

**The Stem and Leaf Graph
for Discrete Quantitative Data**

A simple way to organize data, order the data and get a basic idea of class frequency is with the use of a **Stem and Leaf Graph**.

2 4 4 10 11 12 14 16 21 23
23 30 31 34 35 42 45

The **data listed** above has been organized into **the stem and leaf graph shown below**.

0	2	4	4			
1	0	1	2	4	6	
2	1	3	3			
3	0	1	4	5		
4	2	5				

Each row of the Stem and Leaf Graph is a class. The first class is **0 – 9**, the second class is **10 – 19**, the third class is **20 – 29**, the fourth class is **30 – 39**, the fifth class is **40 – 49** and the last class is **50 – 59**.

The **first class** contains only single digit numbers from **0 to 9 written in order**. The 0 at the start of the first class shows that the **tens digit is a 0**. The members of the **first class in order** are 2, 4, 5

The **second class** contains the numbers from **10 to 19 written in order**. Each of these numbers has a 1 in the tens place. **We write a 1 in the left column** of the graph and then list the numbers in order but **we only write the ones digits**. This saves us writing the 1 in the tens place each time we write a number. The members of the **second class in order** are 10, 11, 12, 14, 16

The **third class** contains the numbers from **20 to 29 written in order**. Each of these numbers has a 2 in the tens place. **We write a 2 in the left column** of the graph and then list the numbers in order but **we only write the ones digits**. The members of the **third class in order** are 21, 23, 23

The **fourth class** contains the numbers from **30 to 39 written in order**. Each of these numbers has a 3 in the tens place. **We write a 3 in the left column** of the graph and then list the numbers in order but **we only write the ones digits**. The members of the **fourth class** are 30, 31, 34, 35

The **fifth class** contains the numbers from **40 to 49** written in order. Each of these numbers has a 4 in the tens place. **We write 4 in the left column** of the graph and then list the numbers in order. but **we only write the ones digits**. The members of the **fourth class in order** are 42, 45

Graphs of Nonnumeric Data

A **Pareto Graph** is a Histogram Graph (bar graph) for **Nonnumeric Data**.

The x axis

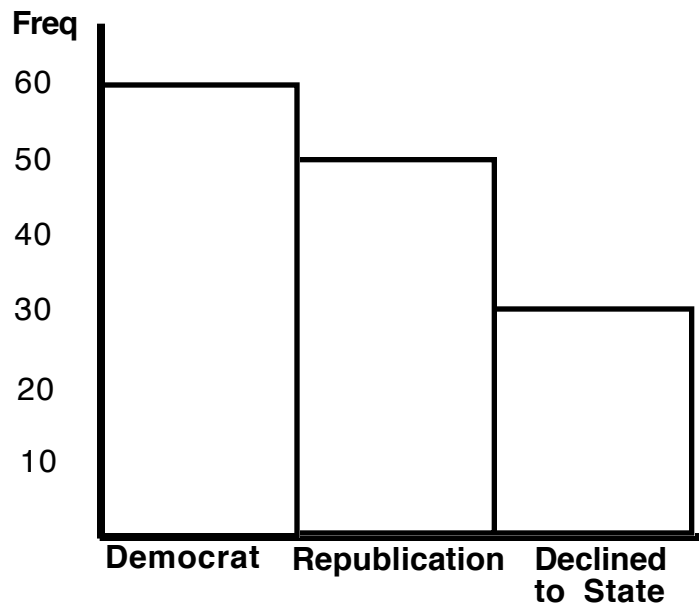
The data is not numeric. Nonnumeric data is based on categories and not numerical values. Examples of categories are: The months of the year, brand of cell phone, or the most popular vacation spots. There is **no scale for the x axis**. The category with **the highest frequency has its bar drawn first**. Bars for each of the other categories are drawn in **descending order of their frequencies**. The least frequent category is placed last. Each bar must have the same width. A title for each bar is placed below the corresponding bar.

The y axis

The y axis is used to show the frequency for each bar in the graph based on its height. The y axis is scaled to **the numbers in the frequency column**.

Example of a Pareto Graph for Nonnumeric Date

Bars for each category are drawn in **descending order of their frequencies**.



Favorite Political Party for the 140 people in my Classes

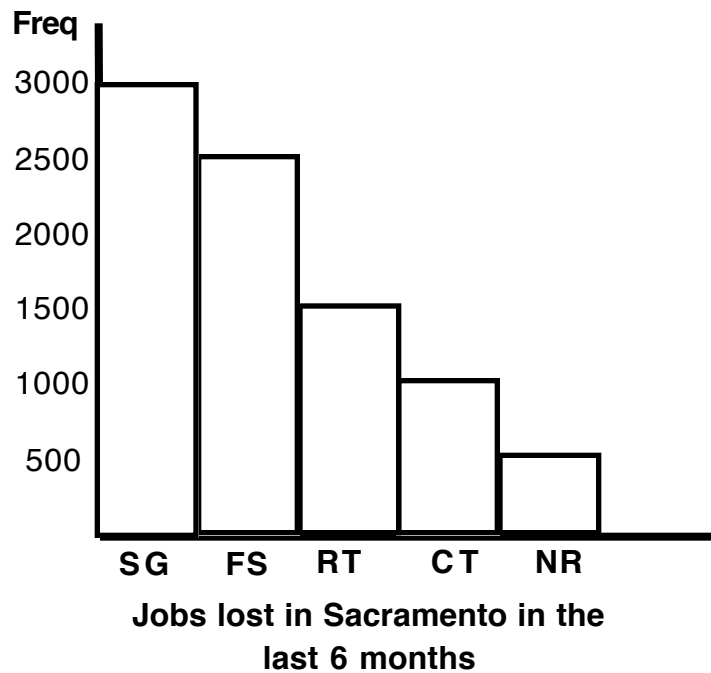
Interpreting the Pareto Graph

140 students were asked to state their favorite political party. 60 of the students chose the Democratic Party. 50 of the students chose the Republication Party. 30 of the students declined to state.

