

## M110 SECTION 15.1 ORGANIZING & VISUALIZING DATA

For many years, the word *statistics* referred to numerical information about state or political territories. The word itself comes from the Latin *statisticus*, meaning “of the state”. We now live in an information age and the study of statistics is more important than ever before. In today’s world, much of statistics involves making sense of data.

Visual illustrations are an important way to depict information from statistics. These visual illustrations are simply pictures that display data – which may then tell us a story about the data. In this section, we will be exploring the following visual depictions of information:

Stem and Leaf Plots  
Histograms

Frequency Tables  
Bar Graphs

Grouped Frequency Tables

### I. Frequency Table

A frequency table shows the number of times a certain piece of data occurs. Let’s make one which describes the number of siblings we have:

Number of Siblings	Tally	Frequency	Relative Frequency
0			
1			
2			
3			
4			
5			
6			
TOTAL			

President	Age at Death	President	Age at Death	President	Age at Death
Washington	67	Fillmore	74	Roosevelt	60
Adams	90	Pierce	64	Taft	72
Jefferson	83	Buchanan	77	Wilson	67
Madison	85	Lincoln	56	Harding	57
Monroe	73	Johnson	66	Coolidge	60
Adams	80	Grant	63	Hoover	90
Jackson	78	Hayes	70	Roosevelt	63
Van Buren	79	Garfield	49	Truman	88
Harrison	68	Arthur	57	Eisenhower	78
Tyler	71	Cleveland	71	Kennedy	46
Polk	53	Harrison	67	Johnson	64
Taylor	65	McKinley	58	Nixon	81

**II. Grouped Frequency Tables**

Whenever you have a large set of data, you can put your measurements into groups, called *classes or intervals*. The following classes were formed from the president data: 40-49, 50-59, 60-69, 70-79, 80-89, and 90-99. What is the size or width of each class? Use these classes and the presidential death data to fill in the following grouped frequency table.

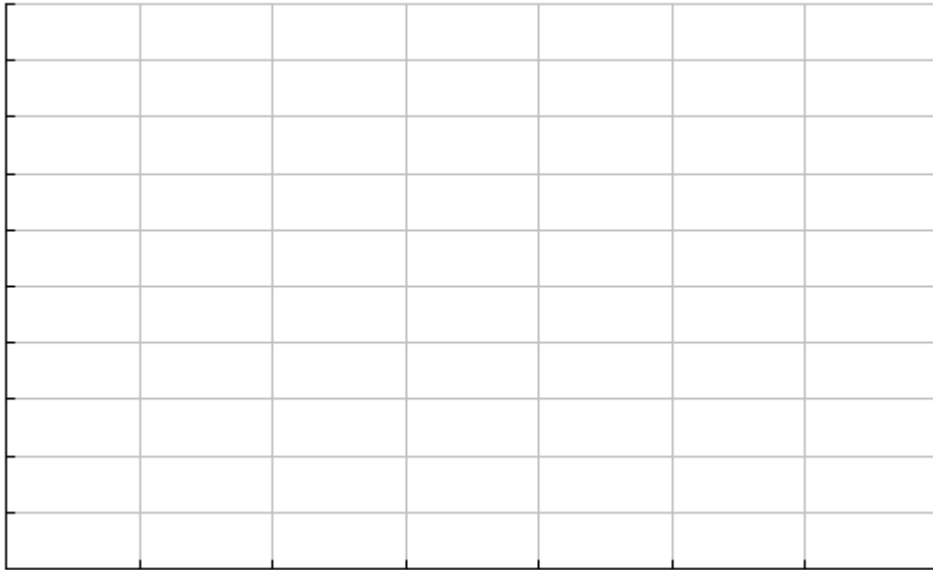
Ages at Death	Tally	Frequency	Relative Frequency
40 - 49			
Total			

In the above example, the groups were already calculated for you. However, when you collect your own data you would have to do this yourself. Next is a systematic way of doing so.



**III. Histogram**

We can look at a graphical representation of this data as well using a histogram. Using the same intervals as in the above frequency table, let's create a histogram. (We use a squiggle to indicate that part of the scale has been omitted; therefore the scale is not accurate at this area.)



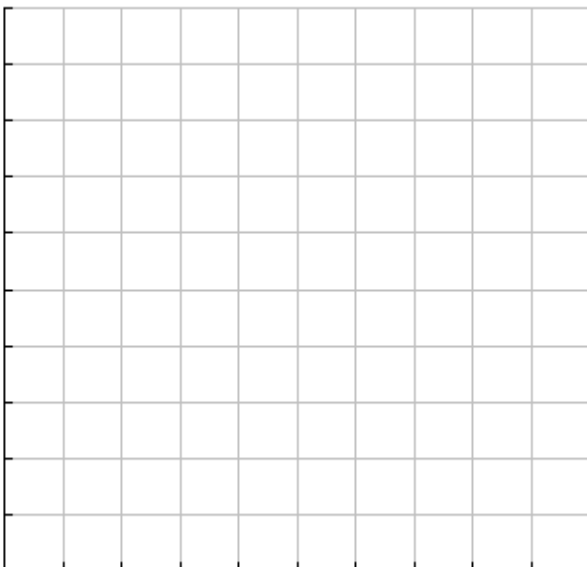
**IV. Bar Graph**

A Bar Graph is just like a histogram, but typically has spaces between the bars. Let's make a Bar Graph with our sibling data.

(YOU CAN USE EITHER THE FREQUENCIES OR THE RELATIVE FREQUENCIES FOR THE VERTICAL AXIS)

Frequency

Percent





**VI. Stem and Leaf Plot**

To construct a stem and leaf plot for the president data, let's assign the ten's digit as the "stems" and the one's digits as the "leaves".

Now let's make an **Ordered Stem and Leaf**  
(Just arrange the leaves least to greatest)

Ages of Early Presidents at Death

4 |  
5 |  
6 |  
7 |  
8 |  
9 |

Ages of Early Presidents at Death

4 |  
5 |  
6 |  
7 |  
8 |  
9 |

If you turn a stem and leaf plot sideways, you can see how a histogram is formed. The advantage that the stem and leaf has over the histogram is that you can actually see each data point whereas on the histogram you can only see the number of occurrences of each outcome.

**A Back-to-Back Stem and Leaf**

(Use the frequency tables about the early and late presidents)

Death Age of Early Presidents	Stem	Death Age of Early Presidents
	4	
	5	
	6	
	7	
	8	
	9	

Advantages of a Stem and Leaf Plot?

Disadvantage?