HOW TO USE EXCEL FOR DATA TABLES, GRAPHS, AND CALCULATIONS Mr. Burghardt

The following are instructions of how to use the Excel program to create Data Tables, Graphs, and Common Calculations for your lab analysis and lab reports. Instructions were made using Excel 2007 on a PC. Your version may be slightly different, but the steps should be the same. If you need more assistance, be sure to see the examples offered following the instructions.

DATA TABLES:

Step 1: Open the excel program (duh?)

Step 2: Type in your headings. Place the independent variable in the first column followed by subsequent dependent variables in the following columns. See the example on the following page for help.

Step 3: Add gridlines to your data table.

Step 4: Paste your data table into your lab report.

GRAPHS:

Step 1. In Excel, create your data table (see above).
IMPORTANT: Be sure your data table is not selected (highlighted). Simply left click in an open cell to unselect your data.

Step 2: On the top bar select the "Insert" tab and left click on type of graph you want to create. A blank graph will appear.

Step 3: Right click on the graph and pull down to "select data."

Step 4: To add your dependent variable data:
- -Click "ADD" on the Legend Entries (Series) side
- -Type the name of the dependent variable in the "Series Name" field
- -Click in the" Series Values field," delete the" ={1}", highlight your first set of data, click OK
- -Repeat for each set of dependent data

Step 5: In "Horizontal Categories Axis Label" side left click on "Edit"
- -In the "Axis label range" left click and highlight your independent variable data, click OK

Click OK and your graph should now be created.

Step 6: Give graph a title, label each axis, add grid lines
- -Select your graph by left clicking on it once
- -Left click on the "Layout" tab on the top menu bar
- -"Chart Title," "Axis Title," "Gridlines," and more options

Step 7: Select your finished graph, copy and paste your graph to your lab report

CALCULATIONS

Excel can do most of the routine as well as complicated calculations for you.

Step 1: With your completed data table open in Excel, left click on a blank cell and type in a title (ex: average, sum, sample size, …)

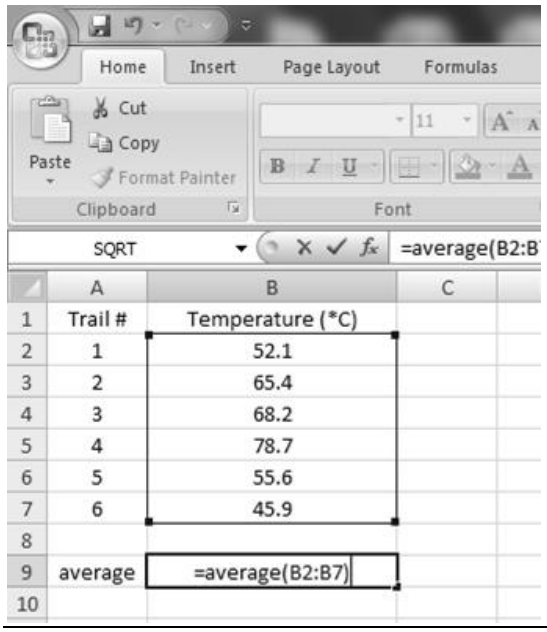
Step 2: To enter the calculation, left click on an empty cell next to your title then select the "Formulas" option from the top bar menu.

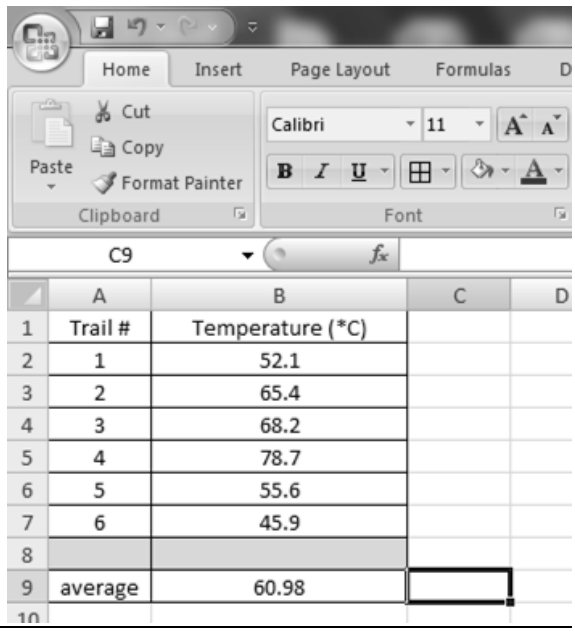
Step 3: Left click on "Insert Function" and scroll down to the calculation you want to perform. Follow the directions and you have completed this calculation.

