

Data

Organizing and displaying data is an excellent way to show information which can help you prove a point. Clear displays can help a person to find trends, make predictions, make inferences, and compare/contrast ideas. Graphic literacy helps us to efficiently interpret information and find relationships.

A big part of displaying data is knowing which kind of graph or display to use. All graphs, plots, charts, and tables are representations that show a connection or interrelation between pieces of information. Whatever the data, there is probably a diagram or graph that will help you see the big picture hidden in the data.

Charts

Data is displayed in rows and columns in *no particular order*. The chart has a title, labels for rows and columns, and a key if necessary. The chart should be accurate and appropriate for the task.

Number Of Pets Owned By 3 rd Graders	
Student Name	Number Of Pets
Susan	3
Chris	7
Paul	1
Kate	4
Anna	2
Jane	2
Sean	0

Table

A table is a **systematically ordered chart**. The table should have a title, labeled rows and columns, and a key, if necessary. The table should be accurate and in appropriate numerical order.

Number Of Chairs In Each Row In The Gym				
Row Number	Red Chairs	Blue Chairs	Green Chairs	Total Chairs
1	2	4	3	9
2	4	8	6	18
3	6	12	9	27
4	8	16	12	36
5	10	20	15	45
6	12	24	18	54

Because it is systematically ordered, this is a T-Table not a T-Chart.

Tricycles	Wheels
1	3
2	6
3	9
4	12
5	15
6	18

Systematic List

A list of information that is systematically organized, accurate, appropriate, labeled, and includes any necessary keys.

Ways To Order 3 Digits

1	2	3
1	3	2
2	1	3
2	3	1
3	1	2
3	2	1

Frequency Table

A frequency table shows how often an item, a number, or a range of numbers occurs. The table must have a title and labeled rows and columns. The occurrence of the item is often represented with tally marks. If there is any way that a mark can be misconstrued, then a key will be needed.

Favorite Foods

Favorite Food	Tally	Frequency
Taco		7
Burger		9

Graphs

Characteristics Of All Graphs:

- Graphs use reference lines called axes. Axes are a horizontal and a vertical line that cross.
- Axes are labeled. Some axes may need a *scalar* label as well as a *descriptor* label.
- Graphs always have a title.

Representations That Compare:

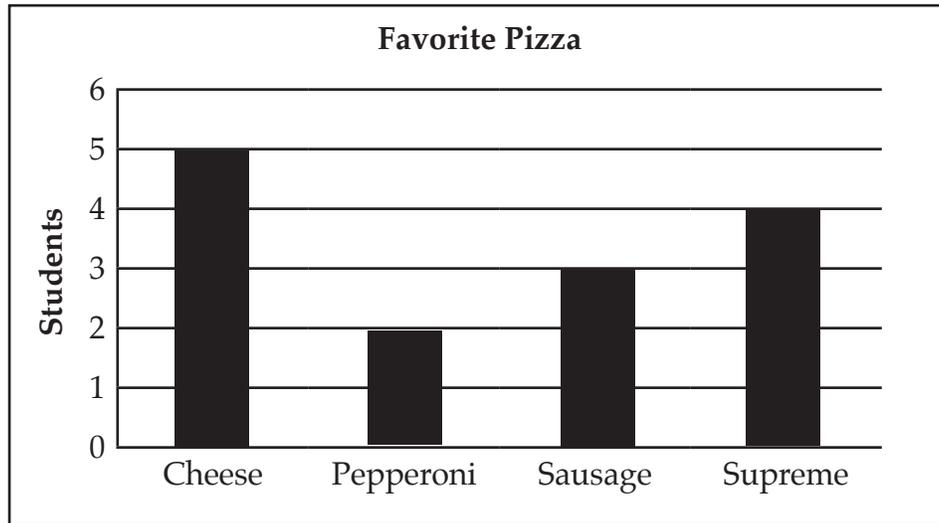
Graphs that compare may show:

- The same kinds of data at different times or places (like scoring records for a team in different years);
- Different kinds of data at the same time or place (like scoring records for two different teams in the same year);
- The different kinds of data that make up 100% of one group of data (like all the different ages of students in your class).

