

Biology 3A Laboratory 1
Statistical Analysis and Graphing

Adding Analysis ToolPak for Excel:

Tools → Add-Ins → check the Analysis ToolPak box and Click “OK”

To Begin Data Analysis:

- Enter you data into columns and sort them according to groups (see below)
- To sort your data, go under the DATA tab and select sort. You then will have options on how you would like to sort your data (by which category). Make sure that you do not sort apart your paired data (make sure the correct right and left finger measurements are paired).

Table 1: Example data sheet for male and female little finger lengths:

Sex	Right (cm)	Left (cm)
F	5.2	4.9
F	5	5
F	5.3	5
F	4.2	4.1
F	5.2	5.1
F	6.1	6.0
M	6.3	6.4
	5.9	5.8
M	5.7	5.8
M	7.4	7.8
M	8.1	8.0
M	5.9	5.9

- Tools → Data Analysis → Descriptive Statistics
 - Highlight your “raw” data
 - Check: Summary statistics & 95% confidence
 - There will be a new Excel worksheet that will open for you with the descriptive stats.

To calculate an unpaired t-test:

- Tools → Data Analysis → t-test for unequal variances & click “OK”
 - Select variable 1 Range (highlight the raw data group)
 - Select variable 2 Range (click in the box first & then highlight the raw data group)
 - Alpha = 0.05 or change to desired value
 - Click “OK”

Constructing a histogram:

- Determine the category intervals (called BIN in Excel) for each group on the same worksheet as your raw data.
 - For example: in the above data set, look at the minimum (4.1) and maximum (8.1) data points and determine the intervals (4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, and 8.5)
- Tools → Data Analysis → histogram & click “OK”
 - Input Range → selected from your raw data for one of the variables.
 - BIN Range → selected from the BIN category that you generated
 - Check the chart output box (very last one in the output section) and click “OK.”
 - This will generated a BIN and frequencies table along with the histogram.
 - Highlight and copy the frequencies from the table and paste it next to your BIN values on your raw data sheet.
 - Do the same with the other variable.

Table 2: Example BIN and frequency table for little finger length data

Categories (or BIN)	Male	Female
4.5	0	3
5.	2	6
5.5	5	4

To graph both histograms on the same graph:

- You’ll need to have the BIN values and the frequencies for both variables.
- Click on the Chart Wizard button on the toolbar or go under Insert and then select Chart.
 - This wizard will walk you through constructing a graph in four steps.
 - Select Column and the particular sub-type that you want. In this case it’s the cluster column. Click “Next”.
 - In step 2, you will select the data that you want to graph.
 - Data Range → Select the data that you want to graph. In Table 2, you would want to select the male and female frequencies including the column heading (Male & Female in this case).
 - Click on the Series tab and place the cursor in the Category (X) axis label box. Select the BIN values, but do not select the BIN heading itself. You will only have to do this if the BIN values are not below the graph after you have selected the data range. Click “Next”.
 - Enter your figure title, axes labels and units. Click “Next”.
 - You’ll have to decide where you want the graph to go.
 - If you need to adjust anything on the graph, you can click on the objects on the graph itself.
 - Many of you will just have to “play” around with this.