SHORTCUT: If you know what calculation you want to perform, you can avoid step 2 and 3 and simply type the formula in the blank cell. All formulas begin with the equals sign "="

Common Calculations: (Blank lines ___ is where you will enter the range of data using the cell).

Average	=Average(__:__)	=Average (B2:B10) calculates the average of cells B2 through B10
Sample Size	=Count(__:__)	=Count(B2:B10) calculates the number of cells that contain numbers
Minimum	=Min(__:__)	=Min(B2:B10) calculates the lowest number in the series
Maximum	=Max (__:__)	=Max (B2:B10) calculates the highest number in the series
Range	Subtract the Minimum from the Maximum (use your calculations above)	
Correlation	=Correl(__:__,__:__)	Calculates the correlation coefficient between two sets of data
Standard deviation of a sample	=stdevA(__:__)	





EXAMPLE:

Experiment: A scientist wants to know if her three friends can run at their same pace for two minutes. She makes her hypothesis that if her friends run a flat course that they will each keep their same pace for two minutes. She records the distance in meters that each of her friends run every 30 seconds for the two minutes. Tom had the following distances: 240 m, 310 m, 500 m, 610 m; Jerry ran it is 200 m, 390 m, 550 m, and 780 m; Mickey ran it in 100 m, 300 m, 400 m, and 450 m.

DATA TABLE

Step 1. Open the Excel program

Step 2. Type the headings in the first row. Be sure to place the independent variable in the first column followed by any dependent variables in subsequent columns.

Independent variable: the data that stands alone and is not changed by other variables.

Dependent variable(s): the data that changes with a change in the independent variable.

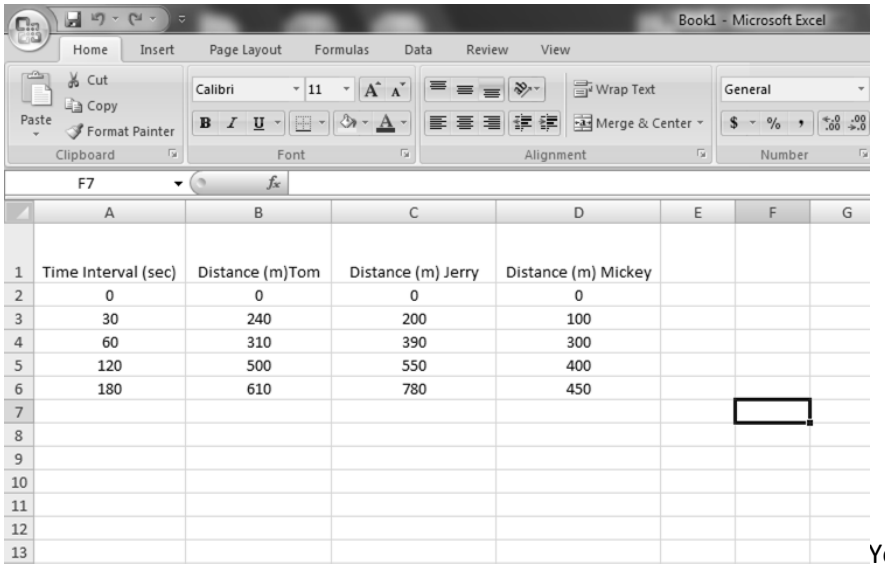
In this experiment there are two variables: 1) The time interval that the data was taken (every 30 seconds) and 2) the distance each subject ran (in meters). Which one is the independent variable?

If you have trouble figuring out the independent and dependent variable simply say it out loud. Which is correct?

"The time interval that the data was recorded depended on the distance the subject ran."

"The distance that the subject ran depended on the time interval the data was taken."

*"The distance that the subject ran depended on the time interval the data was taken" makes sense. Therefore the **independent variable** is "the time interval" and the **dependent variable** is "the distance that the subject ran."*



	A	B	C	D	E	F	G
1	Time Interval (sec)	Distance (m)Tom	Distance (m) Jerry	Distance (m) Mickey			
2	0	0	0	0			
3	30	240	200	100			
4	60	310	390	300			
5	120	500	550	400			
6	180	610	780	450			
7							
8							
9							
10							
11							
12							
13							

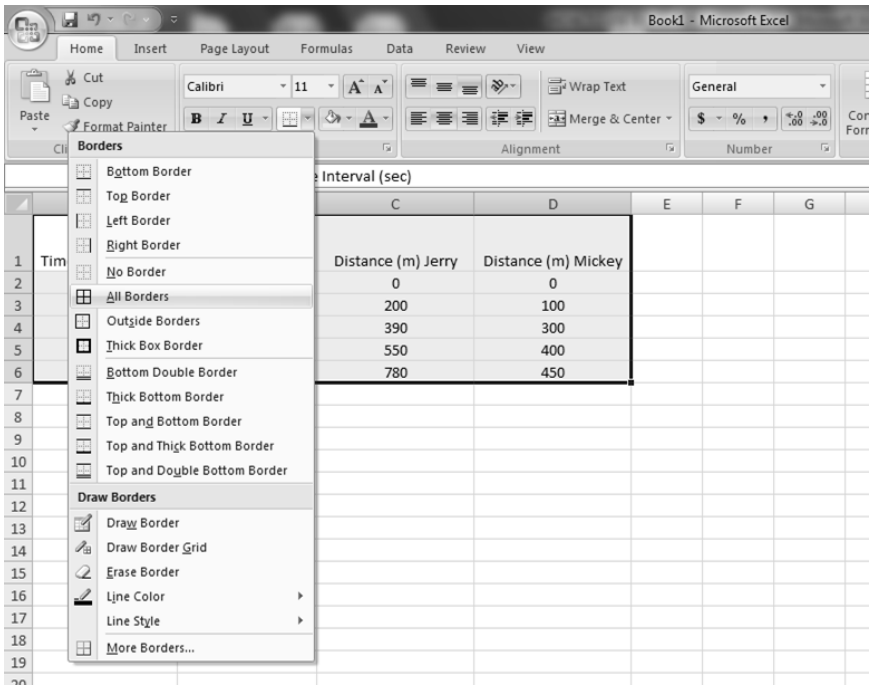
Your table should look like this.

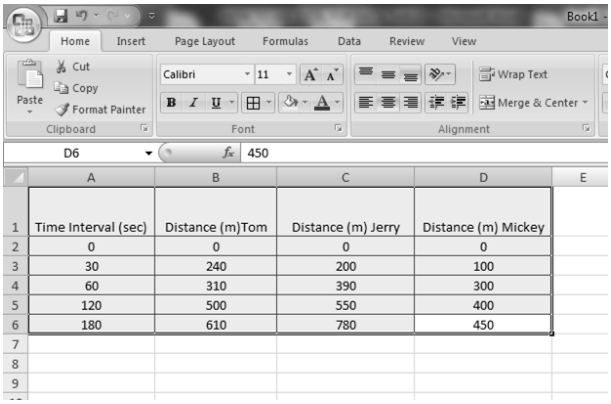
Step 3: Make a grid around your data table.

a) Left click and highlight all of your data table

b) Left click on the Boarder icon found on the home tab (it looks like this ).

c) A menu should open up, Select “All Boarders” and your table should now have gridlines.





Step 4: Insert your table into your lab report.

a. Left click and highlight your data table.

b. Right Click and select “Copy” or press “ cnrl c”

c. Paste your data table in your lab report by right click “paste” or “cnrl v”

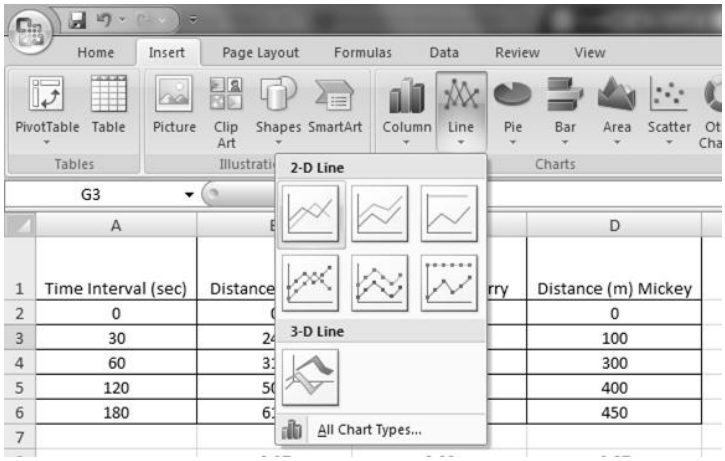
GRAPH:

Step 1. In Excel, create your data table (see above).
IMPORTANT: Be sure your data table is not selected (highlighted). Simply left click in an open cell to unselect your data.

