
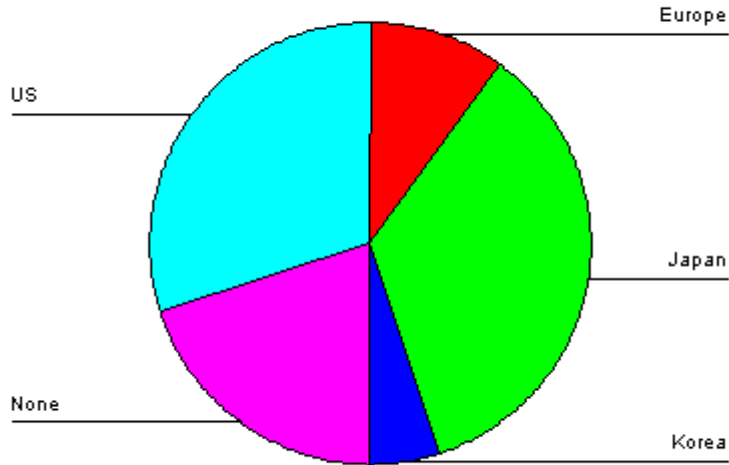
Histograms

Histograms are bar graphs whose vertical coordinate is the frequency count and whose horizontal coordinate corresponds to a numerical interval.

Example:

The depth of clarity of Lake Tahoe was measured at several different places with the results in inches as follows:

15.4, 16.7, 16.9, 17.0, 20.2, 25.3, 28.8, 29.1, 30.4, 34.5,

36.7, 39.1, 39.4, 39.6, 39.8, 40.1, 42.3, 43.5, 45.6, 45.9,

48.3, 48.5, 48.7, 49.0, 49.1, 49.3, 49.5, 50.1, 50.2, 52.3

We use a frequency distribution table with class intervals of length 5.

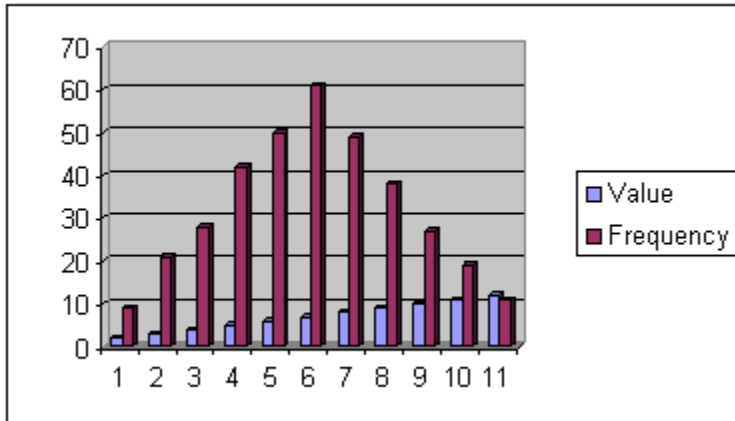| Class Interval	Frequency	Relative Frequency	Cumulative Relative Frequency
15 - < 20	4	0.129	0.129
20 - < 25	1	0.032	0.161
25 - < 30	3	0.097	0.258
30 - < 35	2	0.065	0.323
35 - < 40	6	0.194	0.516
40 - < 45	3	0.097	0.613
45 - < 50	9	0.290	0.903
50 - < 55	3	0.097	1.000
Total	31	1.000	

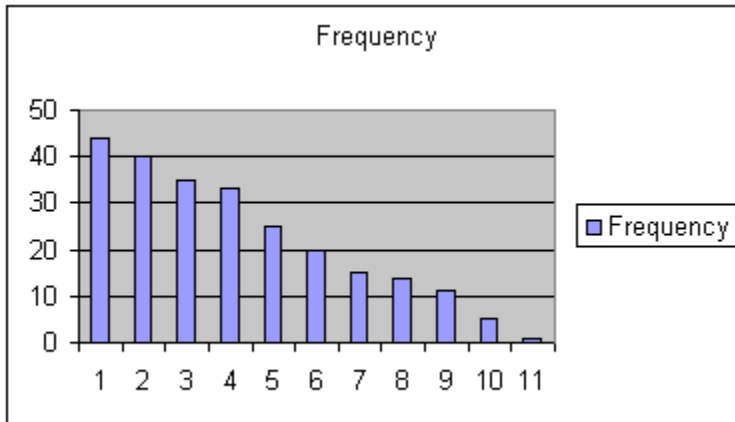**Below is the graph of the histogram**

DEPTH
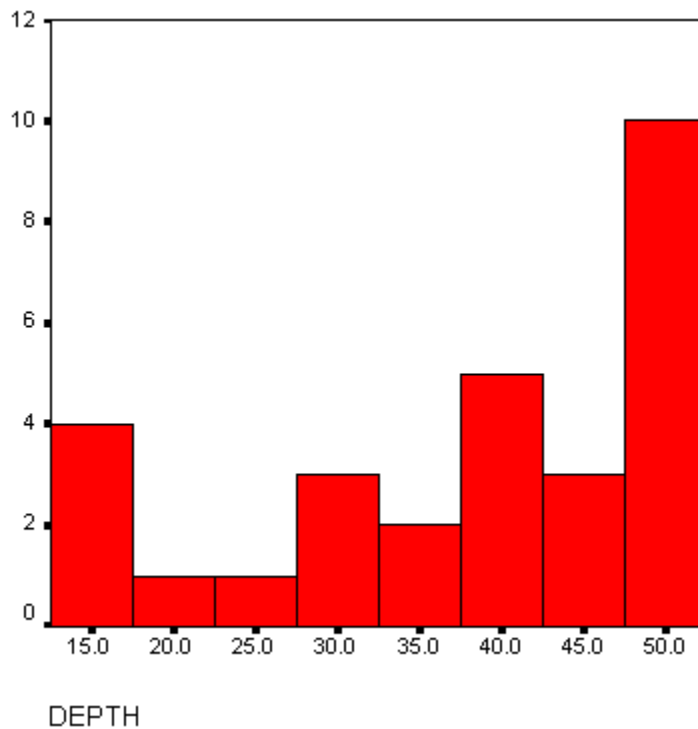
The Shape of a Histogram

A histogram is **unimodal** if there is one hump, **bimodal** if there are two humps and **multimodal** if there are many humps. A **nonsymmetrical** histogram is called **skewed** if it is not symmetric. If the upper tail is longer than the lower tail then it is **positively skewed**. If the upper tail is shorter than it is **negatively skewed.**

Symmetrical

Skewed Right

Bimodal