Frequency refers to a count of how many times a value occurs in a data set.

A frequency distribution shows those counts.

There are two ways to create a frequency distribution:

1. Use the Data Values

   Make a column containing an ordered list showing each unique data value.

   Make a second column containing the count of how many times each data value occurs.

2. Use Classes

   A class is simply a range of values. It is used when the list of unique data values is too long.

   Make a column containing the class ranges.

   Make a second column containing the count of how many of the data values are within that range.

Understanding Classes

**Class Limits**

Recall that a range has a lower bound and an upper bound. In class ranges, the lower bound is called the lower class limit, and the upper bound is called the upper class limit.

**Class Boundary**

A class boundary is the number that separates two classes. It is the midpoint between the upper class limit of the first class and the lower class limit of the second class.

**Class Midpoint**

A class midpoint is the midpoint of the class. Add the lower class limit to the upper class limit, and then divide by two.

**Class Width**

The difference between: 1) two consecutive lower class limits; 2) two consecutive upper class limits; or 3) two consecutive class boundaries.

Constructing a Frequency Distribution Using Classes

This is a summary of the steps outlined in the book on pages 38-39.

1. Decide on a number of classes – usually between 5 and 20.
2. Calculate the class width: $\frac{highestValue - lowestValue}{numberOfClasses}$. Round to a convenient number.
3. Decide on a starting point.
4. Calculate the lower class limits for all of the classes and list them in the first column.
5. Calculate the upper class limits for all of the classes and list them in the second column.
6. Tally the data based on the classes. Use the tally marks to find the frequency for each class.

Note: Add the frequency column. The value must equal the number of data points.

Relative Frequency Distribution

Relative frequency shows the percent of the counts. Add another column to the frequency distribution. For each row, divide the frequency by the total number of data points.

Cumulative Frequency Distribution

Cumulative frequency shows a running total of the counts. Add another column to the frequency distribution. For each row, add the frequency to the cumulative frequency of the previous row. The last row must be equal to the number of data points.