Determining Confidence

A p-value is used to determine how confidant you are that **two** samples of data averaged **are different** from one another.

Use the T-test confidence calculator ONLY when you have a discrete independent variable and you want to compare **two sets of data** that have been averaged (when you make a bar graph with two bars).

If you have your indedpendant variable is discrete and averaged but you have **more than two types** to compare (your bar graph will have more than two bars) you should do an ANOVA test to get your p-value.

T-Test

To find the T-Test calculator.

• Search for Southeast Alaska Science fair in any search engine or go directly to http://www.ptialaska.net/~gennie/SEASF.htm.

• **Follow the link labeled**: Mr. Smith's 2006 Advanced Physical Science and Advanced Biology Rubrics**.**

• **Follow the link labeled:** T-Test – YOU MUST HAVE EXCEL ON YOUR COMPUTER

1. Answer the first question at the top. Answer **1** if your hypothesis stated that the data in column one would be higher, a **2** if your hypothesis stated that the data in column two would be higher, or enter a **0** if you did NOT make a hypothesis regarding the difference of the sets.

2. For the second question:
   Answer Y (yes) if your project uses the exact same subjects***** in a before and after type if project.
   Example: Let's say you wanted to test whether heart rate increased after drinking a cup of hot sauce (don't actually try this!) or whether plant growth would increase after adding fertilizer to pots of soil. In these cases you would be comparing the heart rate of the same people, or the growth of the same pot of plants before and after the treatment.

   Answer N (no) if your project compares to groups of different subjects (subjects can be plants, animals, humans, bread, cake, etc…)
   Example: Say you want to know whether teachers consume more coffee then students. You would then have two groups of test subjects rather than taking 2 measurements on the same subject. The same would hold true if you were testing plants by using more than one group of plants with a different treatment on each.

3. Type in your data (or copy it from another location) in the two columns provided (DO NOT INCLUDE UNITS).

4. The boxes at the bottom of the page will give you a host of statistical information. You must copy down the means of your data, your standard deviation, your p-value, and weather you are confident or not for every two sets of data you check. Any p-value over 0.05 indicates that you cannot conclude that the two sets are different, in fact, they could be the same!

ANOVA

To perform an ANOVA test, you must have the data typed in colums in Excel, each column representing the numbers that will be avergaed to gether to make a single bar of a bar graph.

Goto **TOOLS** in the menu bar and pull down to **DATA ANALYSIS** (if DATA ANALYSIS DOES NOT APPEAR IN THE MENU BAR SEE BELOW ****)

Chose **ANOVA-single factor** from the menu.

While your curser is in the box labeled **input range**, drag the cursur over all of the data in the columns you want to compare (all of the data).

Make sure **alpha** is set to 0.05, and output options say **new workbook**.

Choose OK and the compter screen should flash a few times and gtve you a table of statistics.

Copy down the means of each set, the variance of each set, and the p-value.

If the p-value is less than 0.05, you are confident that the sets are not the same, Note, a number with and E in it is in scientific notation (ie. 1.2333E-14 is the same as 1.2333×10^{-14}, a very small number!).

**** To add DATA ANALYSIS to the tool bar if it is not already there, pull down the tool bar menu to the Add-Ins… tab and check ANALYSIS TOOLPAK, then hit OK.