The most commonly used graphs for comparing data are *bar graphs*, *pictographs*, *histograms* and *circle graphs*.

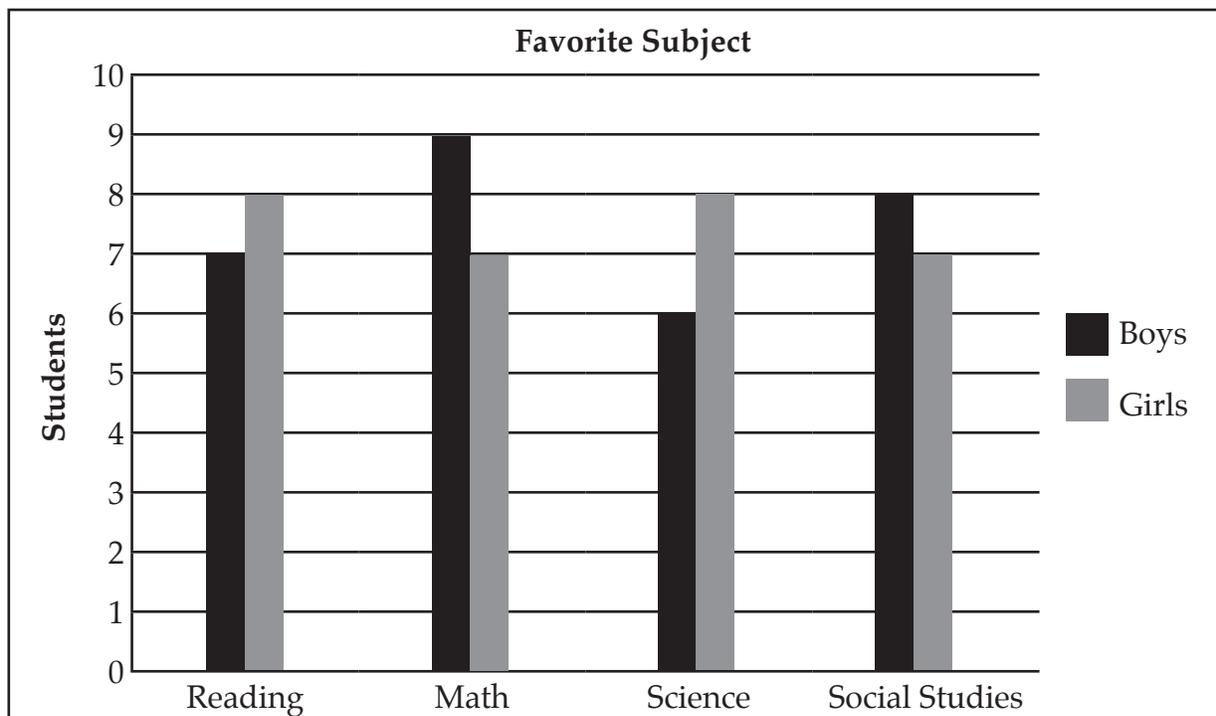
Single Bar Graphs

A bar graph uses the lengths of solid bars to represent numbers and compare data. Just glancing at a bar graph shows how quantities compare. One axis will show the categories and the other a scale of values.



