Teachers Teaching with Technology™
Professional Development from Texas Instruments

Exploring Data Collection with the TI-84 Plus in High School Mathematics and Science

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Pass the Ball

TEACHER NOTES

TI PROFESSIONAL DEVELOPMENT

Activity Overview

Many things in everyday life follow patterns. Mathematics can be used to examine the patterns that occur in a specific scenario and then predict future events for that scenario. This activity includes two examples of such patterns. The data collected is the time it takes to complete a task. The data will be used to make predictions about how long it will take to repeat that same task a certain number of times. The timed task is passing a ball. The basic concept has relevance to many areas of math, science, and everyday life.

Materials

- TI-84 Plus graphing calculator family
- Stopwatch
- Small bouncing ball (tennis/racquet balls work well)

1. For this activity, begin by having four students stand in a circle.

   - The starter will bounce, catch, and pass the ball to the next person.
   - Continue bouncing, catching, and passing the ball until it is back to the one who started.
   - Explain to students the importance of working at a consistent pace rather than working too quickly.

2. Time how long it takes the ball to get all the way around the circle.

   - Start and stop with the same person.
   - Have students record three trials of this process on their worksheets and calculate the average time.
   - Have them record the average in the chart on their worksheet.

Activity Sample Data	
Number of People	Average Time in Seconds
4	6
6	9
9	16
7	13
15	28

3. Complete the table for five different sets of students.

   - There should be a different number of students for each set.
   - To maximize participation, do not allow the same student to be in more than one group.

4. For the last row in each table, have everyone in the room participate.

   - Before timing this trial, have students predict how long they think it will take and write it on their worksheet.
   - Ask them to share their predictions.
   - Then time the trial for the entire class.

1

Pass the Ball

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TEACHER NOTES

5. Press [STAT] [ENTER] to access the Stat List Editor window.

   - Have all students enter the data in L1 and L2. Do NOT include the data for the trial that included the entire class.
   - Have one student enter the data on the overhead calculator.

Data Analysis

6. Create a scatter plot.

   - Press [2nd] [Y=] to access the [STAT PLOT] menu.
   - **1: Plot 1** will be highlighted.
   - Press [ENTER].
   - Use the arrow keys to highlight the On choice, and press [ENTER] to select **On**.
   - Continue using the arrow keys to navigate through this screen and adjust it as shown in the screen shot.
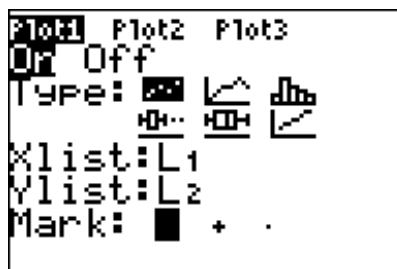
7. Press [ZOOM], and select **9:ZoomStat** by pressing [9] or by scrolling down until it is highlighted and pressing [ENTER].

   - This feature automatically adjusts the size of the graph window to include all the data points.
   - When the scatter plot is displayed, press [TRACE], and scroll right and left to see the coordinates of each point displayed below the graph.
   - Notice the **P1** in the upper left corner.
   - This tells you it is tracing the points from **Plot1**, and displays the lists that are the coordinates of the plot.
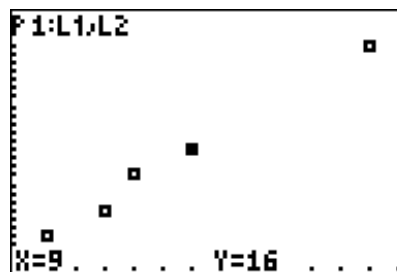
8. Have students fit the data with a function rule. There are several ways you can do this depending on your students' understanding of linear functions and features of the calculator. Below are three suggestions. Choose the one most appropriate for your students. Linear Regression and Manual-Fit Features are taught in subsequent lessons.

   - Use the Linear Regression feature of the calculator.
   - Use Manual-Fit feature of the calculator.
   - Use paper and pencil to sketch a line of best fit, and find its equation.

Pass the Ball

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TEACHER NOTES

The directions here will be for this last option.

a. It may be helpful to take control of the window settings rather than staying with the **9:ZoomStat** setting.
   - You can assure yourself of "friendly" numbers (without a lot of places after the decimal point) when you scroll if the spread on the *x*-values is a multiple of 47 as shown.
   - Expand the *y*-values to include the approximation of the time you expect the entire class will take to pass the ball.

b. Have students sketch their points in the screen provided on their worksheet.
   - Next, have them sketch their approximation of the line of best fit.

c. After sketching the line on their worksheet, direct students to find an equation and enter it in Y1 of the Y= window.
   - To do this, have them identify two points and use their *x*- and *y*-values to determine the slope of the line.
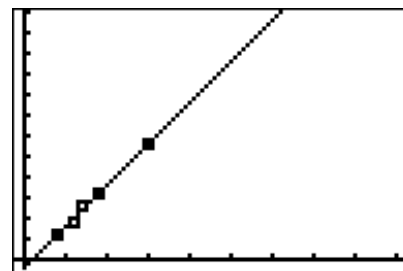
d. Discuss with your students why the point (0, 0) would be a point that should be included with this data.
   - How many minutes did it take for no students to pass the ball?
   - Add the (0, 0) point to your data lists.
   - Since it is likely that the points do not lie in a straight line, have students work in groups and have each group choose two points from the lists.
   - Have each group choose a different set of points. One possible answer is (28–6)/(15–4) = 2.

e. Using this slope, have students write the equation of the line in Y1 and compare their lines with each other.
   - Have them graph the line to determine if their lines fit the plotted points.

9. Have students use either the trace or table feature to predict how long they would expect it to take the entire class to complete the activity.

   - Discuss how close their predictions were to the actual time it took the whole class and possible reasons for any discrepancy.