Example of a **Pareto Graph** for **Nonnumeric Data**

Construct a **Pareto Graph** for the table shown below.

Jobs lost in Sacramento in the last 6 months	Freq.
Computer Tech. (CT)	1000
Nurses (NR)	500
Restaurants (RT)	1500
State Government (SG)	3000
Financial Services (FS)	2500



The **highest** bar represents State Government and is placed at the far left. It's height is 3000
The label under the bar is **SG**

The **second highest** bar represents Financial Services and is placed second from the left. It's height is 2500. The label under the bar is **FS**

The **third highest** bar represents Restaurants and is placed third from the left. It's height is 1500.
The label under the bar is **RT**

The **forth highest** bar represents Computer Tech. and is placed forth from the left. It's height is 1000. The label under the bar is **CT**

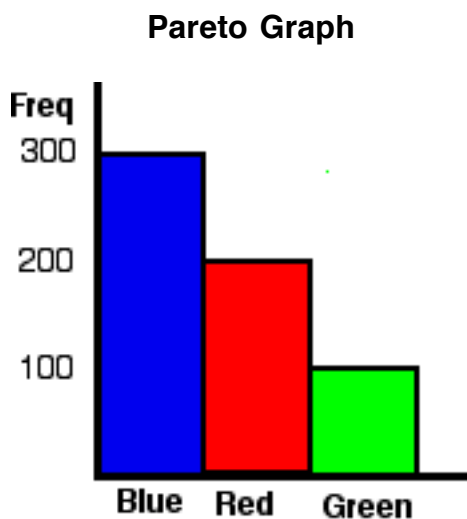
The **fifth highest** bar represents Nurses and is placed last on the far left. It's height is 500. The label under the bar is **NR**

Circle Graphs for Nonnumeric Data

The **Circle Graph** is more commonly referred to as a **Pie Chart**. The circle graph may be more familiar with students than the **Pareto Graph** but both graphs display the same information.

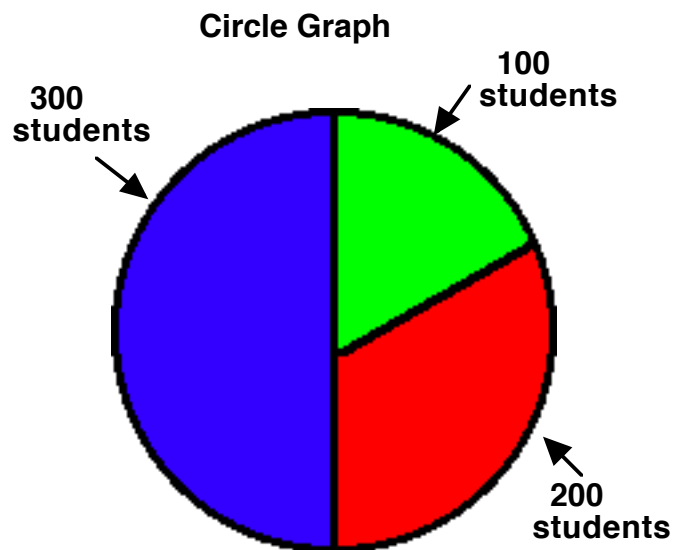
Frequency Table for Nonnumeric Data

Favorite Color based on Red, Blue Green	Freq.
Red	200
Blue	300
Green	100







Favorite Color between Red, Blue and Green based on 600 students

The scale on the y axis of the Pareto Graph allows an easy reading of the heights for each category. The bar for the red category is twice as tall as the bar for the green category. The bar for the Blue category is three times as tall as the bar for the green category. Scaling the y axis is important as most people look at the heights of the bars not the numbers on the left scale.



Favorite Color between Red, Blue and Green based on 600 students

The scale on the Circle Graph can be much harder to get correct. The Green area must be $1/6$ of the circle. It must be 60° . The Red area must be $2/6$ of the circle. It must be 120° . The Blue area must be $1/2$ of the circle. It must be 180° . A protractor is required to get the areas the correct scale. The Circle Graph requires that the total frequency of the data be displayed or that the total frequency of each category be listed. This makes the circle graph more work than the Pareto Graph.

The 4 Most Popular Ice Cream Flavors in a poll of 200 people		Frequency
	Vanilla	40
	Chocolate	20
	Strawberry	80
	Rocky Road	60

There are 200 people who must be divided into the 10 segments of the circle.
This means that **each segment must represent 20 people**.

Vanilla must cover 2 segments to count for 40 people.
Chocolate must cover 1 segment to count for 20 people.
Strawberry must cover 4 segments to count for 80 people.
Rocky Road must cover 3 segments to count for 60 people.

The 4 Most Popular Ice Cream Flavors based on a poll of 200 people

