Graphing Data

Bar graphs and line graphs are great for looking at data over time intervals, or showing the rise and fall of a quantity over the passage of time.

Example:

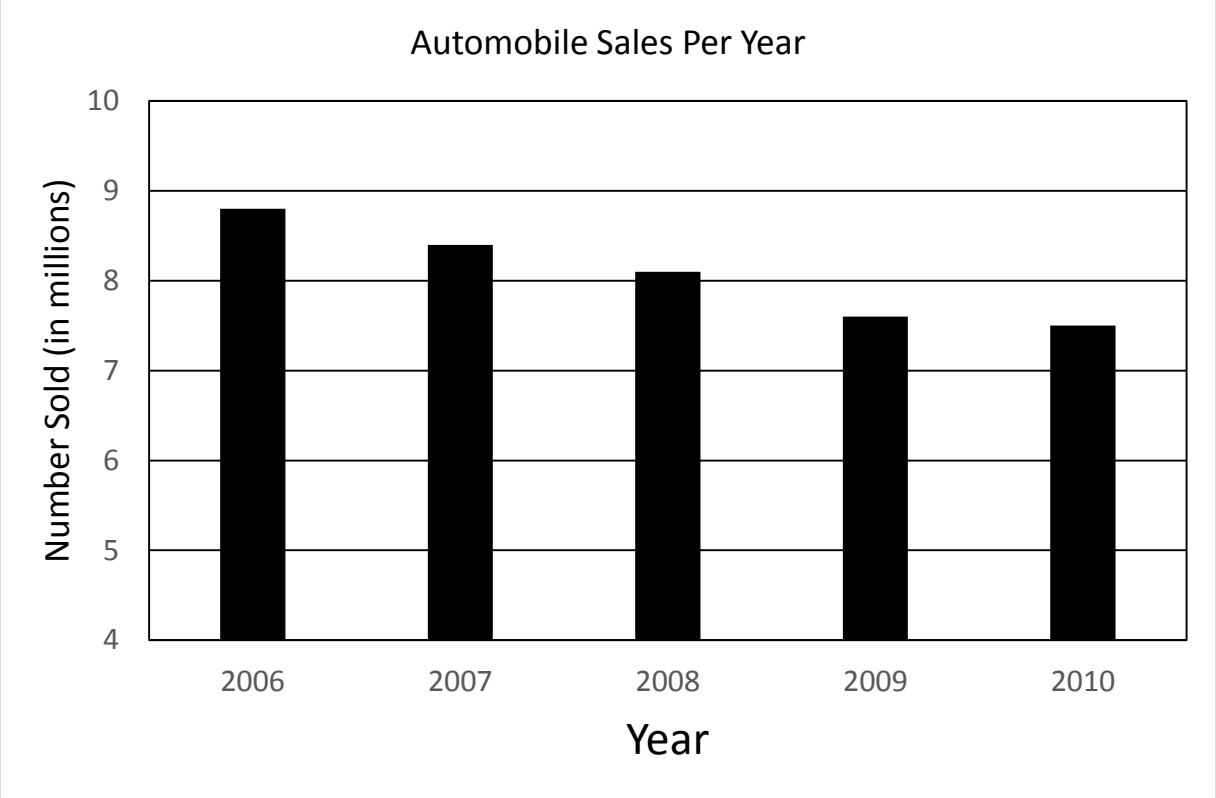
Auto Sales by Year

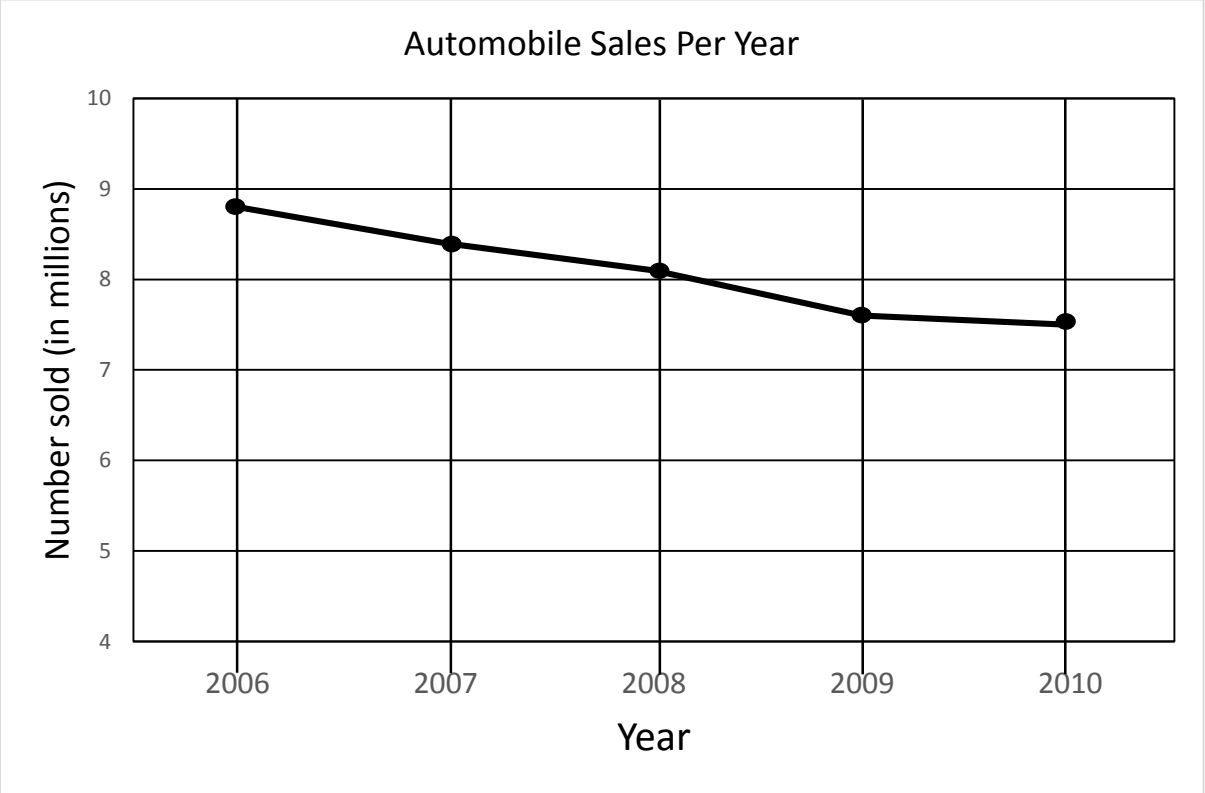
Year	Number sold (in millions)
2006	8.8
2007	8.4
2008	8.1
2009	7.6
2010	7.5