Pass the Ball   **TEACHER NOTES**

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10. Another option for predicting the time it took the entire class to pass the ball is to have the calculator find the *y*-value for a given *x*-value.

- From the graph screen, press ⟦2nd⟧ ⟦TRACE⟧ to access the ⟦CALC⟧ menu.
- **1:Value** is highlighted already, so just press ⟦ENTER⟧.
- An X= is displayed in the bottom left-hand corner.
- Enter the value for the total number of students in the class, and press ⟦ENTER⟧.

   Note: The value you enter must be included in the domain that was set in the ⟦WINDOW⟧ screen.

- The corresponding *y*-value will be displayed, and a cursor will mark the ordered pair on the graph.
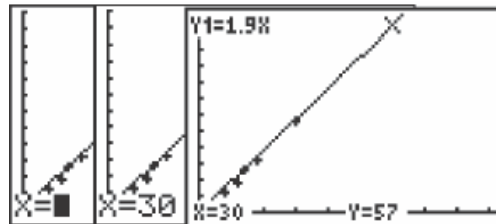
Extension Activity

1. Repeat the process, but this time pass the ball without first bouncing it. A list of sample data is shown.

2. After finding the regression equation and entering it into **Y1**, solve a problem that requires a prediction for values that are beyond the values in the recorded data.
   - For example, "If it took 50 seconds, how many people were there?"

Extension Sample Data	
Number of People	Average Time in Seconds
5	3.98
7	4.91
9	6.42
11	
15	

3. The equation of the line for the sample question would be 50 = *mx*. If the slope was found to be 0.787, the equation becomes 50 = 0.787*x* and *x* ≈ 64 people.

Discussion Notes

- Guide your students toward an understanding of the concept that a change in the *x*-values will cause a change in the *y*-values.
- Point out that if they were able to all pass the ball at exactly the same pace, they would be simulating a constant rate of change in the *x*-values that would bring about a constant and predictable change in the *y*-values.
- The fact that the estimation from the line of best fit is not an exact match to the actual time measured for the entire class is easily explained by human inconsistencies.
- The approximation from the line of best fit was not exact, but it should have been close enough to allow students to understand how this type of model building and reasoning could be used to predict future events with some reasonable degree of accuracy.

Worksheet Answers

The answers to the questions on the worksheet will vary depending on the data collected.

Pass the Ball
Student Activity

Name _____

Class _____

Objectives

- Graph scatter plots
- Graph linear functions
- Analyze proportional relations
- Interpret, predict, and analyze data and graphs

Materials

- TI-84 Plus graphing calculator family
- Stopwatch
- Small bouncing ball (tennis/racquet balls work well)

Number of People	Trial 1	Trial 2	Trial 3	Average Time in Seconds
4				

1. Fill in the table above.

2. Estimate how long you think it will take to do this activity with everyone in the room participating.

3. Enter the number of people in the group in **L1** and the time for that group to pass the ball in **L2**.

    - Turn on the [STAT PLOT] for **L1** and **L2** using the **9:ZoomStat** feature from the ZOOM menu to scale your window.
    - Make a sketch of these data points in the graph to the right.

4. Draw what you consider to be the line of best fit.

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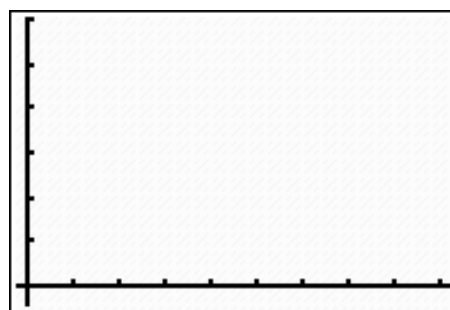
Pass the Ball
Student Activity

Name _____

Class _____

5. Select two points through which your line passes and use them to find the slope of your line.
    - Write the equation of your line here _____, enter it into the calculator beside **Y1 =**, and then press GRAPH .
    - Examine how closely the line you drew matches the line on your calculator.

6. It may be helpful to take control of the window settings rather than staying with the **9:ZoomStat** setting.

    - Press WINDOW .
    - Adjust the spread on the *x*-values to be a multiple of 47 as shown here to assure yourself of "friendly" numbers when you scroll.
    - Next, adjust the *y*-values to include the approximation of the time you expect the entire class will take to pass the ball.

```
WINDOW
 Xmin=-1
 Xmax=46
 Xscl=5
 Ymin=-2
 Ymax=60
 Yscl=5
 Xres=1
```

7. Press TRACE , and use the down arrow key to scroll along the line entered in **Y1**, not the data points.
    - Scroll to the right until your *x*-value matches the total number of students in your class.
    - Record your *y*-value of that point here and explain what it represents.

    $y =$ _____

8. Turn off **Plot 1**, and clear **Y1** before beginning the Extension activity.

Extension Activity

1. Fill in the table below.

| Number of People	Trial 1	Trial 2	Trial 3	Average Time in Seconds
4				

Pass the Ball
Student Activity

Name _____

Class _____

2. Estimate how long you think it will take to do this activity with everyone in the room participating.

3. Enter the number of people in **L3** and the time for passing the ball in **L4.**
   - Turn on the [STAT PLOT] for **L3** and **L4**.
   - Use the **9:ZoomStat** feature from the ZOOM menu to scale your window.
   - Make a sketch of these data points in the graph to the right.
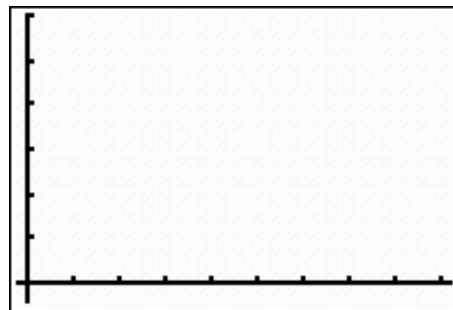
4. Draw what you consider to be the line of best fit.