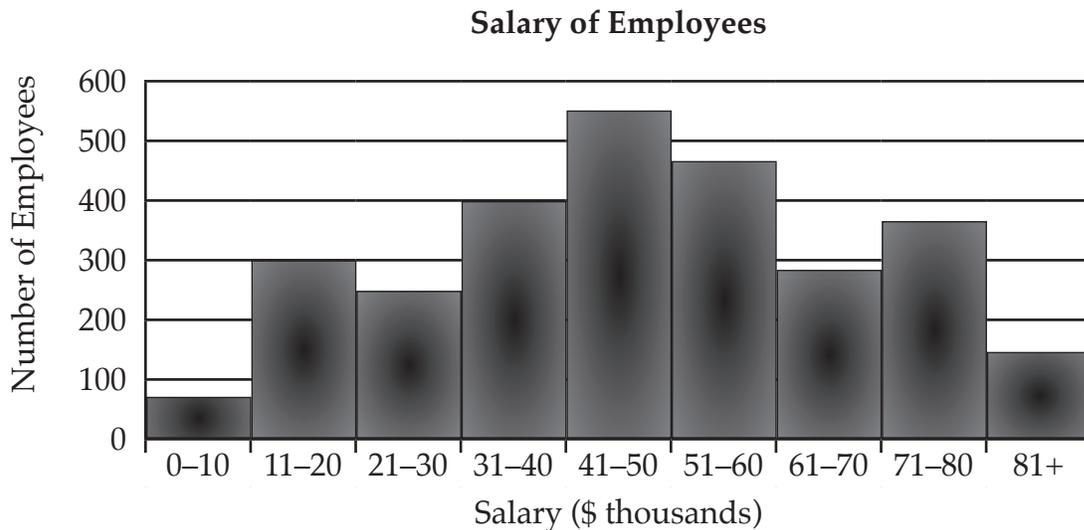
Double Bar Graph

A double bar graph is a bar graph that uses pairs of bars to compare sets of data. One axis will show the categories and the other a scale of values. If there is a comparison within categories, then a key / legend must be added.



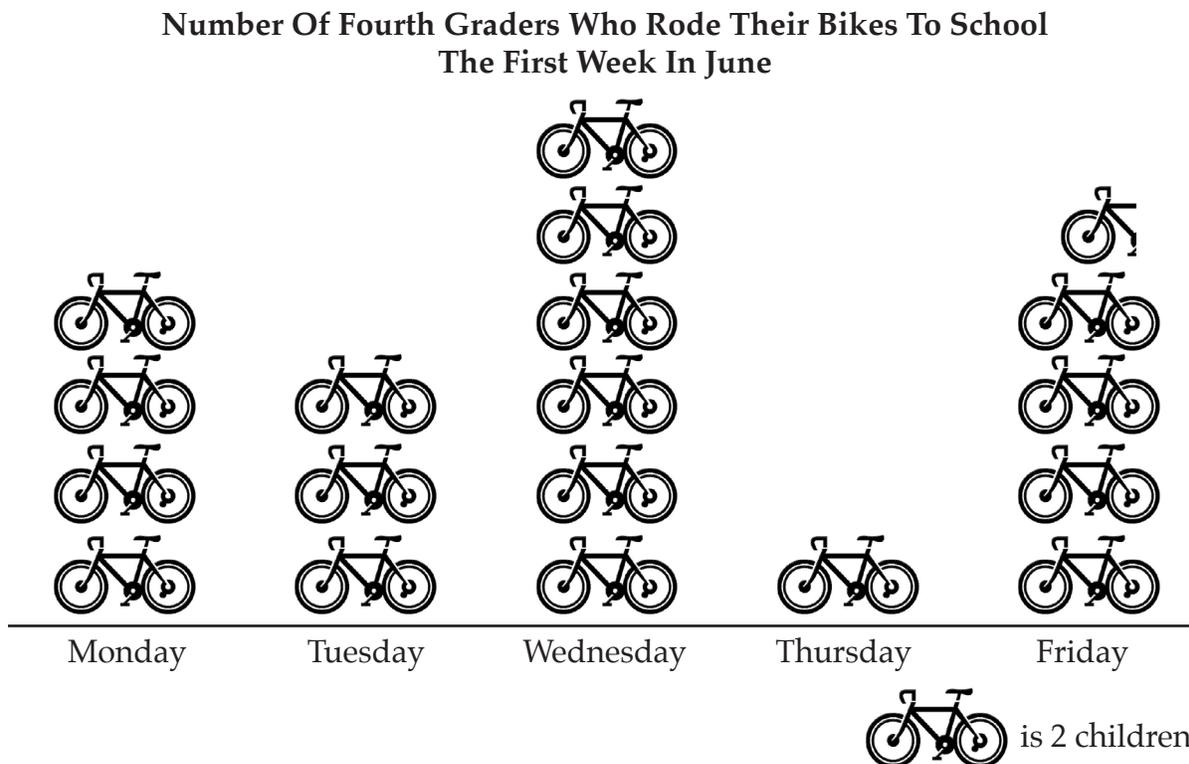
Histograms

A histogram is a bar graph that shows how often data fall into different ranges, or intervals. Histograms differ from bar graphs in that there are no spaces between the bars.



