Name:

Period:

# LAB 4: Computer Graphing

## BACKGROUND

Graphing a set of data by hand can be very helpful when trying to understand the relationship between variables. However, most scientists no longer graph by hand, preferring to use the computer instead. Computer graphing programs are great, but you must still be able to graph by hand when asked to. Also, just because you do it on a computer doesn't make it automatically correct. You still need to double-check to make sure you graphed the data correctly.

## PROBLEM

How do we use a computer program to graph a set of data?

## MATERIALS

- Computer w/Internet Access
- Access to your server folder
- Printer

## PROCEDURE

1. Get a computer and turn it on – Log in to your server so that you can save a file there later.

2. Browse to Mr. Koerger's Website

3. Click on the "Links" button, then on the "Graphing" button.

4. You will see a selection of various graphs there. You must choose the type of graph you will be making. Remember, we almost always use the X-Y Scatterplot (here called "XY").

    - After having chosen XY, you will see a selection of three choices underneath (Line, Bubble, & Scatter). Choose the "Scatter" button.

5. **<u>STOP – Have Mr. Koerger verify that you are at the right place.</u>**

6. The "Style" section at the bottom gives you some choices to customize the look of your graph. **Do this last** – messing around with these choices now may be fun, but it is a waste of your time right now. Get your primary work done and then play around later.

7. On the right-hand side, there is a set of tabs. You are currently on the "Design" tab. Click the "Data" tab.

    - Put an informative title in the Graph Title box.
    - What was your manipulated variable? This is what you will place on the X-axis. Put the axis label in the box (be sure to include any units).

- What was the responding variable? This is what you will place on the Y-axis. Put the axis label in the box (be sure to include any units).
- Your name goes in the Source box.

8. Under "Data Set", you will see two drop-down boxes, one called "Points" and one called "Groups."

   - The first one to think about is the "Groups" box. This determines the number of different groupings of data that will appear on your graph. **Most of the time this box will be left at "1"** because you will only be graphing one set of data (even if you're graphing the class data it should be only one group). You will graph more than one group when you compare two different kinds of data (floating objects and sinking objects, for example).

   - The "Points" box goes from 1 – 50. This is the number of data points on your graph that will be plotted. Count your data points and enter the number in the box.

9. Since you're only graphing one set of data today, you can leave this blank. When you graph more than one set of data, use this box to make a key.

10. Enter your data. Be sure that your X-axis data goes in the X-boxes and the Y-axis data goes in the Y-boxes. This is probably the most time-consuming part of graphing, so you want to double-check with a friend or two that you are doing it correctly. It's a real bummer if you have to do this more than once. You can use the TAB key to move between the boxes if that helps you do this faster. Trying to use the mouse is a bit of a pain.

    - The Minimum and Maximum boxes **must** be left blank.

11. At this point, you can take a look at what your graph looks like. Click on the "Preview" tab on the right. Your graph of the data should appear. Check that you have the following:

    - A title
    - A legend that explains what the data is
    - The X-axis labeled with the manipulated variable.
    - The Y-axis labeled with the responding variable.
    - Your name at the bottom.
    - And *most importantly* check that the data seems to make sense.

12. Notice that each point on the graph is labeled with a value. You may wish to turn this off (though some people find it helpful when reading a

graph). You may choose to leave those on or turn them off by clicking on the "Labels" tab.

13. The *last* thing you should think about before printing and/or e-mailing your graph is styling. Choosing a background color, color of the data points, font, etc. can be fun, but keep a few things in mind. The goal of a graph is to quickly display information. If you have lots of flashy colors that distract the reader or faint text or data that makes it hard to read, then you are actually creating a graph that is *counterproductive*. While it may look "pretty," it has little function (100% accurate, 0% helpful). Simple graphs are best, and graphs that are more flash than substance will not be as useful (and will be graded appropriately).

14. When your graph is ready, click the "Print/Save" tab. Note: you can actually save your graph to come back and work on it later by e-mailing it to yourself. After you have e-mailed it to yourself, print it out using the following steps.

    - Click on the "Print" icon.
    - You may be presented with the option to Open or to Save. Open the file with Adobe Reader.
    - You will see an image of your graph.
    - Click "File" at the top, then click "Save As" to save the file.
    - **Rename the file. Use the following format: *Lastname, Firstname – Lab# Graph*. For example: *Koerger, Alex – Lab 4 Graph***
    - Save the file to your server folder.
    - Open the file and print it to the portable lab printer.

15. On the printed version of the graph, identify any unreasonable data points.

16. Construct a best-fit line to show any relationship in the data. If there is no relationship, write "no relationship" in the margin. Remember, do not force the best-fit line through the origin.

17. Show your printed graph to Mr. Koerger.

18. Shutdown your computer and put it back in the cart.

SUMMARY

Study for the test.