5. Select two points through which your line passes and use them to find the slope of your line.
   - Write the equation of your line here _____, enter it into the calculator beside **Y1 =**, and then press GRAPH.
   - Examine how closely the line you drew matches the line on your calculator.

6. It may be helpful to take control of the window settings rather than staying with the **9:ZoomStat** setting.
   - Press WINDOW.
   - Adjust the spread on the *x*-values to be a multiple of 47 as shown here to assure yourself of "friendly" numbers when you scroll.
   - Next, adjust the *y*-values to include the approximation of the time you expect the entire class will take to pass the ball.

```
WINDOW
 Xmin=-1
 Xmax=46
 Xscl=5
 Ymin=-2
 Ymax=60
 Yscl=5
 Xres=1
```

7. Press TRACE, and use the down arrow key to scroll along the line entered in **Y1,** not the data points.
   - Scroll to the right until your *x*-value matches the total number of students in your class.
   - Record your *y*-value of that point here and explain what it represents.

   $y =$ _____

8. Was your approximation for the time it took the entire class an exact match to the time you recorded from actually doing the activity?

   What could be the cause of any discrepancy?

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Mass Guessing
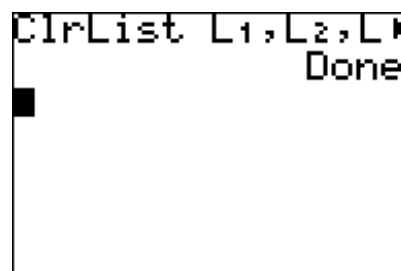## TI PROFESSIONAL DEVELOPMENT

Activity Overview

In this activity, you will guess the mass of various items, enter their estimated and actual masses into lists, and graph the results in a scatter plot.

Materials

- TI-84 Plus graphing calculator family
- Half a dozen items with different masses

1. Have the participants enter the data editor, and clear all default lists by pressing ⌷STAT⌷ and choosing **ClrList**. Then press ⌷2nd⌷ ⌷1⌷, ⌷2nd⌷ ⌷2⌷, ⌷2nd⌷ ⌷3⌷, ⌷2nd⌷ ⌷4⌷, ⌷2nd⌷ ⌷5⌷, ⌷2nd⌷ ⌷6⌷ ⌷ENTER⌷.

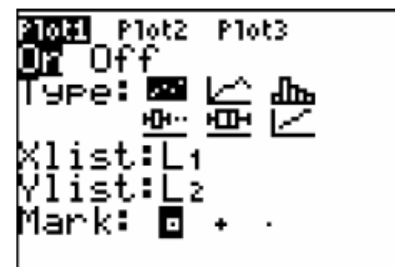   All lists can also be cleared by pressing ⌷2nd⌷ ⌷+⌷ (for [MEM]) and choose clear all lists.

2. Pick up several objects and guess their mass.
   - Record the information on the data sheet. Press ⌷STAT⌷ and choose **Edit** to get to the table.
   - Transfer your predicted mass into in L1. Be sure to enter them in order by assigned number.

3. Now, mass all of the objects and record the results in L2. Be sure to match up items.

4. Have the participants create a scatter plot with the *x*-list (L1) and *y*-list (L2) by pressing [STAT PLOT] and setting the parameters as shown.
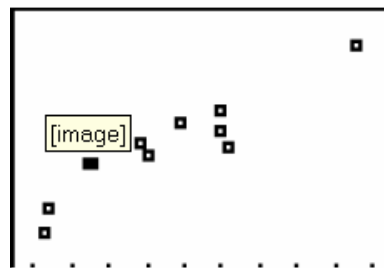
Mass Guessing

5. Make sure the Y= are clear, and use ZoomStat to show the relationship.

    Press ⌊TRACE⌋, and discuss the ordered pair.
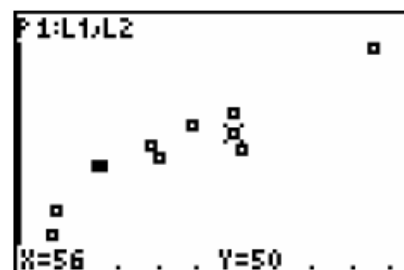
6. Graph *y* = *x* by pressing ⌊Y=⌋. Show the graph by pressing ⌊GRAPH⌋. What is the relationship between the scatterplot and line?
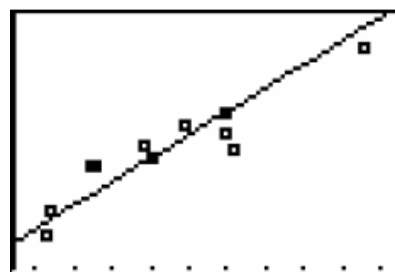
Data Table

Object Number or Description	Predicted Mass	Actual Mass

Grandma Ruth
TI PROFESSIONAL DEVELOPMENT

Activity Overview

As I grew up, I had the pleasure and misfortune of having my grandparents live close by. I enjoyed their company, and their constant desire to spoil their grandchildren by buying us things throughout the year. The downside of these shopping trips occurred in late summer when they would take me shopping for school clothes.

Grandma Ruth would insist in buying me several new outfits for school. These outfits would include everything from shirts and pants to shoes and underwear. There was something about buying underwear with your grandmother as a 14 year-old male that made the trip uncomfortable.

To make matters worse, Grandma Ruth had this strange notion that you could determine if a sock would fit your feet by wrapping it around your fist. So there I stood in the department store, wrapping socks around my fist to see if they were going to fit my feet. Grandma Ruth is gone now, and mixed in my fond memories of her is still the question of whether she was a little crazy in her notion of trying on your socks by using your fist rather than your feet.

