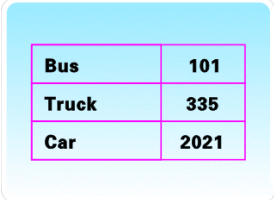

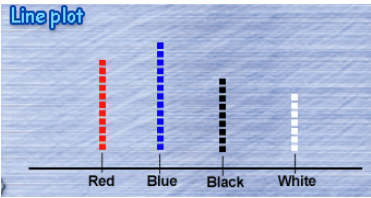
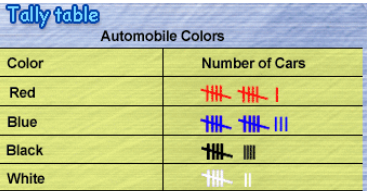
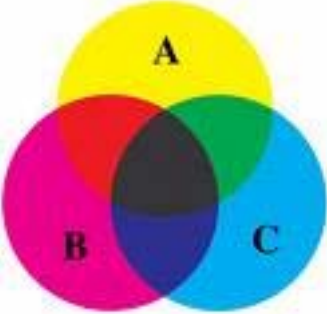
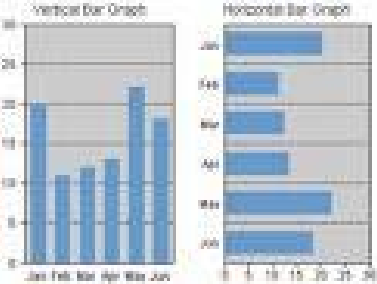
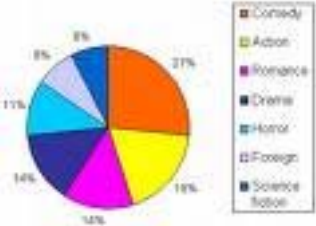
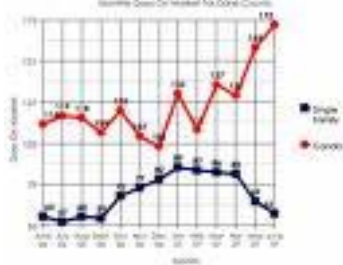


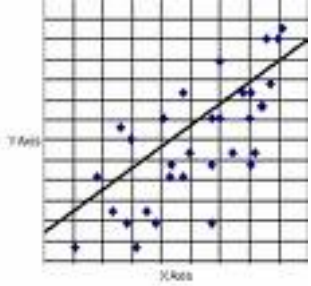

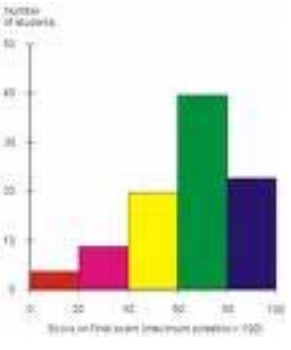
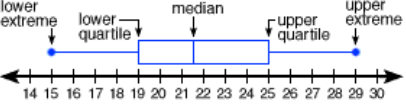
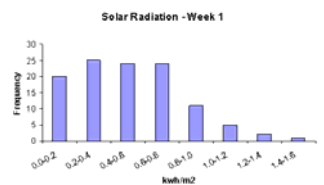
DATA REPRESENTATIONS

A **representation** refers to the type of graph, table, diagram, or model that is used to display data. They are visuals or pictures that help us understand amounts. Graphs and charts communicate information visually and are often used in newspapers, magazines and businesses around the world. Below are descriptions of most of the different forms of representation, including some of the pros and cons of specific formats. Each type also has a graphic, which is just one example of what the representation may look like.