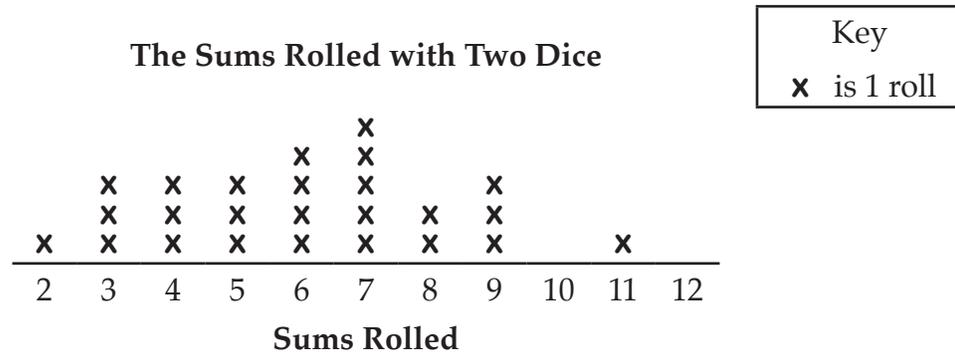
Pictographs

A pictograph is a bar graph that uses pictures or symbols instead of bars to compare data. It must have a key.



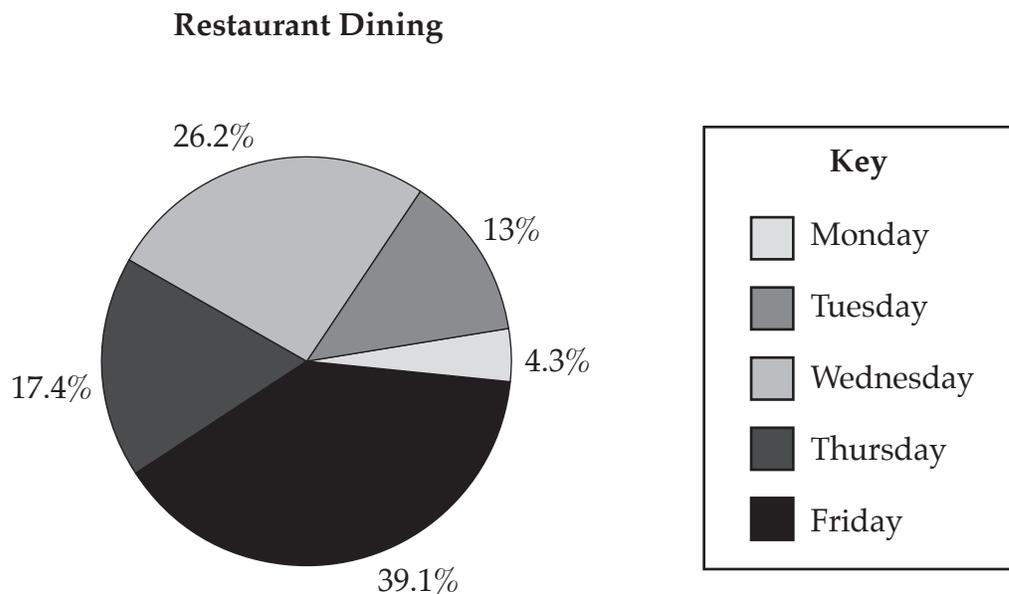
Line Plots

A line plot is used to show the spread of the data. It can also be used to show the mode of the data. Scales do not have to start at 0, but must cover the range of data. The scale must include all numbers in the range, even if no data match that number.