Materials

- TI-84 Plus graphing calculator family
- Tape measure

Plan

1. This is your question to answer so that my faith in my Grandma's sanity can be settled. To settle this, you are to use all that you know about the scientific method. The question has been asked, "Does the diameter of your fist determine your foot size?"

2. Your team needs to develop your test, conduct the experiment, analyze the data, and reach a conclusion supported by the data.

3. Include the collection of fist and foot data.

4. Share your team's plan with the class.

5. During the discussion, the class should determine the exact methodology of the investigation. All teams will then conduct the experiment the same way.

Grandma Ruth
TI PROFESSIONAL DEVELOPMENT

Execute

1. The teams will conduct the accepted experiment as prescribed and modified by the class. Data should be collected and entered into the TI-84 Plus graphing calculator.

2. Place the data for the diameter of the fist (FIST) as the independent variable and the length of the foot (FOOT) in the list editor. Press STAT, and select **Edit** to see the list.

3. Highlight the name of a list, and arrow over to the right or left until you get the first unnamed list.

4. Enter the names **FIST** and **FOOT** in the first and second columns as shown. Now enter the data collected into your newly named lists.

Conclude

1. What did the data indicate? How were you sure? Did all of the variables you listed stay constant or controlled except for the FIST and FOOT?

2. What was your sample size? Was it large enough, how do you know?

3. How did your results compare with other team members?

4. What was the range of the data? Why would that matter?

5. How would you modify the experiment if repeated? Why?

6. Where was the science? What mathematic concepts were involved?

7. What questions come to your mind when you study the data?

Bungee Jumping Barbie

TI PROFESSIONAL DEVELOPMENT

Activity Overview

This activity involves a simulation of bungee jumping. The distance a person falls while attached to a bungee cord depends on their weight and the length of the cord. We will keep the person's weight constant by using the same object for the entire experiment. Our goal is to discover how far a person (represented by the doll) will fall based on how long the bungee cord is. Then we will predict how long a cord will be needed to fall from a known height without hitting the ground.

Materials

- TI-84 Plus graphing calculator family
- Dolls suitable for the experiment
- Boxes of sturdy rubber bands (must be the same size)
- Tape measures or meter sticks

Data Collection

1. Collect a doll and eight identical rubber bands.

2. Attach the first band to the ankle of the doll.

3. Attach the free end of the chain at a fixed point from which a tape measure is attached.

4. Release the doll from the fixed point and record the distance it falls. Repeat the experiment several times.

5. Carefully add bands one at a time and test the drop until the length is eight bands. Be uniform in the way these are joined. Use student work sheet to record results.

Data Entry

Enter the number of rubber bands in L_1 and the distances in L_2.

Create a scatter plot of L_1 versus L_2.

Bungee Jumping Barbie

TI PROFESSIONAL DEVELOPMENT
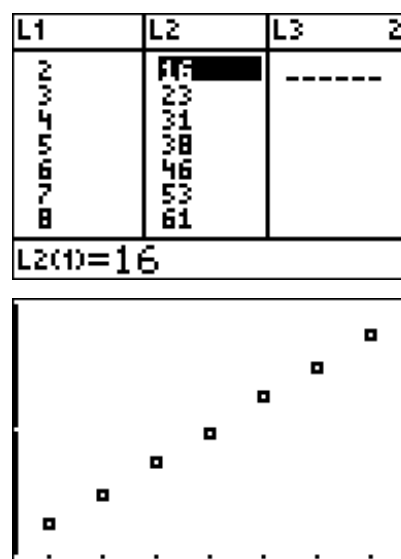
Analysis

1. Perform a manual fit on this data.

   - Press STAT and choose CALC then scroll to Manual Fit and press ENTER.
   - Press ALPHA [F4] to choose Y1 to store the equation as Y1.

2. When you get the next screen, press ENTER to choose the first point.

   - Press the arrow keys to create a line, and press ENTER to set the end point. The graph will appear.
   - Change *m* and *b* until you are happy with the fit. Then press 2nd [QUIT].

3. The equation is on the screen and can also be seen by pressing Y=. Record it here _____.

   - Using the resulting equation, predict how many rubber bands you will need to drop the doll from a new height given by the instructor.
   - Test your prediction.
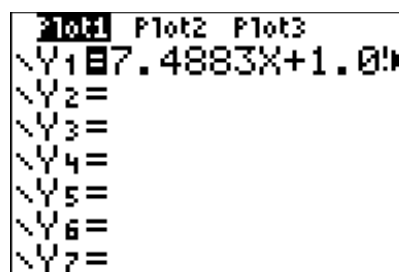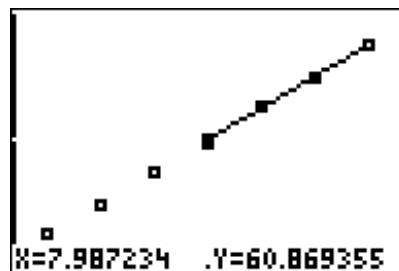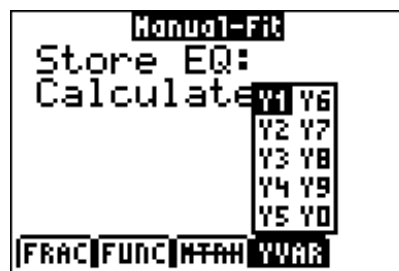
Bungee Jumping Barbie
Student Activity

