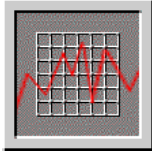


CONSTRUCTING LINE GRAPHS, CIRCLE GRAPHS, AND HISTOGRAMS

Graphs are used to organize data into a graphical visual display of data that can be interpreted more easily. A line graph shows change of data over time displaying increases and decreases. A circle graph is a graphical representation of a whole group of data divided up into parts. A histogram is a special bar graph that represents the frequency of data that has been organized into intervals.

Constructing a Line Graph



Rebecca set up a lemonade stand in her neighborhood. It became more popular as the word spread that her lemonade was the best cool drink around. She kept daily records of sales and decided to graph the success of the stand.

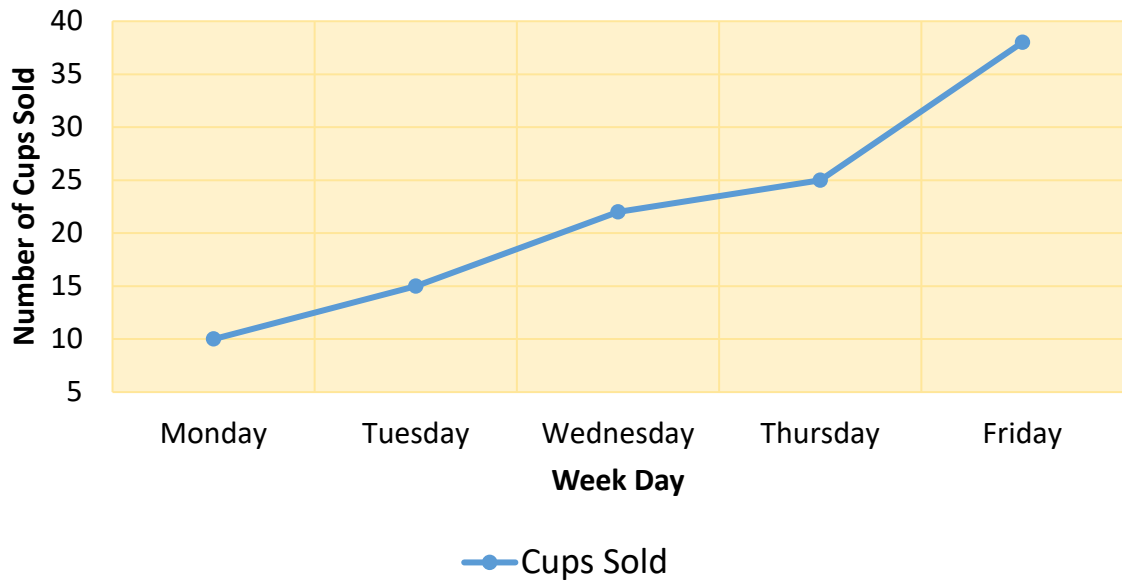
Data Collected

Week Day	Cups Sold
Monday	10
Tuesday	15
Wednesday	22
Thursday	25
Friday	38

Rebecca took these steps to create the graph.

- Rebecca looked over the **range of data**, 10 through 38. She rounded 38 to 40, and then decided that a **scale** of divisions of 5 for the vertical axis fit her data.
- She counted by 5's up the vertical axis, starting with 5 and **spacing evenly**. Since the data began with 10, the initial value on the vertical axis did not have to be zero.
- For the horizontal axis Rebecca spaced out the days of the week evenly.
- She **titled** the graph, "Lemonade Sales," then labeled each axis with a **subtitle**, the horizontal axis, "Week Day," and the vertical axis, "Number of Cups Sold."
- Rebecca completed the graph by **plotting points** and connecting with **line segments**.
- After completing the graph, Rebecca had a visual display of the success of her lemonade stand displaying an overall increase in sales.

Lemonade Sales



Constructing a Circle Graph

Madison recently surveyed her classmates to find out what color was their favorite color? She gave them four choices: blue, green, yellow, red.

First, she made a **tally** chart to keep track of their responses. Then she decided that a **circle graph** would display the data most effectively.

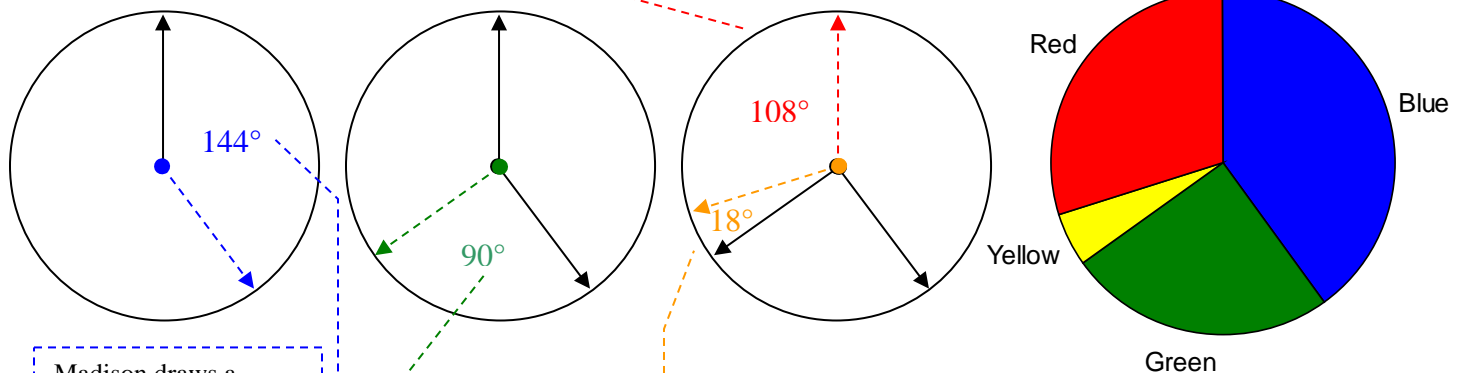
She then made another chart to organize her calculations for drawing the graph. Madison made fractions based on 20 (total responses), then reduced them. She multiplied the fractional part of the whole group by 360 since there are 360° in a circle.