Steps for Making a Bar Graph or Line Graph

1. Draw and label the horizontal and vertical axes of the graph.
2. Choose a scale to fit the data for each exis and make intervals.
3. Draw a bar for each interval or plot points and connect them.
4. Title the graph.

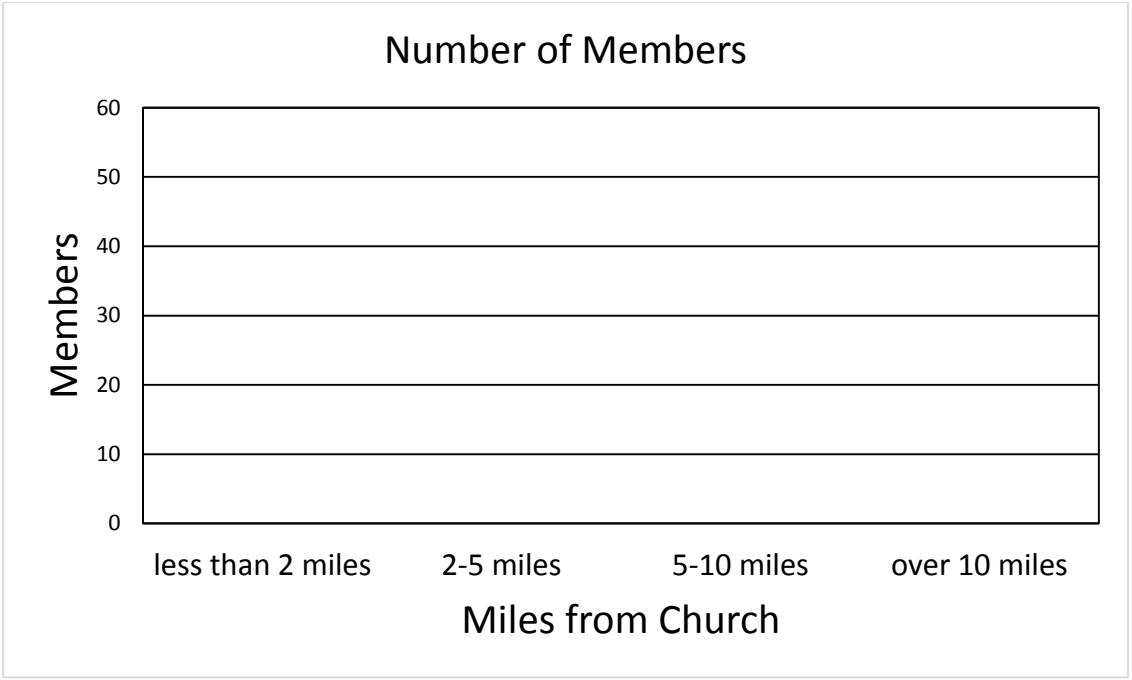
The data in a bar graph and line graph:



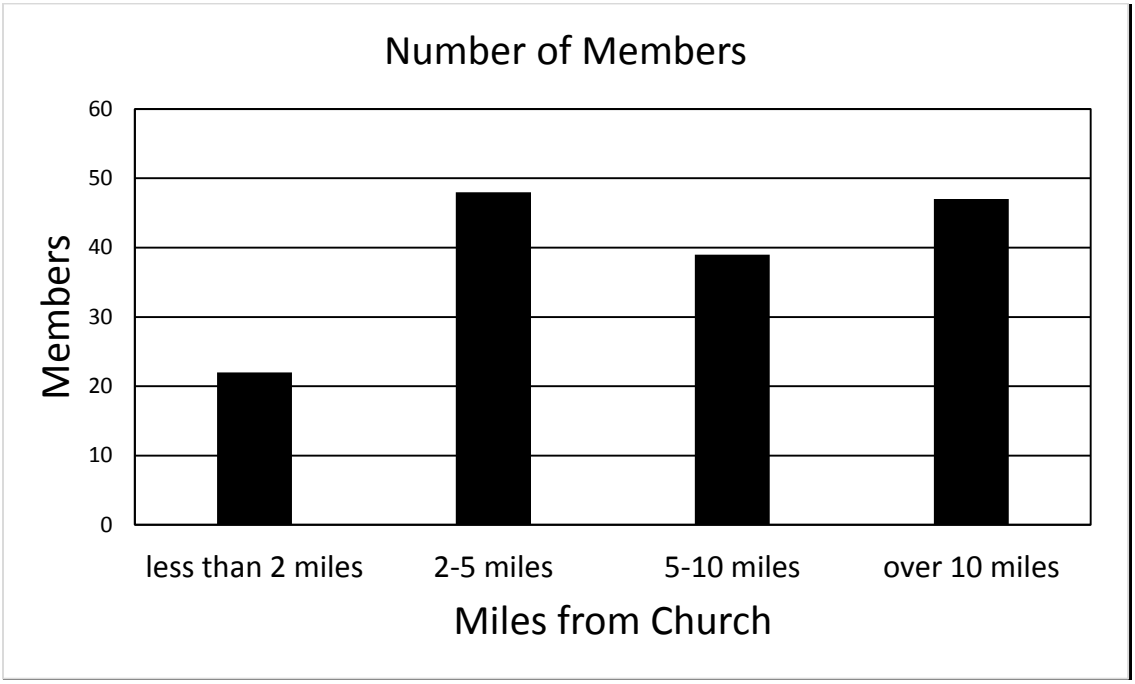


Sample Problem: Make a bar graph of the following chart using increments of 10.

Miles from Church	Number of Members
less than 2 miles	22
2-5 miles	48
5-10 miles	39
over 10 miles	47