Circle Graph

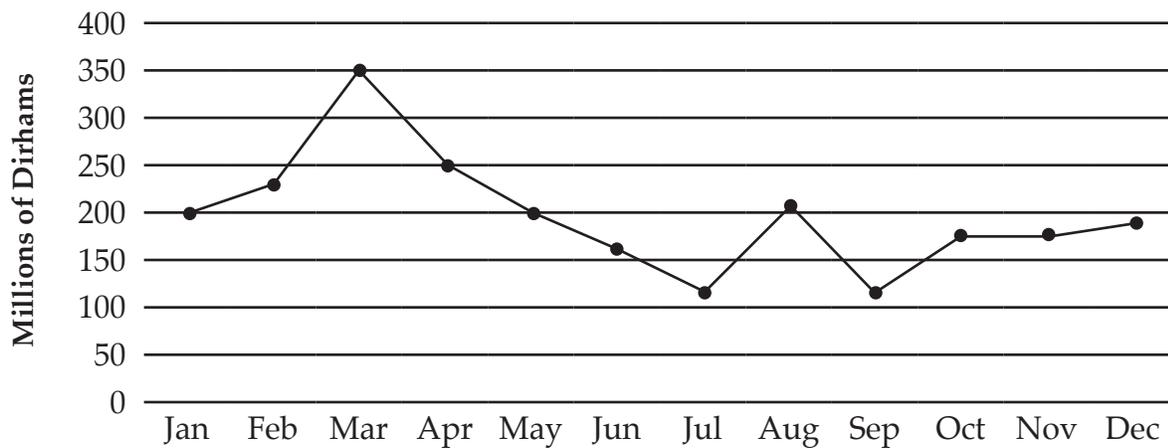
A circle graph is a graph that represents data using sections of a circle. Circle graphs, also known as pie charts, are the best type of graph for showing the relative proportions of different categories to each other and to the whole. Circle graphs are used when exact quantities are less important than the relative sizes of the parts: The sum of the percents in a circle graph is 100%. "Percentage" is used to refer to a general relationship rather than a specific measure. "A large percentage of people eat dinner out on Friday night."



Single Line Graph

Line graphs visualize trends among data sets, which are sometimes listed in an accompanying table in a report. Data points are plotted with relation to a vertical axis showing the dependent variable and a horizontal axis showing the independent variable. A line is then drawn through these points to display significant trends.