Step 2: On the top bar select the "Insert" tab and left click on type of graph you want to create.
A blank graph will appear.

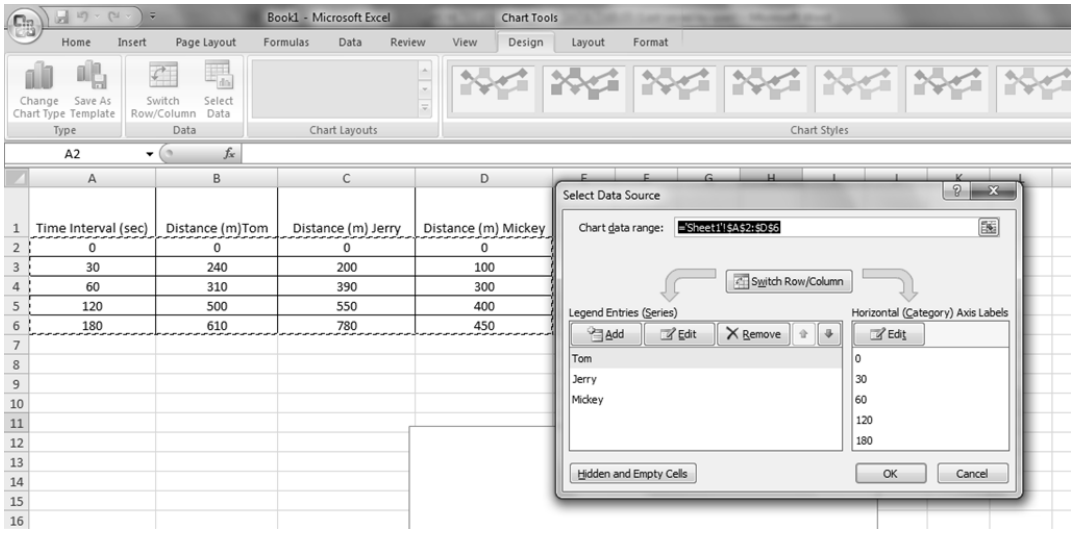
Line Graph: Trends over time (ex -time intervals, trial numbers…) –most common graph used
Bar Graph: Comparing data sets from groups (ex- average girl height vs. average boy height)
Pie Charts: Parts of a Whole
Scatter Plot: Several data points. Often used instead of a line graph with a "best fit line or curve" to show trends.

For this example, we will be using a line graph.



Notice that the data table is not highlighted

Step 3: Right click on the graph and pull down to “select data.”



Step 4: To add your dependent variable data:

-Click “ADD” on the Legend Entries (Series) side

-Type the name of the dependent variable in the “Series Name” field

-Click in the” Series Values field,” delete the” ={1}”, highlight your first set of data, click OK

-Repeat for each set of dependent data

Step 5: In “Horizontal Categories Axis Label” side left click on “Edit”

-In the “Axis label range” left click and highlight your independent variable data, click OK

Click OK and your graph should now be created.

