Finding Linear Models Part I

Math Concepts

- Linear functions
- Graphing
- Slope/rate of change

Materials

- TI-83 Plus
- Appropriate measuring device if data is to be collected by students

Overview

The student will enter data into lists, determine an appropriate window, and graph a scatter plot.

- **Collect the data**

  A data set is provided below. The procedure is the same for any data set.

Year	Profit in Thousands of Dollars
90	125
91	205
92	296
93	510
94	620
95	904
96	1040

- **Get ready to enter the data**

  Press [STAT] and [ENTER] (Figure 2). If a list contains data press [▲] until the cursor is on the name of the list. Then press [CLEAR] [ENTER]. Be sure that this is really what you want to do, as this erases the data.

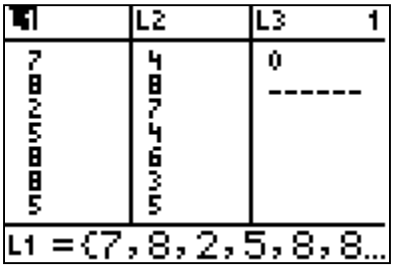

Figure 2

Teacher Notes

- Any set of data that is linear works well. Two suggestions for data collected by the student that require students to measure are: (foot, forearm) or (base of the thumb, wrist). The latter may be linked to the passage in ***Gulliver's Travels*** where Gulliver is being measured by the Lilliputians for new clothes.
- Often students will press [DEL] rather than [CLEAR]. This moves the list from STAT to memory and L1, L2, etc. are not there. (Figure 1)

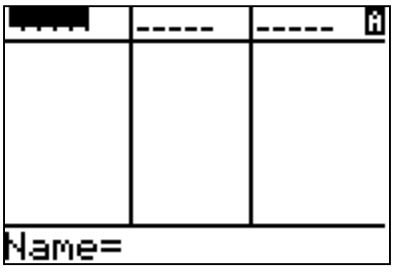

Figure 1

To bring back L1, L2, etc. press [STAT] [5] (put the Set Up Editor command on the screen) [ENTER]

- Enter the "Year" in L1 and the "Profit" in L2. (Figure 3) It is easier to enter one column at a time. Type the number, and then press [ENTER]. Press [▶] to move the cursor to the first line in L2. Note that on the entry line at the bottom of the screen you will see L2(1)=. Enter the profit. Since this is two-variable data, be sure to enter the data in the correct order.

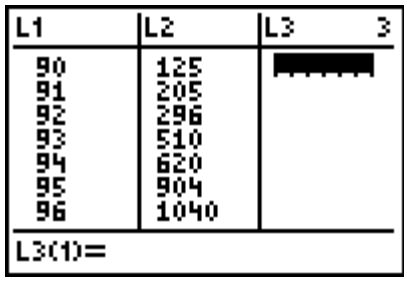

Figure 3

- **Set up the scatter Plot**

  Press [Y=]. If there are any functions in [Y=] move the cursor to each line and press [CLEAR]. **Always clear [Y=] before beginning a STAT PLOT or turn off the functions.** To turn functions off move the cursor so it is blinking on the "=" as shown. (Figure 4)

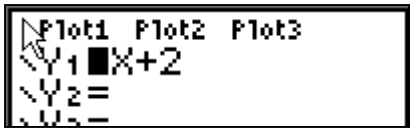

Figure 4

  Press [ENTER]. The function is saved in [Y=] but it will not graph as it is now unselected. (Figure 5)

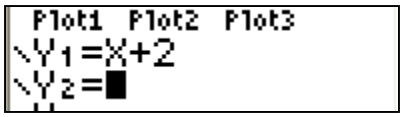

Figure 5

  Press [2nd] [Y=] to open the **STAT PLOT** screen.

  Press [1] to open STAT PLOT 1. Press [ENTER] to turn the stat plot on. Press [▼] to move down. Then press [ENTER] to move the cursor to the scatter plot icon and press [ENTER]. Press [▼] to move down to XList, press [2nd] [STAT] to change the name to L1. Press [▼] to move (execute it). On the home screen you will see the word **DONE**. L1 through L6 are now in **STAT EDIT**.

- If students do not clear existing lists, they may get misleading results. When they attempt to graph the scatter plot they may get an error message if the lists are not the same length.

down to YList, press 2nd STAT 2 to change the name to L2. Press ▼ to move down to Mark. Use ▶ or ◀ to move the cursor to the mark and press

Figure 6

- **Set up the window and graph the scatter plot**

  A sample is shown below. (Figure7 and 8) There are many other good windows that will display the data.

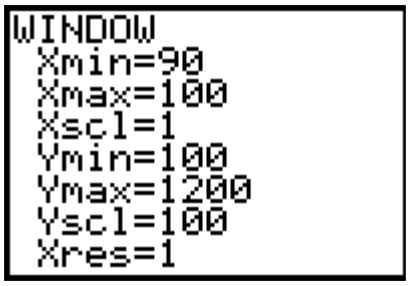

Figure 7

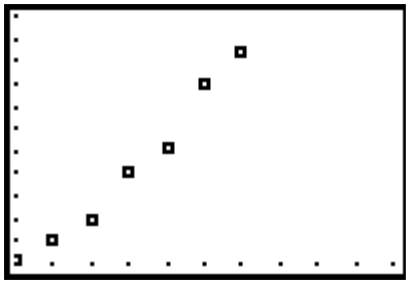

Figure 8

For discussion:

1. Does this data seem to be linear?
2. Will any real world data ever fall exactly on a straight line?
3. What other window(s) might we use to display this data? Do particular windows have any advantages or disadvantages?