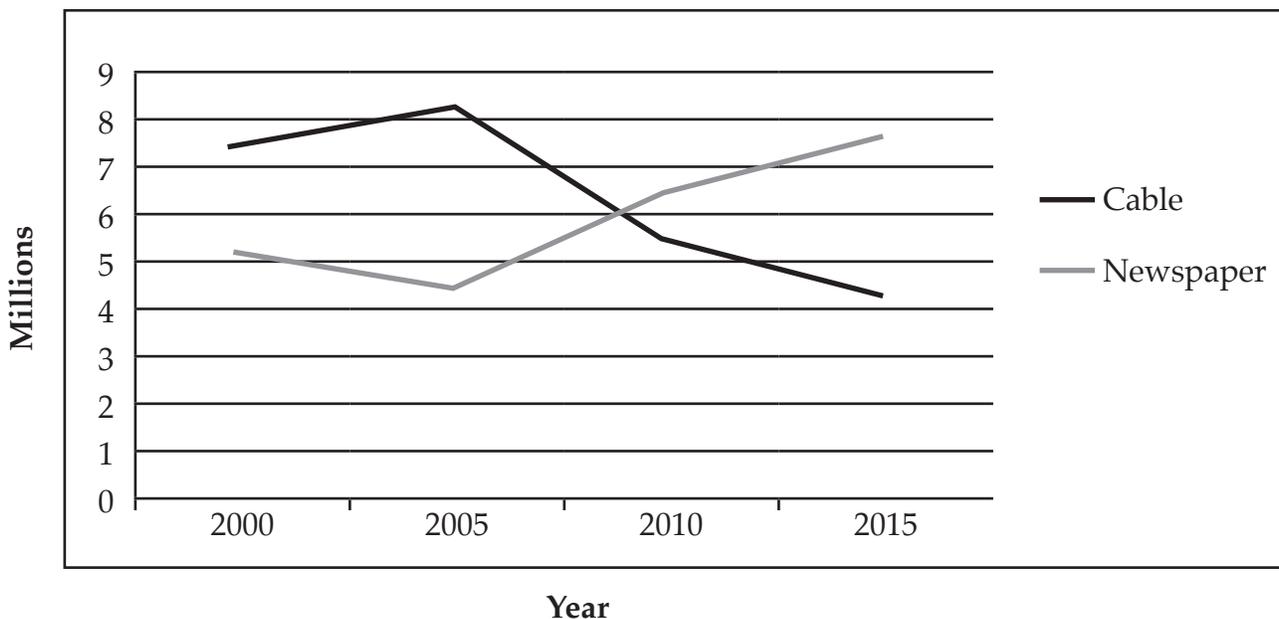
Dubai Gold Sales 2002



Multiple Line Graph

A multi-line graph is a *line graph* used to compare two or more quantities that are increasing or decreasing over time. It must contain a key.

Cable TV Viewers and Newspaper Readers



Stem And Leaf Plot

The “stem” is the left-hand column which contains the tens digits. The “leaves” are the lists in the right-hand column, showing all the ones digits for each of forties, fifties, sixties, etc. You’re just listing out how many entries you have in certain classes of numbers, and what those entries are. Here is an example of a stem-and-leaf plot containing a few additional details.

Complete a stem-and-leaf plot for the following list of grades on a recent test:

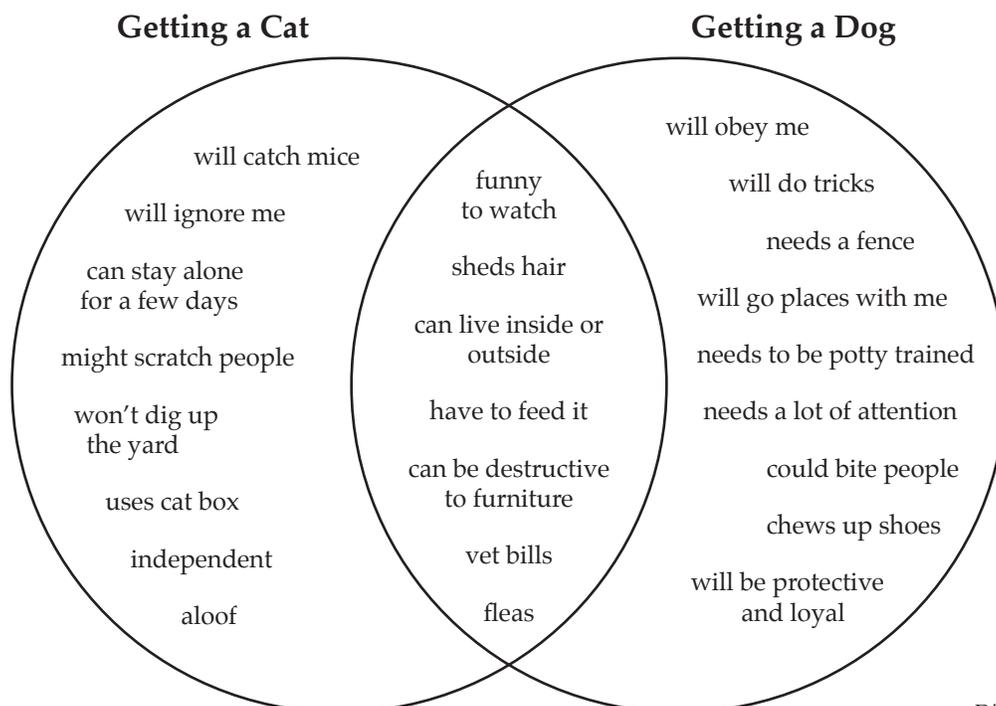
73, 42, 67, 78, 99, 84, 91, 82, 86, 94

Test Grades

Stem	Leaf
4	2
6	7
7	3, 8
8	2, 4, 6
9	1, 4, 9

Venn Diagram

Venn diagrams normally comprise overlapping circles. The interior of the circle symbolically represents the elements of the set, while the exterior represents elements that are not members of the set. The overlapping area or intersection would then represent the set of what is common such as “getting a cat or a dog.”

