TI Technology Guide for *More of U.S.*

TI-83 Plus and TI-84 Plus Families

Creating Lists of Data, Displaying the Graph, Modeling Data with an Exponential Function, and Finding a Point of Intersection of Data

Activity 1:
To enter the data from the table in the activity, press
STAT and select **1:Edit** to access the List Editor
window. Be sure to clear any existing data in the lists
by highlighting the list name and pressing CLEAR
ENTER. [If you see a list other than L1 through L6,
press and select STAT **5:SetUpEditor** ENTER and
then follow the above instructions.]

Move the cursor to the first data position in L1. Enter
the data from your table for Year. Move the cursor to
the first data position in L2 and enter the
corresponding population data.
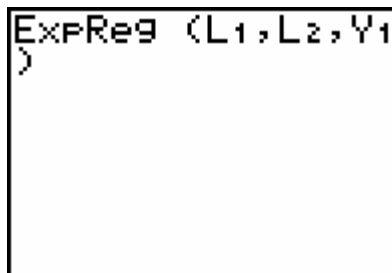
Access the STAT PLOTS menu screen by pressing
2nd Y=. Select **1:Plot1** to get the screen shown.
Notice that **Plot1** and **On** are highlighted. To turn on
or off any plot, place the cursor over the name, press
ENTER, then select either **On** or **Off**, and press ENTER
again. This process acts like a toggle switch to turn
the plots on and off the graphing display.
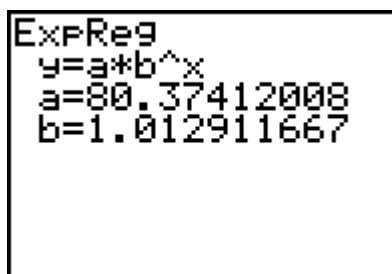
Press Y= and clear any equations listed. Press ZOOM
9:ZoomStat to automatically adjust the viewing
window to display all the data. Press GRAPH to
display the scatter plot of the population data from
your lists. You may also press TRACE to view the
coordinates of the data points.
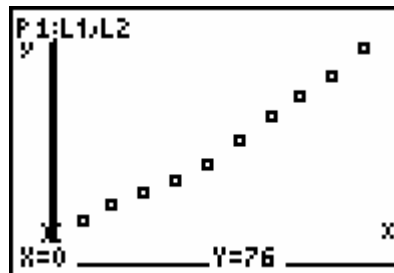
To find the exponential function that best models the data, press and select $\boxed{\text{STAT}}$ > CALC > **ExpReg**. On the home screen after the ExpReg prompt, enter **(** $\boxed{\text{2nd}}$ [L1] **,** $\boxed{\text{2nd}}$ [L2] **,** $\boxed{\text{VARS}}$ > Y-VARS > Function > Y1 **)** as shown.
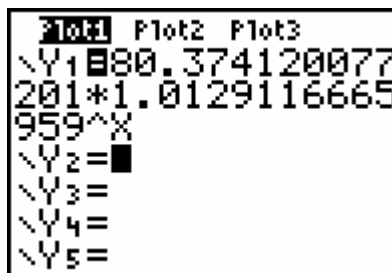
```
ExpReg (L₁,L₂,Y₁
)
```

Press $\boxed{\text{ENTER}}$ to have the handheld calculate the exponential function that best models the data set.

```
ExpReg
 y=a*b^x
 a=80.37412008
 b=1.012911667
```
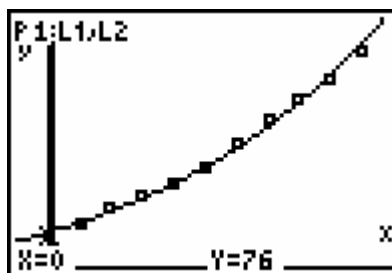
Activity 2:

The function has also been entered for Y1 in the $\boxed{\text{Y=}}$ editor. Now both Plot1 and Y1 are highlighted, which means they will both scatter plot and the exponential function will be displayed on the graph screen.
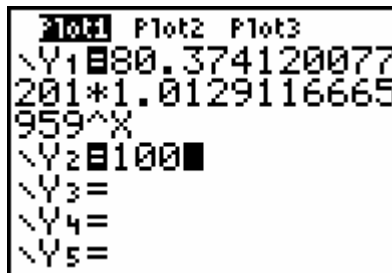
```
Plot1  Plot2  Plot3
\Y1█80.374120077
201*1.0129116665
959^X
\Y2=█
\Y3=
\Y4=
\Y5=
```

Press $\boxed{\text{GRAPH}}$ $\boxed{\text{TRACE}}$ to see the coordinates. Press $\boxed{\blacktriangledown}$ to toggle between the scatter plot data and the exponential function.
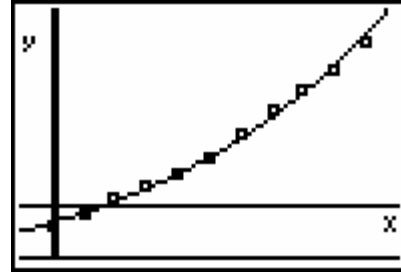
```
P1:L1,L2
 y
                         x
X=0            Y=76
```
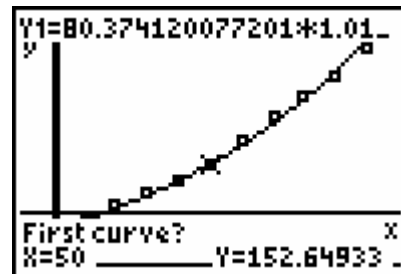
Activity 3:

Press $\boxed{\text{Y=}}$ and enter 100 in Y2.

```
Plot1  Plot2  Plot3
\Y1█80.374120077
201*1.0129116665
959^X
\Y2█100█
\Y3=
\Y4=
\Y5=
```

Press GRAPH to view the plots of all three sets of values (scatter plot, exponential function, and linear function).

Press 2nd [CALC] **5:intersect**. At the bottom of the screen, the prompt appears for identifying the curves that intersect. Use the up or down cursor keys to switch between the curves. For this example we are looking for the intersection of the exponential model (Y1) and the *y*-value of 100 (Y2).

After you enter these curves, the prompt suggests that you make a guess of the coordinates. You may make a guess, or just press ENTER. The coordinates of the intersection are displayed.
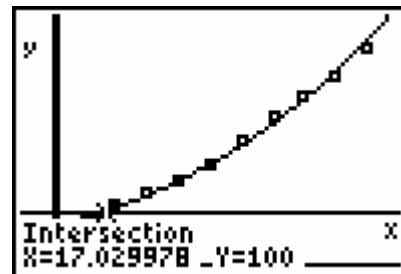
For the extension activity, students will need to reset the viewing window to accommodate seeing the graph prior to the 1842 date. This means that they will need to enter negative Xmin values. A sample of window settings is shown.
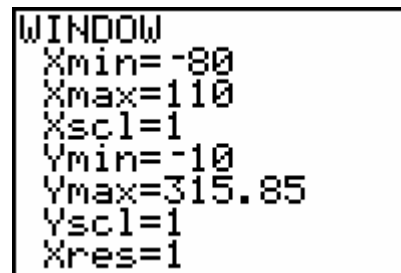
The resulting graph of the exponential function and the quadratic function can be traced to the time frame before 1842. Students should observe the significant difference in the behavior of the two models in this data range, as compared to the time period 1900-2000.
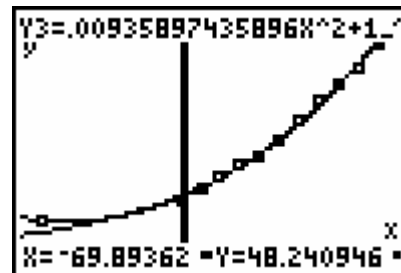
Using the Science Tools App:

Start the application by pressing APPS and selecting **:SciTools** > DATA/GRAPHS WIZARD. Within the application, you may enter 2nd [QUIT] at any time to return to menu screens. To select a menu option from the screen, press the graphing key directly below it.

```
DATA/GRAPHS WIZARD


DATA = NEW/EDIT DATA
  ⊾ = PLOT DATA
STAT = ANALYZE DATA


[DATA]  [⊾]  [STAT]
```
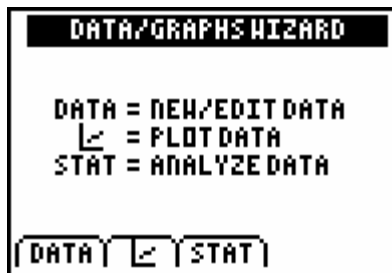
To input the data from your table, press Y= to access the DATA option. The List Editor is displayed so that data can be entered into L1 and L2. To return to the menu screen, press 2nd [QUIT].

```
L1      L2      L3      2
 0      76      ------
10      92
20      106
30      123
40      132
50      151
60      179
L2(1)=76
```

Press WINDOW to see the plot options, then choose the scatter plot option (⊾∵).

```
⊾∵ = SCATTERPLOT (2 VAR)
⊾  = XY LINE (2 VAR)
⊞⊶ = MOD. BOXPLOT (1 VAR)
⊞⊞ = HISTOGRAM (1 VAR)


[⊾∵][⊾][⊞⊶][⊞⊞]
```
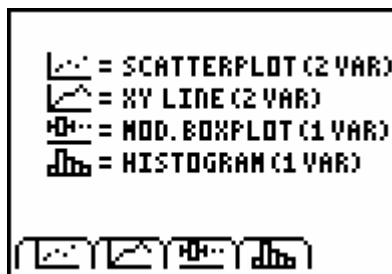
The prompt appears for the independent variable (*x*) with L1 highlighted. Press ENTER. The next prompt appears for the dependent variable (*y*). Select L2.

```
DEPENDENT VARIABLE (Y):
1:L1
2:L2
```

The scatter plot is displayed with the window automatically adjusted to include all the data points (ZoomStat). Enter 2nd [QUIT].
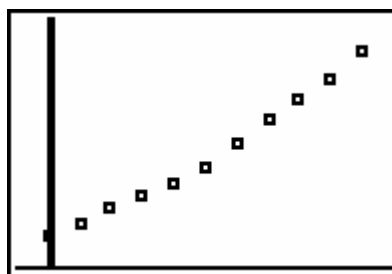
The next window (CHOOSE A FIT METHOD) prompts you to select a function type. The handheld will automatically find a function of that type which models the data set most closely. Press the number of your choice or highlight the function and press ENTER.
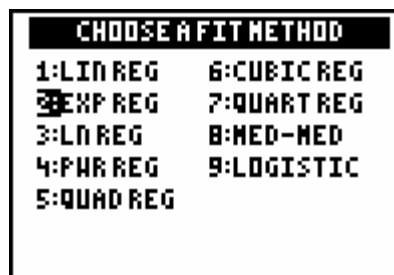
The scatter plot and the model function are displayed. The shaded boxes indicate the data points that fit on the curve.
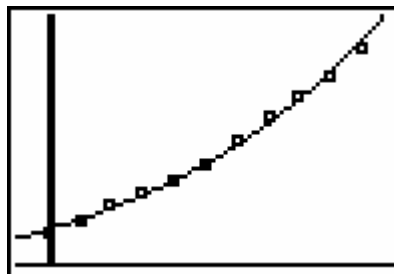
Press TRACE ▼ to view the coordinates along the model curve. Enter 97 as the *x*-coordinate, press ENTER and view the corresponding *y*-coordinate.
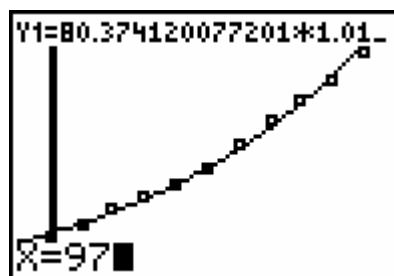
To exit the Science Tools App, repeatedly press 2nd [QUIT] until the EXIT option appears on the screen. Press Y= to return to the home screen of the handheld.