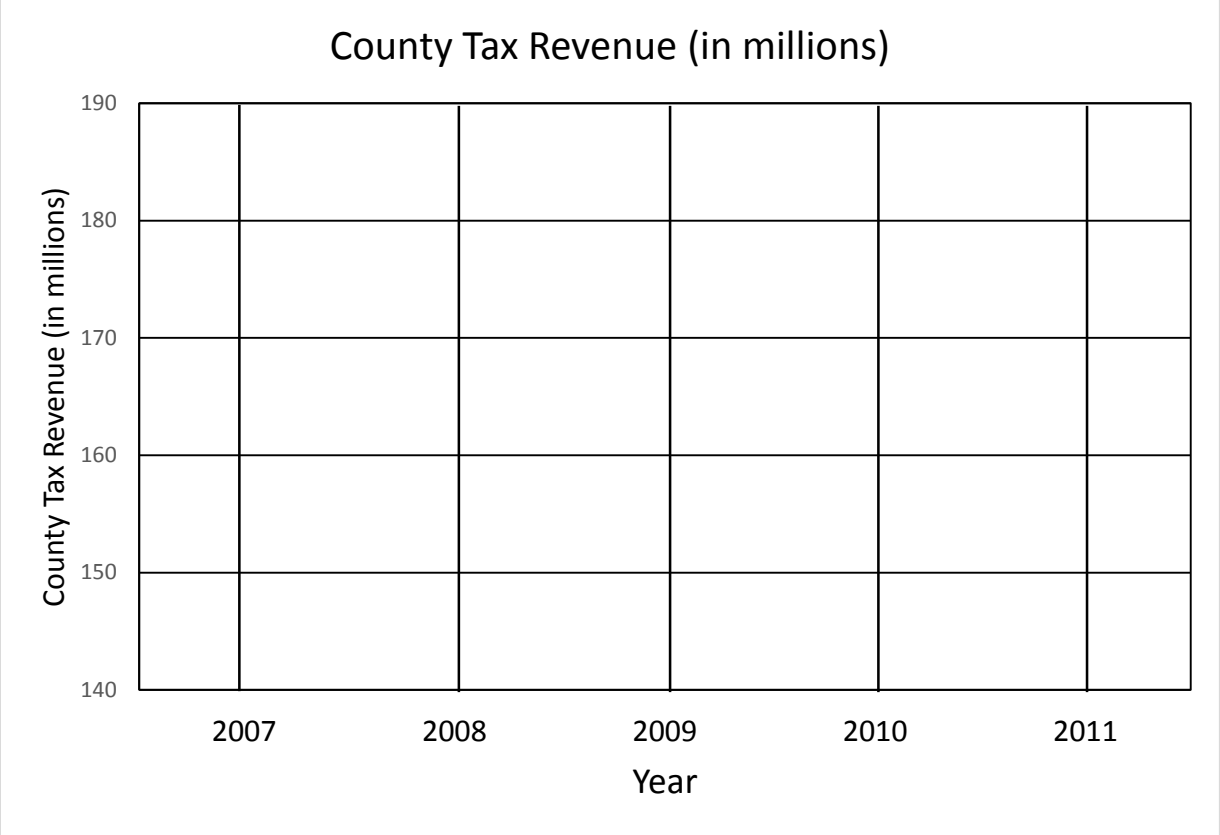


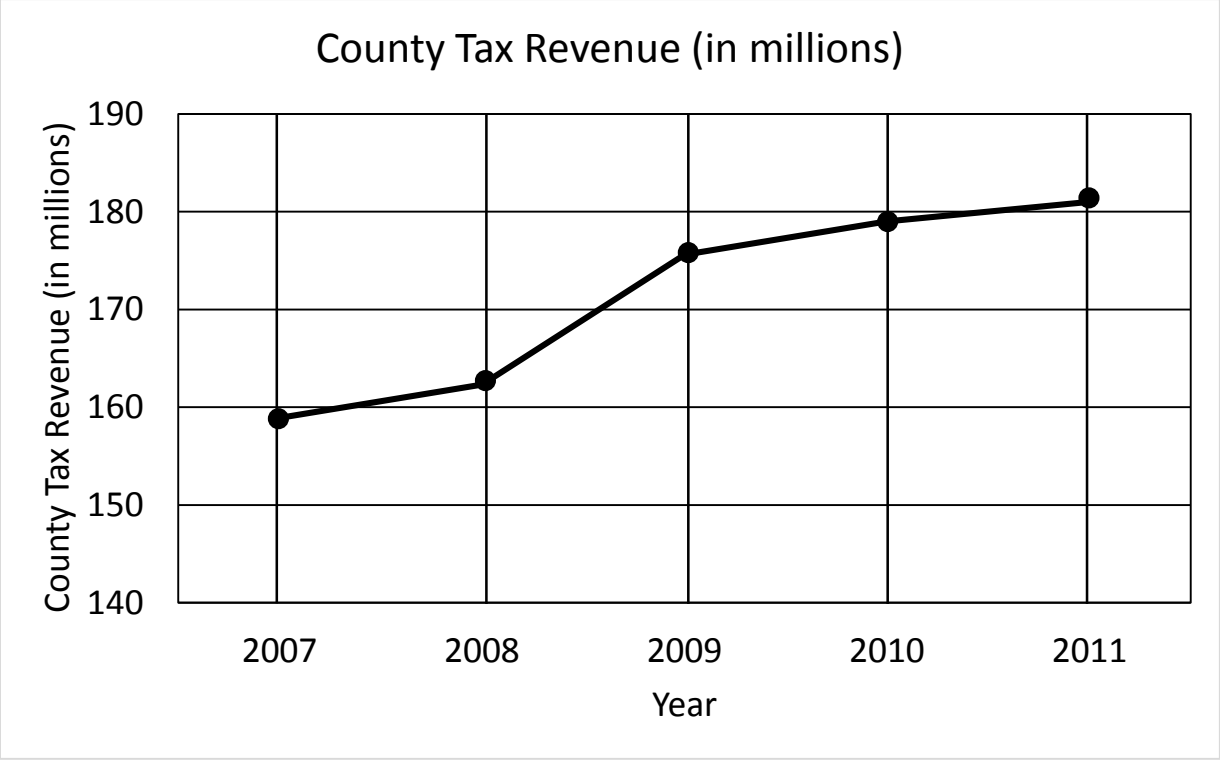
Solution:



Sample Problem: Make a line graph of the following chart.

Year	County Tax Revenue (in millions)
2007	158.9
2008	162.3
2009	175.6
2010	179
2011	181


County Tax Revenue (in millions)
190
180
170
160
150
140
County Tax Revenue (in millions)
2007
2008
2009
2010
2011
Year


County Tax Revenue (in millions)
190
180
170
160
150
140
County Tax Revenue (in millions)
2007
2008
2009
2010
2011
Year

Circle Graphs

Consider the following example: Last year in CHAT we had the following students:

7^{th} graders – 29	9^{th} graders – 29	11^{th} graders – 22
8^{th} graders – 50	10^{th} graders – 58	12^{th} graders – 20

Total CHAT students - 208

Steps to making a circle graph:

1. Turn the numbers into percentages (rounded to the nearest percent)

7^{th} graders – 29 $\rightarrow \frac{29}{208} = .14 = 14\%$

8^{th} graders – 50 $\rightarrow \frac{50}{208} = .24 = 24\%$

9^{th} graders – 29 $\rightarrow \frac{29}{208} = .14 = 14\%$

10^{th} graders – 58 $\rightarrow \frac{58}{208} = .27 = 28\%$*

11^{th} graders – 22 $\rightarrow \frac{22}{208} = .11 = 11\%$

12^{th} graders – 20 $\rightarrow \frac{20}{208} = .10 = 10\%$

*If the percents don't add up to 100%, adjust the largest number. We need to make it 29% for the 10^{th} graders.

2. Since a circle contains 360°, multiply each % by 360 to find the number of degrees for each category (rounded to the nearest degree).

7^{th} graders $\rightarrow (14\%)(360) = 50°$

8^{th} graders $\rightarrow (24\%)(360) = 86°$

9^{th} graders $\rightarrow (14\%)(360) = 50°$

10^{th} graders $\rightarrow (27\%)(360) = 97°$ *

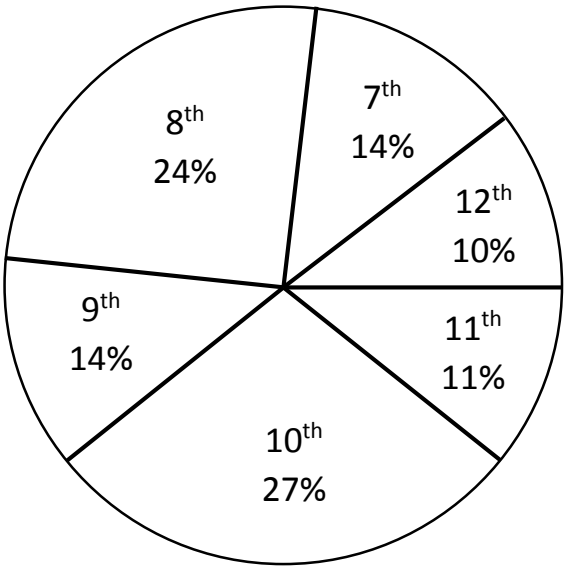
11^{th} graders $\rightarrow (11\%)(360) = 40°$

12^{th} graders $\rightarrow (10\%)(360) = 36°$

*If the degrees don't add up to 360° adjust the largest number. We need to make it 98° for the 10^{th} graders.