REPRESENTATION FORMATS	DESCRIPTION						
<p style="text-align: center;">TABLE</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Bus</td> <td>101</td> </tr> <tr> <td>Truck</td> <td>335</td> </tr> <tr> <td>Car</td> <td>2021</td> </tr> </table>	Bus	101	Truck	335	Car	2021	<p>A table is a chart that organizes data in rows and columns to show facts and figures. These rows and columns intersect to form cells, the basic unit of the table in which a piece of data is placed. A whole table with the crossed lines to form the rows and columns is sometimes referred to as a grid. Organizing data into tables makes it easier to compare numbers, and is then easy to set up a graph to illustrate the data.</p>
Bus	101						
Truck	335						
Car	2021						
<p style="text-align: center;">PICTOGRAPH</p> <p style="text-align: center;">March 2002 Weather</p> 	<p>A picture graph uses pictures or symbols to show data. A picture or icon represents a value of numerical data. A pictograph may use one-to-one correspondence (one picture = one “unit”) or each picture or icon can represent a multiple of the unit (e.g. one picture = 5 units). A key is necessary to understand the value the symbols represent.</p>						
<p style="text-align: center;">LINE PLOT</p> 	<p>A line plot is a representation in which X’s, symbols, or objects are used to show a frequency along a number line. In a line plot, we mark each possible value between the minimum and maximum data values and then stack dots above each of these values to represent actual counts. A line plot is sometimes called a dot plot. A line plot is a picture of information on a number line. When the line plot is complete, the number of dots above each value indicates the frequency, or the number of times, that this particular count appears in the data.</p> <ol style="list-style-type: none"> 1. Order the values of the data set 2. form of a number line on the horizontal axis 3. choose a starting number that is slightly below the minimum value in the data set 4. choose an ending number that is slightly above maximum value 5. for each count (data set entry), place a dot above its corresponding value 6. continue until there is a dot for each value in the data set <p>+ easy to see which is the greatest number and least number in a collection of data + easily shows which number occurred most often, or the mode</p>						

REPRESENTATION FORMATS	DESCRIPTION										
<p style="text-align: center;">TALLY CHART</p>  <table border="1" data-bbox="228 296 592 436"> <thead> <tr> <th>Color</th> <th>Number of Cars</th> </tr> </thead> <tbody> <tr> <td>Red</td> <td>11</td> </tr> <tr> <td>Blue</td> <td>10</td> </tr> <tr> <td>Black</td> <td>7</td> </tr> <tr> <td>White</td> <td>4</td> </tr> </tbody> </table>	Color	Number of Cars	Red	11	Blue	10	Black	7	White	4	<p>A tally chart is a representation that consists of categories with the frequencies indicated by tally marks. Tallies are marks that equal a certain number.</p>
Color	Number of Cars										
Red	11										
Blue	10										
Black	7										
White	4										
<p style="text-align: center;">VENN DIAGRAM</p> 	<p>A Venn diagram shows how two or more groups of information overlap or have shared features. Each circle represents one of the sets, or groups of information. The overlapping section shows the shared features.</p>										
<p style="text-align: center;">BAR GRAPH</p> 	<p>A bar graph is a representation that is used to make comparisons among groups. Bar graphs are constructed using horizontal or vertical bars of equal widths. The heights (or lengths) are equal to the values (e.g., counts, percents, temperature scales) being represented. The higher or longer the bar, the more there is of something. A bar graph is one of the most common ways to display categorical data (e.g., countries, favorite colors, months, eye color, ages, and favorite whole number) and discrete numerical data. An important characteristic of a bar graph displaying categorical data is that there is not always one "correct" order in which to put the categories.</p> <ul style="list-style-type: none"> + Comparisons between different variables very easy to see + Clearly show trends in data, (how one variable is affected as the other rises or falls) + Given one variable, the value of the other can be easily determined + Can be used to show how something changes over time or to compare different times + Good for plotting data that spans many years (or days, weeks . . .) + Good for plotting really big changes from year to year (or day to day) - Shows larger changes better than smaller ones 										
<p style="text-align: center;">CIRCLE/PIE GRAPH</p> 	<p>A circle graph is a pictorial representation used to compare parts of a whole. The circle of a pie graph represents 100%. Each portion (sector) that takes up space within the circle stands for a part of that 100%. Many times the fractional parts are different colors and a key explains the colors. The size of the sector is determined by the percent of the whole that its respective categories represent. A circle graph look like pieces of pie, so it is sometimes called a pie graph.</p> <ul style="list-style-type: none"> + Is possible to see how something is divided among different groups + Can be used to show percentages of a whole + Best to use when you are trying to compare parts of a whole - Do not show changes over time (represents percentages at a set point in time) 										

