

Modeling Linear Data *Handout*

Make tables and graphs in order to interpret data and speculate about future events.

INTRODUCTION:

Data can be used both interpretively and speculatively. In this exercise the data given in graphical and tabular form will be used to produce a "Line of Best Fit" that will be used to speculate about future data. This speculation can be used to direct future experiments and inquiries to best suit the needs of the researchers.

THE TASK:

1. Visit www.Pinellas.WaterAtlas.org > Research > Data Download > accept the disclaimer.
2. Select Data Type: Surface Water Quality
3. Select By Location: Water Body Name; Select By Sample Info: Data Range, Parameter > Submit
4. Type "Lake Tarpon"; Select Date Range 01/01/91-12/31/96; Select Parameter: Secchi depth > Click Submit
5. Look at the results list for stations and dates > Select Lake Tarpon Site 32 > Click Tab: Give me selected station data
6. Select File format: Column > Generate File to download > Download File > Select a location to SAVE your file click save > click open. You should now be looking at an excel spreadsheet with all of your data.

You have downloaded a LOT of data! Now we will use this data to create a graph. To create your graph, follow the steps in your spreadsheet software. If you have Excel, you will use the Chart Wizard. Your x-axis data is the sample date data and the y-axis data is the depth data. Make sure the last step you complete for the Chart Wizard is selecting the chart to be in a new worksheet so it is large enough to work with. Once you create a graph with all of your data, you need to narrow it down to show only monthly sampled data between Jan 1991 and Dec 1995, this will provide 5 years of data. In your spreadsheet of data, keep the data associated to one sample per month preferably the same day of the month (i.e., February 26, March, 26, etc.) go through and delete the rows with data that are multiple samples (i.e. you may have 4 samples dates for January, delete all but one) or outside of the time frame. Continue editing your spreadsheet and then go back to the graph, you will see it is easier to complete the assignment. Print out your final graph.

ASSIGNMENT:

Select a time period that shows a linear correlation and draw a line of best fit. Determine the water level based on your line for the following year. Repeat the process for four more lakes using the same time interval from your first graph. Print out the four graphs. Calculate and compare the slope for the five lines. Do the lakes show similar trends? If so, why? If not, why not?

The four additional lakes are:

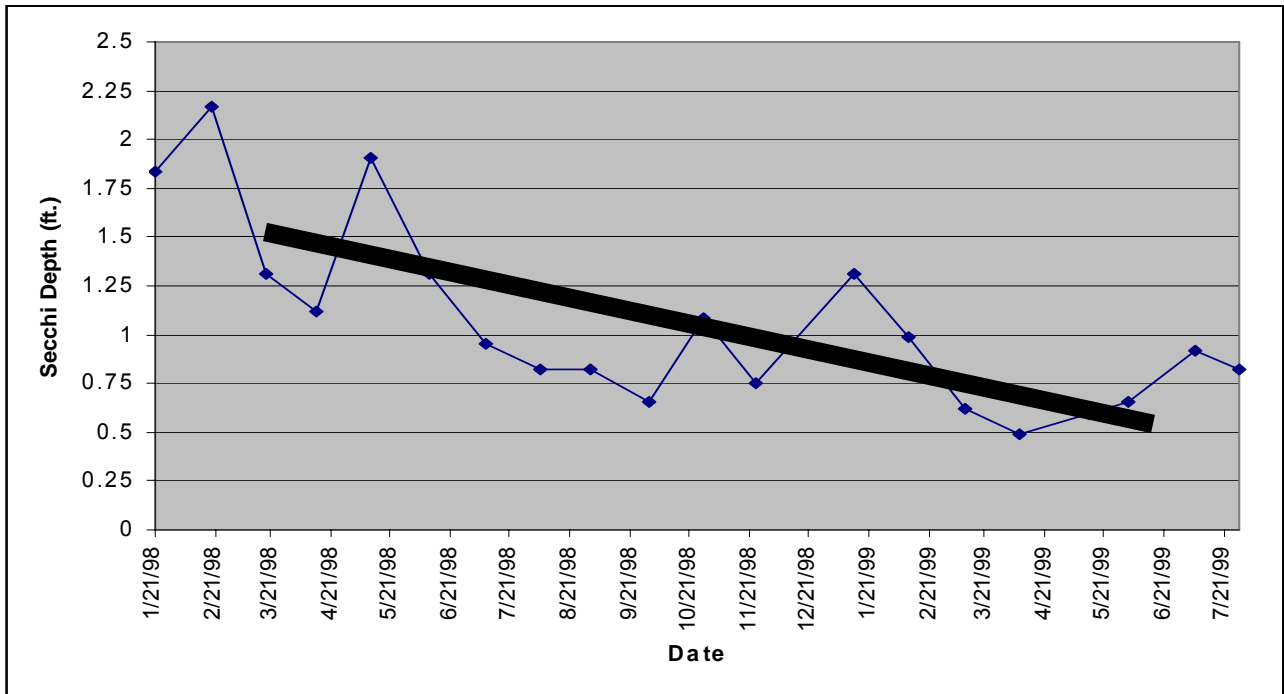
- a. Cliff Stephens Park Lake (1991-1998)
- b. Crescent Lake (5/9/90-7/31/07)
- c. Eagle Lake (10/27/91-4/16/02)
- d. Mirror Lake (8/22/89-6/27/95)

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EXAMPLE:



In the example above, a line of best fit is drawn. Two points can be selected and a slope determined. With the points and a slope an equation may be written. (See below)

$$\text{Slope} = \frac{\Delta y}{\Delta x} = \frac{0.65 - 1.08}{217} = -0.00198 \text{ ft/day} = -0.723 \text{ ft/year}$$

Dates are converted into days and the equation of the line can be written.

$$Y = 0.00198x + 1.6344$$

Name:

Date: