

Using Charts: Tables, Graphs and Diagrams

Graphs, diagrams, and tables are devices that organize and present information in patterns that are easy to see and read. Charts like those shown on these pages are especially helpful for making comparisons between two or more similar sets of facts.

Tables

A comparison of populations GNP and Life Expectancy			
Country	Population	Life Expectancy (years)	Per Capita GNP (in U.S. \$)
Canada	29,600,000	78	\$20,670
United States	263,200,000	76	\$24,750

Tables organize information into rows and columns. Tables allow the reader to find information quickly and make comparisons between similar sets of facts. This table shows facts about population, per capita GNP (gross national product), and life expectancy in years. Tables are also used to record data as it is collected.

The effect of different activities on heart rate				
Type of Activity	Heart Rate (beats/min)			Average
	Trial 1	Trial 2	Trial 3	
Resting	84	85	83	84
Rollerblading	156	150	162	156
Weight lifting	120	105	114	113
Watching the World Series	96	90	90	92

To make a data table:

1. Give your table a title that identifies your variables. (Variables - The types of information that you have or that you will be collecting.)
2. Label the first vertical column on the left with your independent variable (type of activity/what is being tested).
3. Underneath, the first column labels, list each of the independent variable (resting, Rollerblading, weight lifting, watching the World Series).
4. Now label the next column with the dependent variable/data collected (heart rate Trial 1, Trail 2, Trail 3).
5. Create as many columns and rows as needed, according to your data labels.
6. It may be desirable to add an additional column that could be used to record calculated averages, or additional information

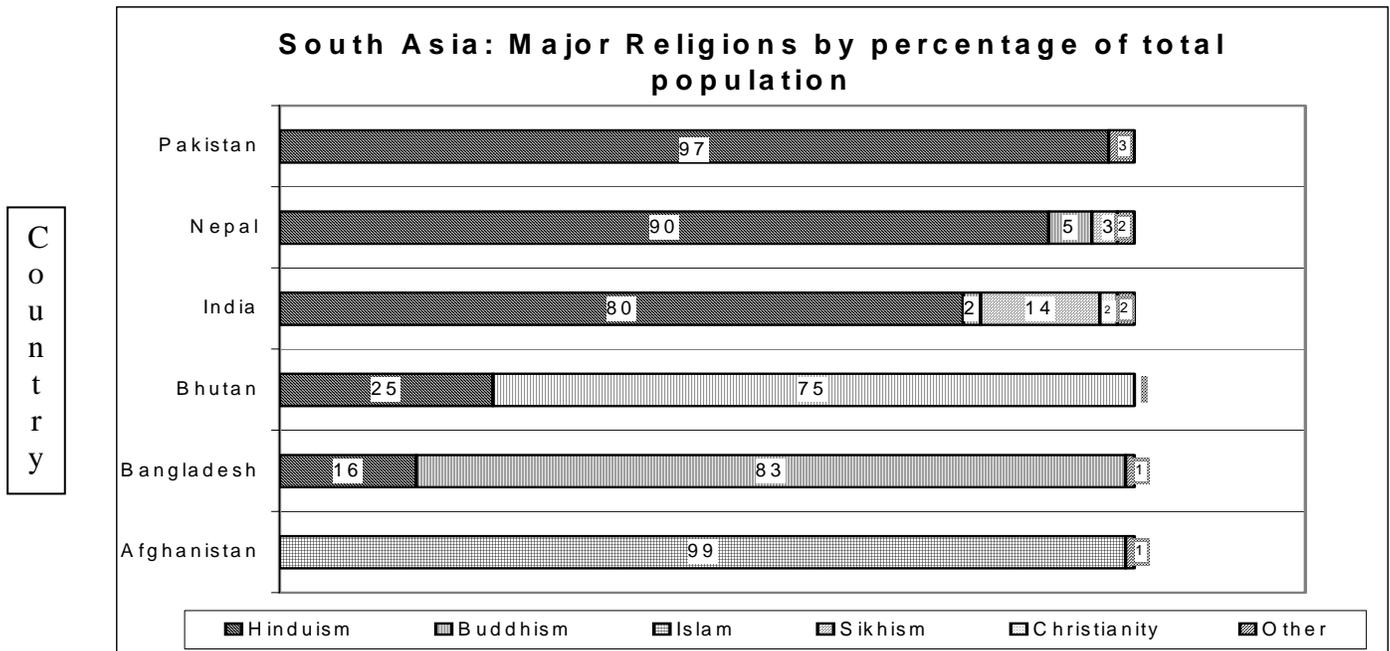
How to Interpret Data Tables

Data tables can be a wealth of information. As stated one of the main purposes of a data table is to organize data in an easily retrievable/useable fashion. A well thought out/designed data table can save the user much time and effort in locating and interpreting the information. Use the data table above to answer the following questions.