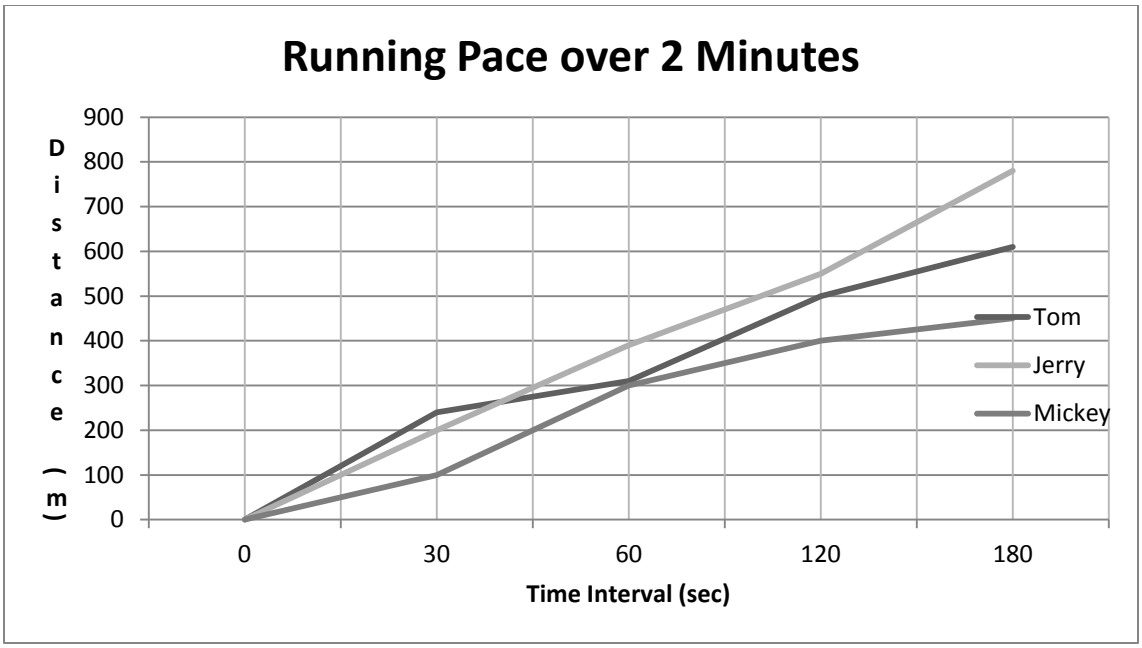
Step 6: Give graph a title, label each axis, add grid lines

-Select your graph by left clicking on it once

-Left click on the “Layout” tab on the top menu bar

-“Chart Title,” “Axis Title,” “Gridlines,” and more options

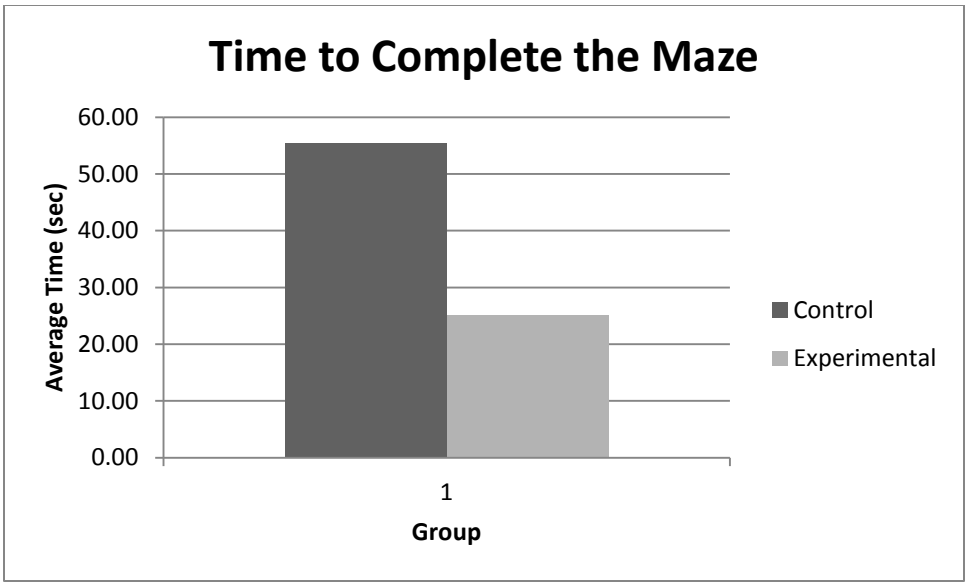
Step 7: Select your finished graph, copy and paste your graph to your lab report



Example of when to use a Bar Graph:

Experiment: A scientist wants to know if a mouse will run through a maze more quickly if a food reward is given at the end of a maze. She makes her hypothesis that if food is presented then the mouse will run the maze in less than 50% of the time. As a control, she first records the amount of time in seconds it takes a mouse to run the maze without any food at the end. She then repeats the experiment with food at the end of the maze. She tests a sample size of 5 mice.

Mouse	Time(sec) no food (control)	Time (sec)with food
mouse 1	80	40
mouse 2	60	20
mouse 3	44	25
mouse 4	22	11
mouse 5	48	24
mouse 6	78	30
AVERAGE TIME	55.33	25.00
Percent Difference		45.18%



Conclusion: Her hypothesis that if food is presented then the mouse will run the maze in less than 50% of the time is supported as the mice completed the maze in an average 45.2% of the time compared to their previous trial.

Possible Sources of Error: The mice had run the maze prior to the experimental trail with food. They may have learned the maze and therefore were faster. Also, a small sample size does not offer a great amount of reliable data.