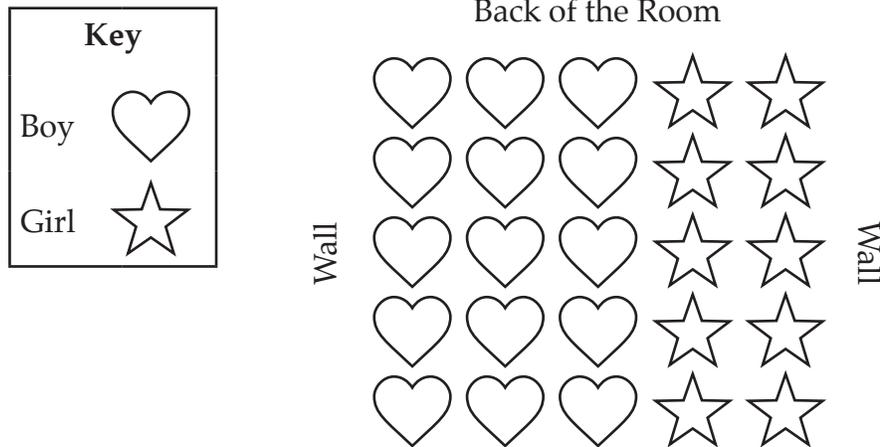


Diagrams

A diagram is an explanatory drawing. A diagram should be appropriate to the task, explanatory in nature, have a title, labels and any necessary keys.

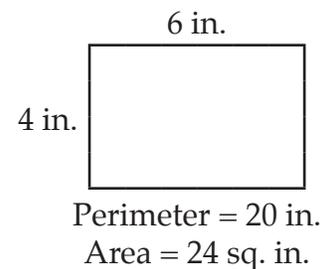
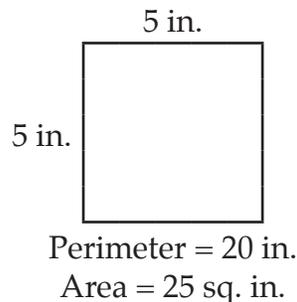
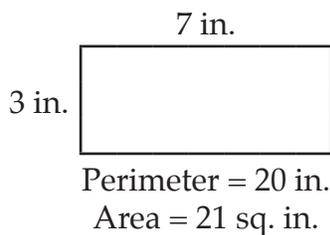
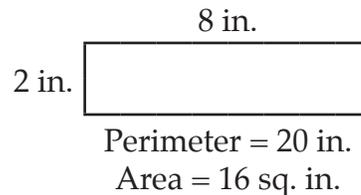
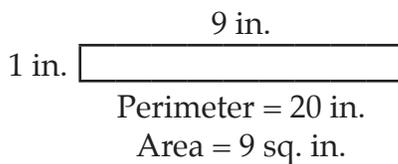
Example 1:

Mrs. Hill's Classroom



Example 2:

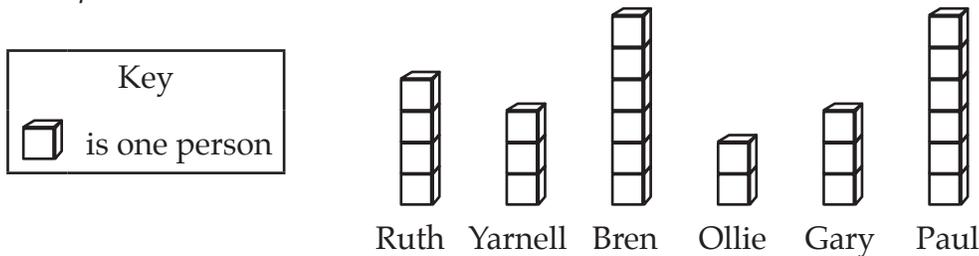
"I was asked to find all the different rectangles that have a perimeter of 20 inches. I made some diagrams to show the rectangles I found. I made sure I labeled the length and width with numbers and units!"