3. Draw a circle and use a protractor to measure the correct number of degrees for each category.
4. Label each pie-shaped piece in words and percents.
5. Title the graph.

CHAT Students



Make a pie chart for our previous example:

Miles from Church	Number of Members
less than 2 miles	22
2-5 miles	48
5-10 miles	39
over 10 miles	47

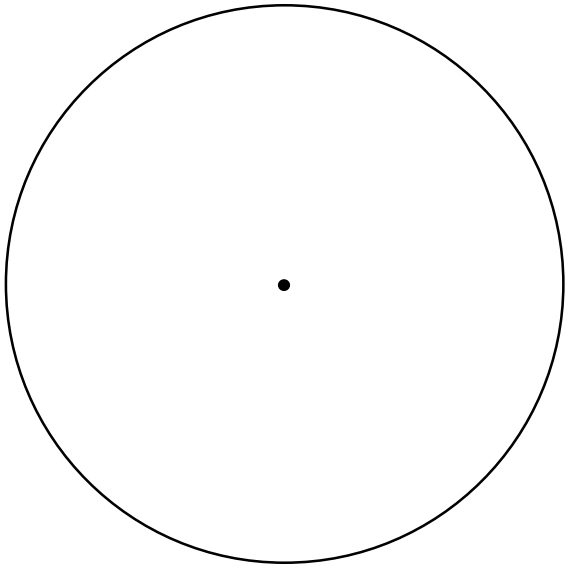
Less than 2 miles $\rightarrow \frac{22}{156} = 14\% \rightarrow (.14)(360) = 51°$

2-5 miles $\rightarrow \frac{48}{156} = 31\% \rightarrow (.31)(360) = 111°$

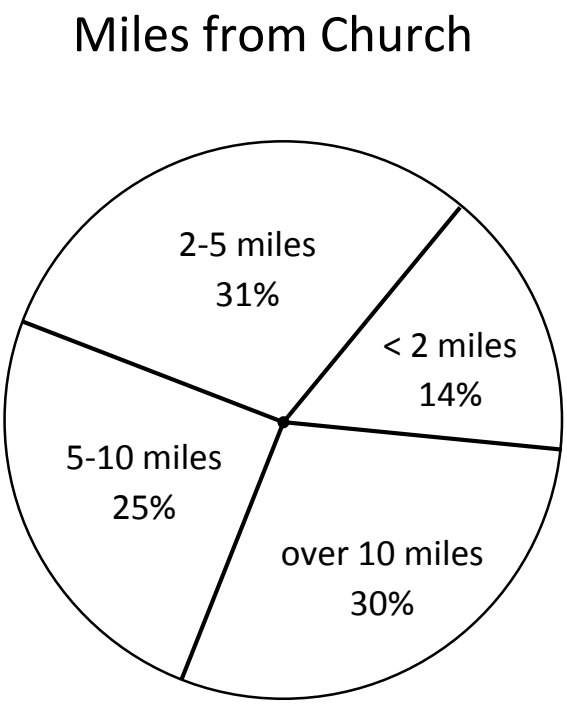
5-10 miles $\rightarrow \frac{39}{156} = 25\% \rightarrow (.25)(360) = 90°$

Over 10 miles $\rightarrow \frac{47}{156} = 30\% \rightarrow (.30)(360) = 108°$

Miles from Church



Solution:


Miles from Church
2-5 miles
31%
< 2 miles
14%
5-10 miles
25%
over 10 miles
30%

How to decide which type to use:

Box-and-whisker	• To Illustrate the 5-point summary • To quickly compare 2 or more data sets • When the data set is large	• When the exact values in the data set are important
Stem-and-leaf	• To visually represent the range, mode, and data inconsistencies • To keep exact values of the data set visible • When the data set is large	• When central tendency information is to be conveyed by the representation
Scatterplot	• To illustrate the relationship between two characteristics of the data	• When the data set is large
Histogram	• To clearly illustrate large amounts of data when central tendency values are fairly apparent • When the data set is large	• When the exact values in the data set are important • When two or more sets of data are to be compared
Bar graph	• To illustrate data reported as frequency in groups • To compare two or more data sets	• When data is not organized by groups
Line graph	• To illustrate changes over a period of time • To compare two or more data sets	
Pie chart	• To display how the entire whole is separated into parts • When data is reported as percentages or frequencies in groups	• When two or more sets of data are to be compared • When there are many categories given in the data set