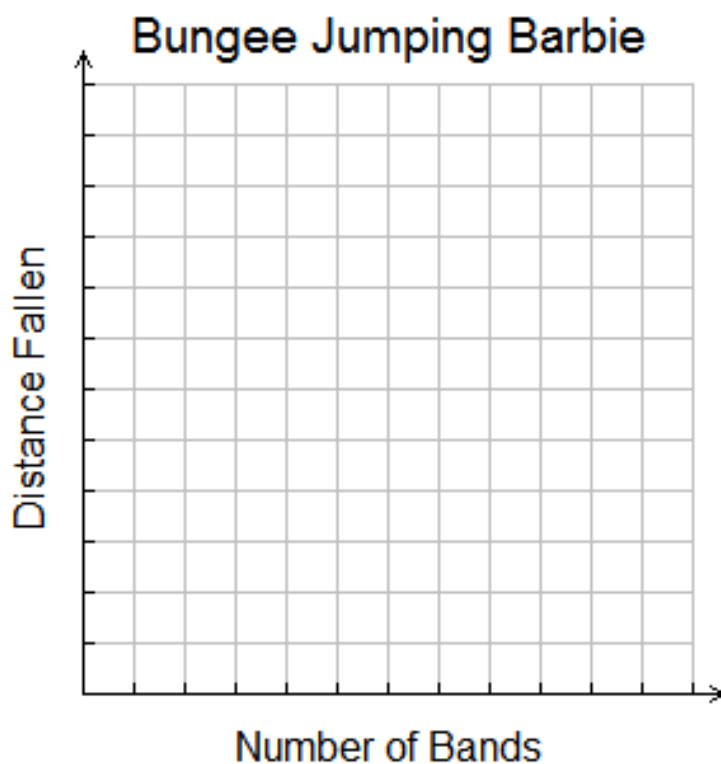**Name** _____

Class _____

Activity Overview

This activity involves a simulation of bungee jumping. The distance a person falls while attached to a bungee cord depends on their weight and the length of the cord. We will keep the person's weight constant by using the same object for the entire experiment. Our goal is to discover how far a person (represented by the doll) will fall based on how long the bungee cord is. Then we will predict how long a cord will be needed to fall from a known height without hitting the ground.

1. What variable do we control? This is the *independent variable*, or the *domain*.

2. What variable is not under our control? This is the *dependent variable*, or the *range*.

3. Make a rubber band chain attached to the ankle of the doll.
    *   Begin with two rubber bands and drop it.
    *   Add bands, one by one, and repeat until you get to eight rubber bands.

Number of Bands	Average Distance Fallen (cm)
2	
3	
4	
5	
6	
7	
8	

Bungee Jumping Barbie
Student Activity

Name _____

Class _____

4. Graph the data on the grid provided below:

Bungee Jumping Barbie

Distance Fallen

Number of Bands

5. Find a mathematical model using Manual Fit. What equation did you get?

6. Now use your model to predict the number of bands needed to come as close as possible (to get the maximum rush) without hitting from a given distance.

7. What is the given distance provided to you?

8. Using your equation, what is the number of bands you will need? Show work.

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Them Bones

TI PROFESSIONAL DEVELOPMENT

Activity Overview

Students will measure their bones and determine the relationships between the various bone sizes.

Materials

- TI-84 Plus graphing calculator family
- Meter stick
- Dry spaghetti

Introduction

Scientists do not always find all of the bones needed to make real measurements of dinosaurs. They may find a leg bone, or a skull, or a few ribs. By calculating the relationship between the lengths of the bones found, they can estimate the size of the animal.

In this activity, you will measure some bones in your body; and then determine what type of relationship exists between those bones.

Procedure

1. Each member of the group should measure the length of their shoe using a tape measure or meter stick. Record each measurement in the data table.

2. Each member of the group will measure their forearm from the bend at the wrist to the elbow using the tape measure or meter stick. Record each measurement in the data table.

3. Obtain data measurements from other groups to total 12 data sets (shoe length, forearm length), and record them in them.

From Elbow to Wrist

From Heel to Toe

Them Bones

TI PROFESSIONAL DEVELOPMENT

Use the following steps to enter your data into the TI-84 Plus graphing calculator:

1. Press [STAT], and then press [ENTER] to access the List editor.
2. If L1 is not empty, press [▲] to move the cursor to the top of the list, and then press [CLEAR], [ENTER] to clear L1.
3. Press [▲] to move to the top of L2, and repeat step 2 to clear L2.
4. Move to the first position in L1 [L1 (1)], enter the first value in the shoe length column, and press [ENTER]. Continue this process until all values in the shoe length column are entered.
5. Press [▲] to move to the first position in L2 [L2 (1)], and enter the first value in the forearm length column. Continue this process until all values in the forearm length column are entered.
6. Press [2nd] [Y=] to access [STAT PLOT] and press [ENTER] to access the screen shown.
   - Adjust the settings to match those shown.
   - Use the arrow keys to move around the screen, and press [ENTER] to select the settings.
   - Press [ZOOM] [9] to set up the window.
   - Press [GRAPH] to see a plot of forearm length versus shoe length.
7. Make a sketch of the data as it appears on the screen. Be sure to label the axes.
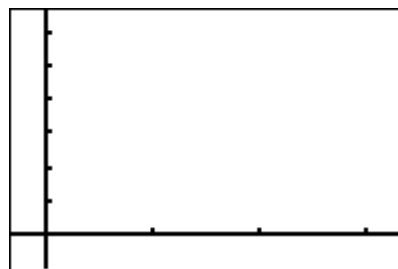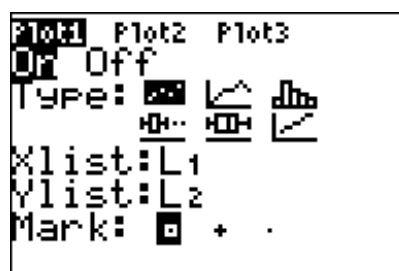
Analysis

1. Break off a piece of spaghetti approximately as long as the width of the TI-84 Plus graphing calculator screen.
2. Then place the spaghetti on the screen of your calculator, and move it around until it best follows the pattern of your points.
3. The spaghetti represents a graph of a line that would predict the relationship between the length of your forearm and the length of your shoe.
4. Sketch your line of placement for the spaghetti on the graph in Question 7 above.
5. One way the TI-84 Plus can determine this line is by calculating the median-median fit.