1. What is the average heart rate for someone Rollerblading (include the proper units)? _____
2. Which activity produced the least amount of variation in heart rate for each trial? _____
3. What would be the average daily heart rate for a person if they did all four of these activities in a single day? (Show your work)

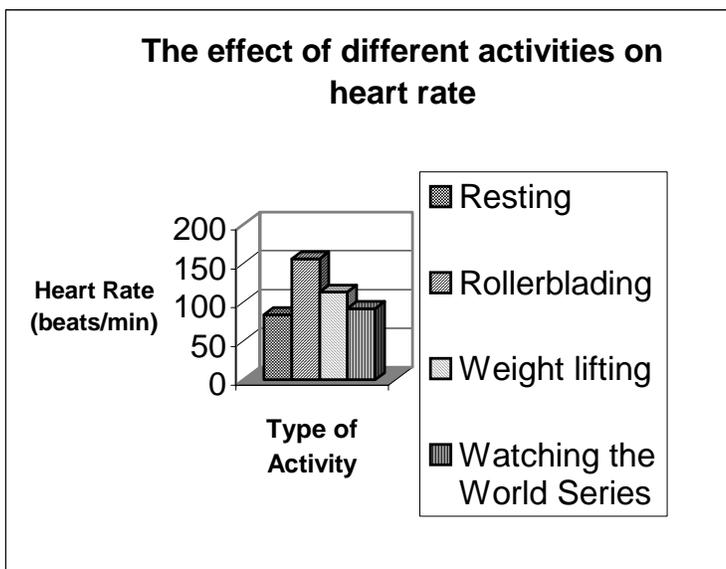
Bar Graphs

Bar graphs are a simple way to compare information in a visual way. The bar graph below makes a comparison between countries, based on the major religion of that country, and what percentage of the total population believes in those religions.



To make a bar graph:

1. On a piece of graph paper, draw a set of axes. (x & y)
2. Place the levels of your independent variables along the horizontal (x) axis.
3. Place a scale that includes all the values of your dependent variable on the vertical (y) axis.
4. Label the axes with the names of your variables.
5. For each level of the independent variable, draw a solid bar to the height of the corresponding value of the dependent variable. Example: The average heart rate for Rollerblading was 156 beats per minute. Draw a bar above the Rollerblading label to reach the 156-beats-per-minute mark on the y-axis. Leave equal space between each bar so your graph is easy to read.
6. Give your finished graph a title.

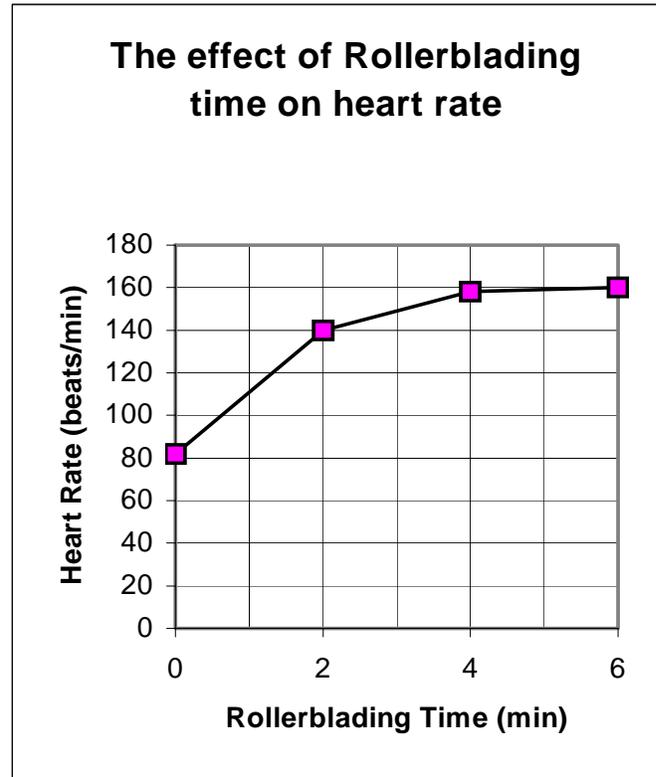
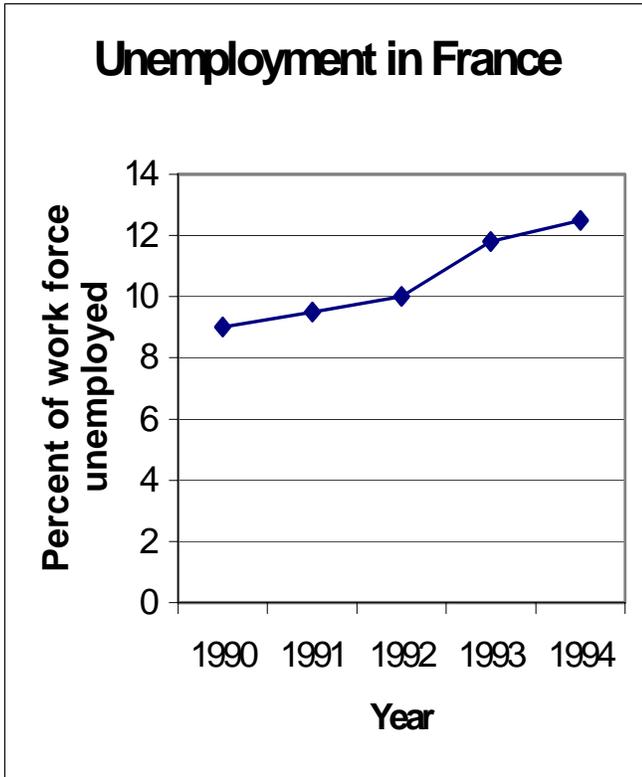