REPRESENTATION FORMATS	DESCRIPTION										
<p style="text-align: center;">LINE GRAPH</p> 	<p>A line graph is typically used to represent serial data (data that can be collected without gaps such as change in temperature over a time period). Typically, observations are made over regular intervals. Then, these discrete points are plotted and adjacent points are connected with line segments to indicate the serial nature of the data and allow for interpolation</p> <p>line graph – one dependent variable is graphed and shown as one connected line segment</p> <p>broken line graph – data collected on the dependent variable is not serial (continuous), so data points are not connected and segment line is broken</p> <p>multiple line graph – more than one dependent variable is graphed on the same display, resulting in two lines (see left)</p> <ul style="list-style-type: none"> + makes it easy to see change when comparing something + good at showing specific values of data (given one variable the other can easily be determined) + show trends in data clearly visibly show how one variable is affected by the other as it increases or decreases) + enable the viewer to make predictions about the results of data not yet recorded + can be used to show how something changes over time + good for plotting data that has peaks (ups) and valleys (downs) + good for plotting data that was collected in a short time period 										
<p style="text-align: center;">STEM AND LEAF PLOT</p> <p style="text-align: center;">Title</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="border-right: 1px solid black;">Stem</th> <th>Leaf</th> </tr> </thead> <tbody> <tr> <td style="border-right: 1px solid black;">0</td> <td>1 3 6</td> </tr> <tr> <td style="border-right: 1px solid black;">1</td> <td>2 8</td> </tr> <tr> <td style="border-right: 1px solid black;">2</td> <td>3 5 6 7</td> </tr> <tr> <td style="border-right: 1px solid black;">3</td> <td>0 0 9</td> </tr> </tbody> </table>	Stem	Leaf	0	1 3 6	1	2 8	2	3 5 6 7	3	0 0 9	<p>A stem-and-leaf plot organizes data to show their shape and distribution. The data is arranged by place value. The digits in the largest place are referred to as the “stem” and are always on the left side of the chart. The “leaves” are the digits in the smallest place and are always displayed to the left of the stem.</p> <p>Examples of use: series of scores on sports teams, series of temperatures or rainfall over a period of time, series of classroom test scores.</p> <ul style="list-style-type: none"> + can be constructed quickly using pencil and paper + values of each individual data point can be recovered from the plot + data is arranged compactly since the stem is not repeated in multiple data points + great organizers for large amounts of information - usually used when there are large amounts of numbers to analyze
Stem	Leaf										
0	1 3 6										
1	2 8										
2	3 5 6 7										
3	0 0 9										

REPRESENTATION FORMATS	DESCRIPTION
<p style="text-align: center;">SCATTER PLOT</p> 	<p>Scatter plots, or X-Y plots, are plots of observations that are used to determine if there is a relationship between two variables being studied. The x-axis is used to measure one event (or variable) and the y-axis is used to measure the other. If both variables increase at the same time, they have a positive relationship. If one variable decreases while the other increases, they have a negative relationship. Sometimes the variables don't follow any pattern and have no relationship.</p>
<p style="text-align: center;">AREA GRAPH</p> 	<p>Area graphs can be used to show how something changes over time. They have an x-axis (horizontal) and a y-axis (vertical). Usually, the x-axis has numbers for the time period, and the y-axis has numbers for what is being measured. Area graphs can be used when you're plotting data that has peaks (ups) and valleys (downs), or that was collected in a short time period for one or more groups.</p>
<p style="text-align: center;">HISTOGRAM</p> 	<p>A histogram is a graphical representation of frequency distributions (e.g., counts, percents) used to compare groups. The groups being compared will have values that are continuous and can be ordered from least to greatest. Mean, median and mode, are used to find one number that is representative of all the numbers in the data set. The effect is a rough approximation of the frequency distribution of the data. Some variables that can be represented using histograms include ages, heights, test scores, and times. A histogram is constructed of contiguous rectangles (rectangles touching each other), and the widths and height of the rectangles are proportional and spacing between them is consistent</p> <ul style="list-style-type: none"> - while the frequency of each class is easy to see, the original data points have been lost
<p style="text-align: center;">BOX AND WHISPER PLOT</p> 	<p>A box-and-whisker plot is a representation displays the median, the quartiles, the outliers and about the range and distribution of a set of data. It shows how far apart and how evenly data are distributed, but it does not display any other specific values.</p> <ol style="list-style-type: none"> 1. Find the values of the median, and the upper and lower quartiles; 2. Draw a rectangle (called the box) from the lower quartile to the upper quartile, and draw a line across the width of the box at the median; 3. Extend a line (called the whiskers) from the midpoint of the box to the minimum value and similarly draw a line extending to the maximum value.
<p style="text-align: center;">FREQUENCY TABLE</p> 	<p>A frequency table lists categories (or classes) of scores, along with counts (or frequencies) of the number of scores that fall into each category. As a guideline, the number of categories should be between 5 and 20.</p>