Them Bones

TI PROFESSIONAL DEVELOPMENT

6. Use the following steps to find the median-median fit for your data points using your TI-84 Plus:

   - Press ⌊STAT⌋ ⌊▶⌋ to get the CALC Menu on your calculator for regression calculation.
   - Select option **3:Med-Med**.
   - Use arrow keys to go to **StoreReq**.
   - Press ⌊ALPHA⌋ ⌊F4⌋ to select the storage location and press ⌊ENTER⌋. Arrow to Calculate and press ⌊ENTER⌋ again.
   - Copy the equation on the line below:

     _____

   - Press ⌊GRAPH⌋ to view the graph of the median- median line determined by the TI-84 Plus.
   - How does this compare to your original sketch of the graph?

Conclusion

1. Look at the graph. What does the line tell you about the relationship between the length of the forearm and the length of the shoe?

2. Suppose you and your friend are arm wrestling. You notice that your friend's forearm is longer than yours. What does this tell you about your friend's foot?

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Them Bones

Student Activity

Name _____

Class _____

Record your data here:

Student Name	Shoe Length (cm)	Forearm Length (cm)

1. Break off a piece of spaghetti approximately as long as the width of the TI-84 Plus graphing calculator screen.

2. Then place the spaghetti on the screen of your calculator, and move it around until it best follows the pattern of your points.

3. The spaghetti represents a graph of a line that would predict the relationship between the length of your forearm and the length of your shoe.

4. Your regression equation _____.

5. What does the line tell you about the relationship between the length of the forearm and the length of the shoe?

6. Suppose you and your friend are arm wrestling. You notice that your friend's forearm is longer than yours. What does this tell you about your friend's foot?

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Getting Started with the TI Connect™ Software

TI PROFESSIONAL DEVELOPMENT

Activity Overview

Teachers and students need a way to back up their graphing calculator, take screen captures, and easily update the operating system. The TI Connect™ software application makes exchanging information between the TI-84 graphing calculator family and your computer quick and easy. Use TI Connect software to create and access calculator content, transfer and backup files, take screen captures, and update the operating system of your graphing calculator. TI Connect software includes TI DeviceExplorer, TI ScreenCapture, Backup, Restore, TI DataEditor, Explore My TI Data, and Send to TI Device. In this activity, you will explore the basic features of the TI Connect software.

Materials

- TI Connect software (version 4.0)
- TI-84 graphing calculator family
- Silver Link or standard A to mini-B USB black cable.

Note: Although this activity frequently references the TI-84 Plus C Silver Edition graphing calculator, most functions work with the TI-84 Plus and TI-84 Plus Silver Edition graphing calculators.

Part One – Getting Started

Step 1:
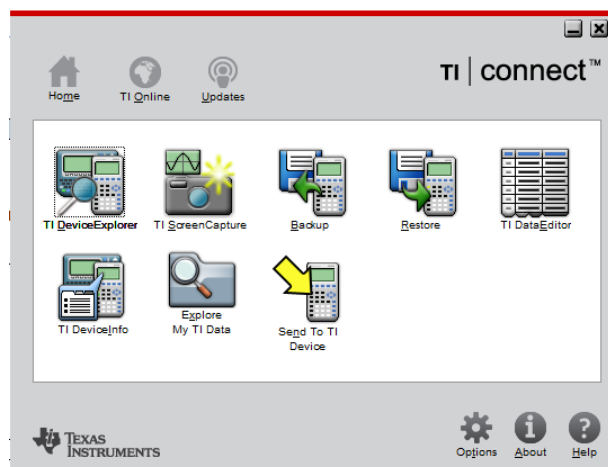
To open the TI Connect software:

- Connect the TI-84 Plus C Silver Edition to the computer using the Silver Link cable or Standard A to Mini-B USB black cable.
- Turn on the graphing calculator.
- Double-click on the TI Connect icon on your computer.

Step 2:

The TI Connect Home Screen will open up to display a list of actions.

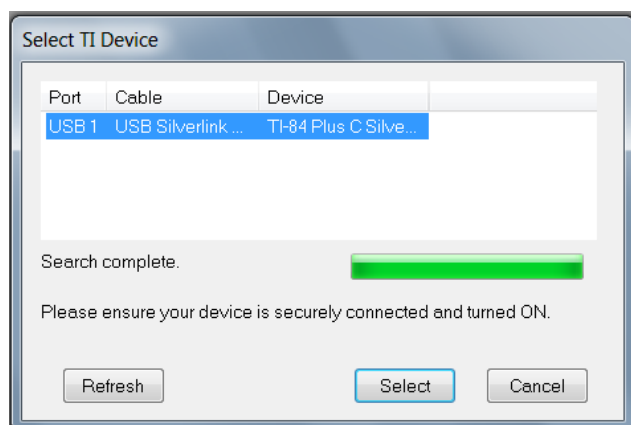Select an appropriate action by clicking on the icon.

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TI PROFESSIONAL DEVELOPMENT

Step 3:

The TI Connect software will open communication with the TI-84 Plus and find the attached calculator. Press the Select button when the graphing calculator is 'found', and you can begin.

Step 4:

With the addition of the TI-84 Plus C Silver Edition to the TI-84 family, the TI Connect software has been updated. What has changed?

New feature:

- Send to TI Device has been made more easily accessible by placing an icon on the TI Connect Home Screen.

Updated features:

- TI Device Explorer has been updated to work with the addition of color and backgrounds.