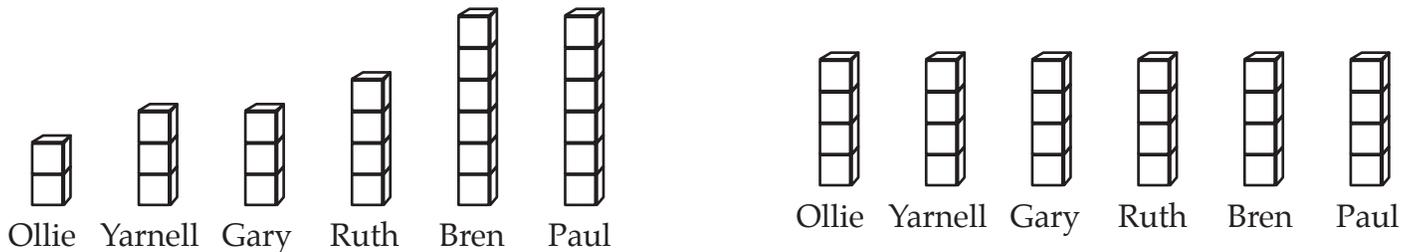
Models

Models are representational drawings or constructions, such as sets of plans, scale representations or structural designs. A Model should include a title and any necessary keys. A model, like all representations, should be accurate and appropriate to the task. Models can be documented with photography, drawings or other methods.

Students were asked to find the average number of people in an American family. One student asked 6 children in his class how many people were in his/her family. He made a model to represent the data.



The student models the data.



Next, the student puts the towers in order.

Last, the student evens out the towers and gets an average of 4 people per family.

Tree Diagram

Also called: systematic diagram, tree analysis, analytical tree, hierarchy diagram. The tree diagram starts with one item that AND looks like a tree, with trunk and multiple branches. It is used to break down broad categories into finer and finer levels of detail. Developing the tree diagram helps you move your thinking step by step from generalities to specifics.

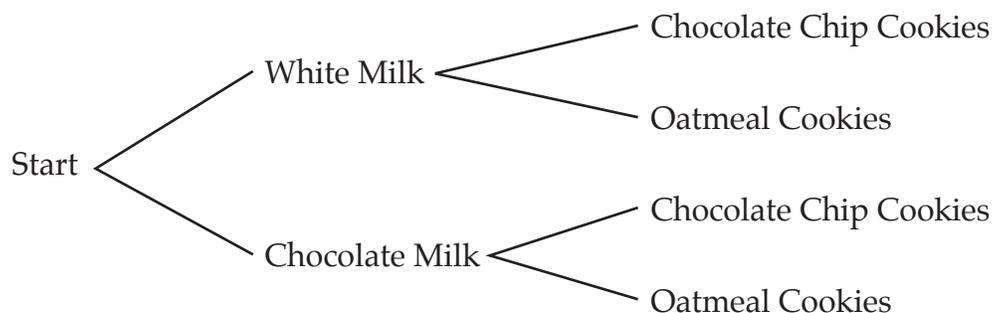


Diagram Tips

- Share a problem with the students that would lend itself to a diagram.
- Let students conclude that “drawing a picture” would be a good plan for showing their thinking.
- Talk about KISS (Keep It Simple Sweetie) as opposed to artwork in showing a plan. (approach and reasoning)
- Let students share KISS ideas such as just drawing legs and shoes, just drawing a person’s face, just drawing hats and mittens, etc.
- Once students are comfortable with making diagrams and scribing the labels, introduce the mathematical language term, key. Keys unlock doors just as keys unlock the diagram.
- Let students create diagrams with keys to define what they are diagramming. Have some fun by covering up the key and asking other teachers or guests to tell what a student’s work is showing. For example, call a square a cracker, a marshmallow, etc. so students learn the value of a key.
- Have students practice keys by using them for lunch count, work stations, etc.
- When students are completely comfortable with diagrams and keys, begin moving the information from the diagrams to a table/chart, tree diagram, etc. (verification)

Measurement

Common units

Ounces (oz)	Pounds (lbs.)	Tons (T)
pencils	people	cars
paper	food	trucks
cups	reindeer	airplanes
pens	desk	trees
posters	fish	whales
drinks	animals	boats