Tally of Favorite Color		
Blue	++++	8
Green	++++	5
Yellow		1
Red	++++	6

Favorite Color		
Blue	$\frac{8}{20} = \frac{2}{5}$	$\frac{2}{5} \times 360 = 144^\circ$
Green	$\frac{5}{20} = \frac{1}{4}$	$\frac{1}{4} \times 360 = 90^\circ$
Yellow	$\frac{1}{20}$	$\frac{1}{20} \times 360 = 18^\circ$
Red	$\frac{6}{20} = \frac{3}{10}$	$\frac{3}{10} \times 360 = 108^\circ$
Check	$\frac{20}{20}$	360°

To check the calculations, Madison adds the results to check. The fractions **total 20/20**, which makes **1 whole** circle and the degrees total **360 (whole)**

Madison will not have to draw the last angle, but will measure it. It should measure 108° (red).



Madison draws a circle with one radius. She places a protractor on the radius, using the center of the circle as the vertex, and draws the first angle (blue).

She then moves the protractor to rest on the ray she just drew and proceeds to make the second angle (green).

Madison then moves the protractor to rest on the ray she drew and proceeds to make the third angle (yellow).

Madison completes the graph by adding category labels, a title, and color to correspond to the survey topic.

Constructing a Frequency Table and Histogram

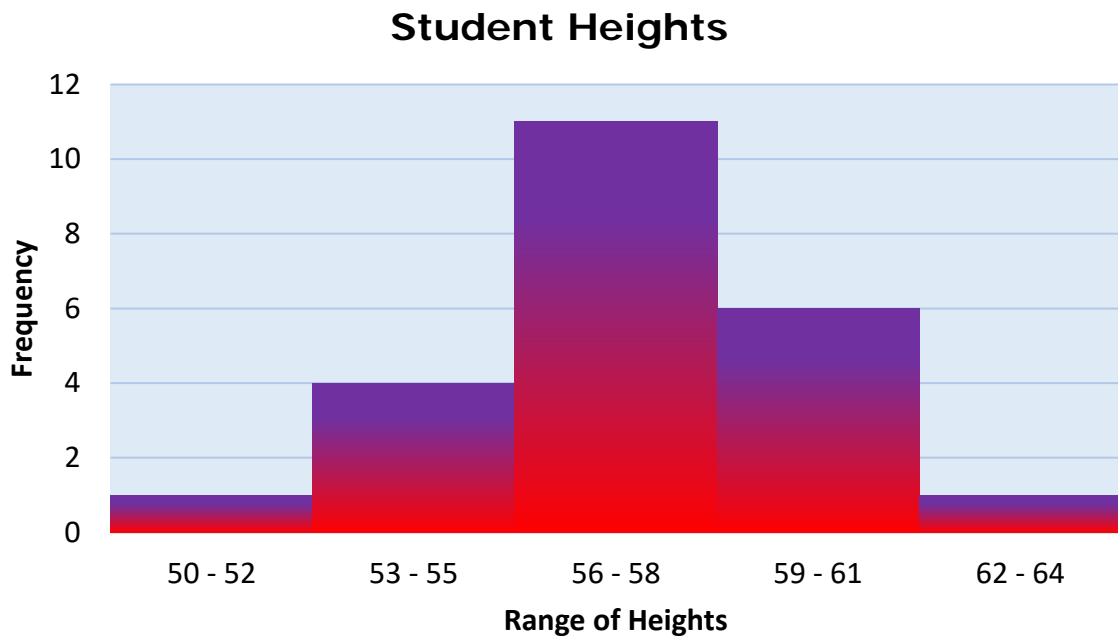
A frequency table may be used to organize intervals of data from a tally.

Frequency is the number of occurrences of data in an interval. An **interval** is a range of data.

Height (inches) (intervals of 3)	Tally	Frequency
50 – 52		1
53 – 55		4
56 – 58	++++ +++++	11
59 – 61	++++	6
62 – 64		1

For example: a survey of the height of a class of sixth graders has been tallied and organized into a frequency table below. All the heights are organized into intervals of 3, starting with 50-52 and ending with 62-64. The frequency is a total count of the tally per interval.

A **histogram** is a graphical representation of the data in the table graphing the intervals of data by the frequency of the heights within the intervals. The bars of the graph are the same width as they represent the same interval. In a histogram, the bars touch each other. The range is listed across the horizontal axis and the frequency is listed along the vertical axis. *The scale along the vertical axis and the intervals along the horizontal axis should be equally spaced both numerically and in actual size.*



The graph shows that most 6th graders' heights fall within a range of 53 inches through 61 inches.