How to Interpret Bar Graphs

1. What is the maximum heart rate graphed? _____
2. What activity increased the heart rate to approx. 90 b/m? _____.
3. What is the approx. heart rate for someone resting? _____.
4. Which activity has a heart rate approx. double that of someone resting? _____
5. What is the approximate difference in heart rate between Weight Lifting and Watching the World Series? _____

Line Graphs

Line graphs show the relationship between two sets of information, in the graph on the left, the relationship between employment and time is being made.



To make a line graph:

(Refer to the graph on the right)

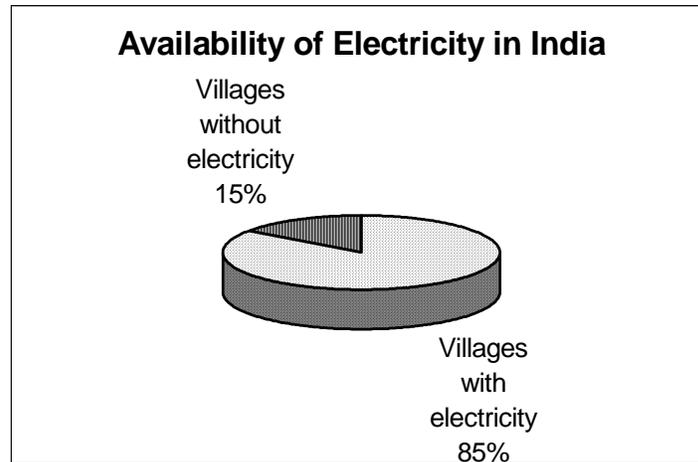
1. On a piece of graph paper, draw a set of axes.
2. Place labels for the levels of your independent variable (Rollerblading time in minutes) along the horizontal (x) axis.
3. Place a scale that includes all the values of your dependent variable (heart rate) on the vertical (y) axis. (The scale does not have to start at zero.)
4. Label the axes.
5. Plot a point on the graph for each piece of data. For example, say the average heart rate after 2 minutes of Rollerblading was 140 beats per minute. Draw an imaginary vertical line from the 2-minute point on the x-axis.
6. Then, draw an imaginary horizontal line from the 140-beats-per-second point on the y-axis. Plot a point where the lines intersect.
7. Connect the points. (Rather than connecting the points, scientists sometimes draw a “line of best fit” which shows the general trend the data follows. A line of best fit is often curved.)
8. Give your finished graph a title.

How to Interpret a Line Graph

1. For what years do we have data for the unemployment rates in France? _____ to _____
2. If the population in France was 10 million in 1992, how many people were unemployed that year?
Answer _____
3. Between which two years did the unemployment rate increase the most? _____ to _____
4. When did the heart rate reach 140 b/m on the Rollerblading graph? _____
5. What was the number of heart beats per min after 3 min of Rollerblading? _____
6. What was the increase in heart rate over the 6 min. time period of Rollerblading? _____

Circle Graphs (also known as Pie Charts)

Circle graphs are an easy way to show the size of parts in relation to a single whole. In these graphs the whole or total is represented by a circle, which is broken into pie-shaped sections. Each section represents a part of the whole.



To make a pie chart:

1. Draw a circle with a compass.
2. Mark the center with a point; this is where each pie “slice”, or wedge, will start.
3. To figure the size to make each wedge, convert your data from percentages to angle degrees. A complete circle can be divided into 360 degrees. So, for example, if 10 percent of kids preferred weight lifting, the pie wedge for weight lifting should be 10 percent of the 360-degree circle, or 36 degrees.
4. Measure the wedge by positioning a protractor at the center point; mark the angle by placing points on the edge of the circle (or beyond it.)
5. Draw a line from these points to the center of the circle.
6. Label the wedge (include its percentage)
7. Start measuring your next wedge from the edge of the first so the wedges do not overlap. When you’re done, the entire circle should be filled. If not, check your math (all angles should add up to 360 degrees), and measure again.
8. Give your finished chart a title.

How to Interpret a Pie Chart

1. If there are 100 villages in India, how many **do NOT have** electricity? _____
2. If there are 100 villages in India, how many **have** electricity? _____
3. If 10% of the pie chart is 36 degrees, how many degrees is 15% of the pie chart? _____
4. How many degrees is 90% of the pie chart? _____