

## Technology Applications

### Using the TI-82 with Data

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Graphing calculators are used in the mathematics classroom to visualize functions and to model abstract concepts. Use of this valuable learning tool can be extended into the science classroom. With this technology, data can be represented visually in a format that links the data to mathematics functions. Students may then make conclusions about their hypothesis that have a mathematical basis.

In the following explanations, the TI-82 Texas Instruments graphing calculator has been used. The keys of the calculator are denoted by boxes while other selections designate menu choices.

#### ENTERING THE DATA:

Up to six data lists can be stored in the TI-82 calculator. Keeping similar data (height, time, weight, etc) together in separate lists is the only requirement to begin the process of entering the data. Determining which data set represents the independent and dependent variables can be declared later in the process. It is even possible for the data set to be a calculation of other data sets entered into one of the lists.

If data already exist in one or more list(s) that are to be used, clear the entries by one of the following keystroke methods:

- **STAT**  
EDIT 4: ClrList **ENTER**  
Enter the name of the single list (L1, L2, L3,...) from which data are to be removed. Multiple entries are separated by a comma.  
**ENTER**
- OR
- **STAT**  
EDIT 1: Edit **ENTER**  
Move cursor using arrow keys and highlight the name of the list  
**CLEAR** **ENTER**

To begin entering the data, the steps are:

- **STAT**  
EDIT 1:Edit **ENTER**  
  
Enter the data one piece at a time followed by **ENTER**

- Corrections can be made to the data by moving the cursor to the incorrect entry and re-entering the correct data at that position.
- If one of the lists is to be a calculation derived from two other lists, the calculation can be done by using the up-arrow key (↑) to place the cursor at the name of the list, entering the formula using the list names as the variables, and then **ENTER**.
- After all the data have been entered, exit the lists with **2<sup>nd</sup>** **QUIT**

**SETTING UP INDEPENDENT / DEPENDENT VARIABLES:**

Only two lists can be used at a time for graphing purposes. It is necessary to decide which of the lists (L1 – L6) will be the Xlist (independent variable) and Ylist (dependent variable) for the graph. This information needs to be conveyed to the calculator in order to set up the graph properly.

- **STAT**  
CALC  
 ↓ ↓ 3:SetUp... **ENTER**  
 ↓ ↓ 2-Var Stats  
 Proceed to highlight which list is to be used for the Xlist and Ylist followed by **ENTER**.  
 Frequency is usually set to 1.  
 Use **2<sup>nd</sup>** **QUIT** to return to the home screen.

- For the graph to be constructed there must be a one-to-one correspondence between the number of data entries in the list. An error message will appear upon trying to create a graph with unequal number of entries between the two lists.

**VIEWING THE DATA THROUGH GRAPHS:**

The calculator can do three different graphs of the data at the same time. It is possible to show simultaneous graphs, such as time (L1) and height (L2), time (L1) and weight (L3), and time (L1) and temperature (L4). However, it is necessary to tell the calculator which list will be the independent variable and the dependent variable. For each plot, the numbering of the x- and y-axis is done through the following steps:

- **2<sup>nd</sup>** **STAT PLOT**  
 Choose the number of the Plot (1, 2, or 3)  
 Choose ON ↓  
 Choose the type of graph: broken line graph or connected lined graph ↓  
 Xlist: determine which list will act as the independent variable ↓  
 Ylist: determine which of the list will act as the dependent variable ↓  
 Mark: choose the mark for displaying the data points in the graph

- **WINDOW**

use down arrow to begin window menu ↓

Xmin value refers to the lowest number needed on horizontal axis

Xmax value refers highest number needed on horizontal axis

Xscl is the interval at which tick marks will be placed along the horizontal axis

Ymin refers to the lowest number needed on vertical axis

Ymax refers to the highest number needed on vertical axis

Yscl is the interval at which tick marks will be placed along the vertical axis

- **GRAPH**

If the graph has too much information to make the viewing cluttered, return to the **2<sup>nd</sup> STAT PLOT** section to turn off the necessary graphs.

The coordinate graph can be resized by following the steps associated with the **WINDOW** key.

Although data entry and deviation of calculated values can also be done through a spreadsheet, the availability of the graphing calculator makes graphical data analysis applicable to the science class as well as the mathematics class. Interpretation of the mathematical functions associated with the graphs of data sets will be addressed in future installments of this section.