- TI ScreenCapture has been updated to include color and image capabilities.

Unchanged features:

- Backup

- Restore

- TI DataEditor

- TI DeviceInfo

- Explore My TI Data

In the following sections, each of these features will be discussed.

Note: The steps and directions given here are for a PC. If you are using a Mac, many of the processes that are described are the same. However, if you need help, remember to access the Help Menu from the various TI Connect screens.

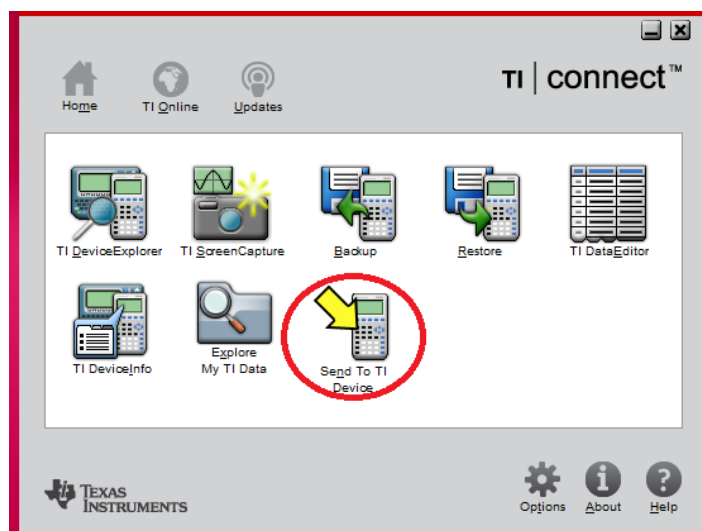## Getting Started with the TI Connect™ Software
TI PROFESSIONAL DEVELOPMENT

Part Two – Send to TI Device

The Send to TI Device feature allows the student or teacher to send calculator files from the computer to the TI-84 Plus C Silver Edition.
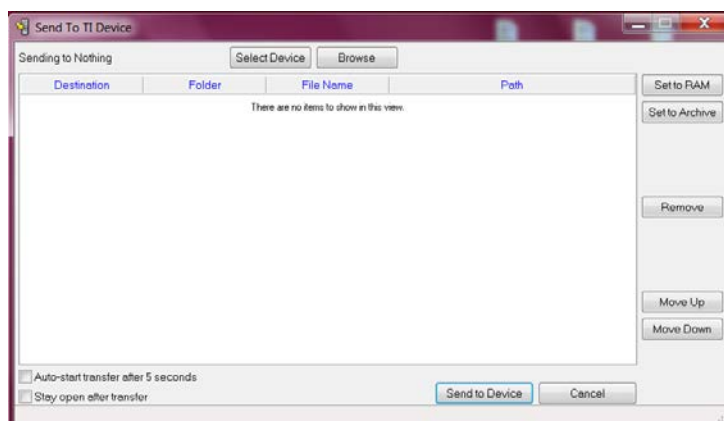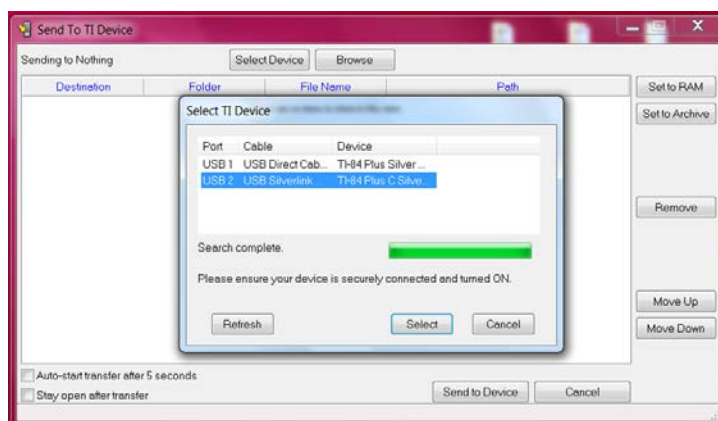
Step 1:

Click the Send to TI Device icon.

Step 2:

The Send to TI Device Window will open. Press on the Select Device button.

Step 3:

The TI Connect software establishes connectivity with the graphing calculator. Press the Select button.

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Getting Started with the TI Connect™ Software
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Step 4:

Next press the Browse button, and locate the file(s) you want to send. Press Open.
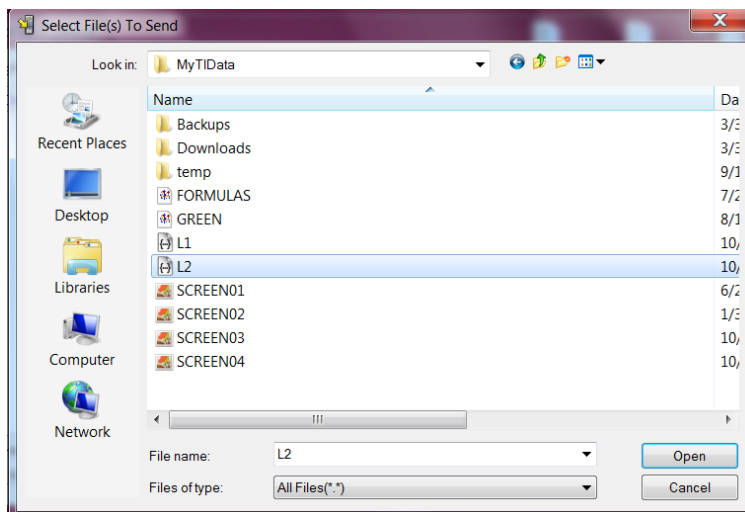
Step 5:

When your selections are finished, press the Send to Device button.

- A Transferring… Window opens. You might get a transfer warning about files already existing. Follow the prompts.

- When transfers are complete, the Send to TI Device window closes.

- You can now access the sent files on the TI-84 Plus C Silver Edition.
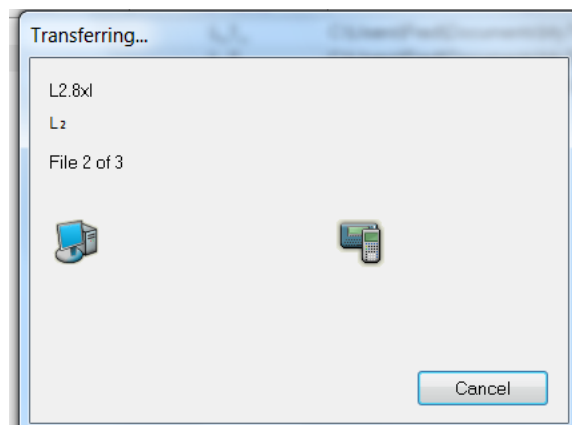
Keep in Mind:

- Sending files lets you share your files with others and still maintain a copy on both your computer and your own graphing calculator.

- Files stored on the computer can be sent to the RAM or Flash/Archived memory of the connected graphing calculator.

- If multiple calculators are connected to the computer, you can only choose to send to one of them at a time.

- Do not unplug TI connectivity cables while using Send to TI Device.

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Part Three – TI Device Explorer

The TI DeviceExplorer feature allows the teacher or student an easy way to work with the files on the TI-84 Plus C Silver edition. The TI Device Explorer key features are:

- Viewing the contents of the graphing calculator
- Copying calculator files to your computer
- Copying computer files to a connected graphing calculator
- Deleting calculator files
- Backing up and restoring calculator files
- Updating calculator files

Step 1:

Click the TI DeviceExplorer icon.
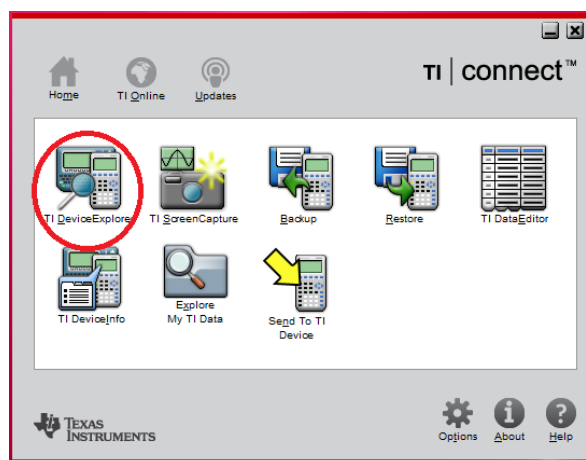
Step 2:

When TI Connect establishes connectivity with the TI-84 Plus C Silver Edition, press the Select button.

- The TI DeviceExplorer window will open.
- Click on a "**+**" next to any icon to view the contents of that folder.
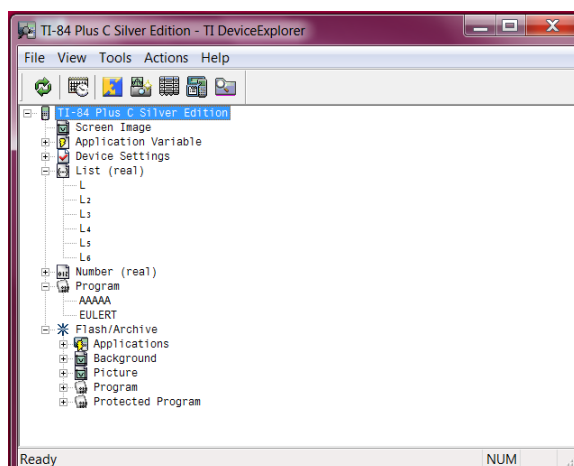
Step 3:

Drag and drop computer files into the TI DeviceExplorer as an alternative to using the Send to TI Device. Drag and drop calculator files from the TI DeviceExplorer into a computer folder for backup or later use. Right-click on a calculator file in Device explorer and choose delete.

Note: You can transfer/send files to your TI-84 Plus without opening TI Connect. Just drag a file on your computer to the TI Connect desktop icon for a quick transfer to your connected calculator.

Getting Started with the TI Connect™ Software
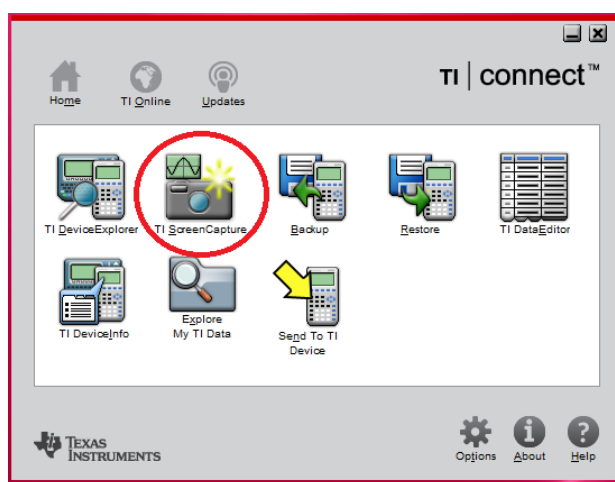
TI PROFESSIONAL DEVELOPMENT

Part Four – TI Screen Capture

The TI ScreenCapture feature gives the teacher or student an easy way to capture the screen images of the TI-84 Plus C Silver Edition. Features of TI ScreenCapture include:

- Capturing the calculator screen as an image.
- Editing the images.
- Transferring images between the calculator and another computer application.
- Saving images in various file formats.
- Converting an image to the TI-84 Plus C file format for use as a background.
- Printing the screen capture.

Step 1:

Click the TI ScreenCapture icon.

Step 2:

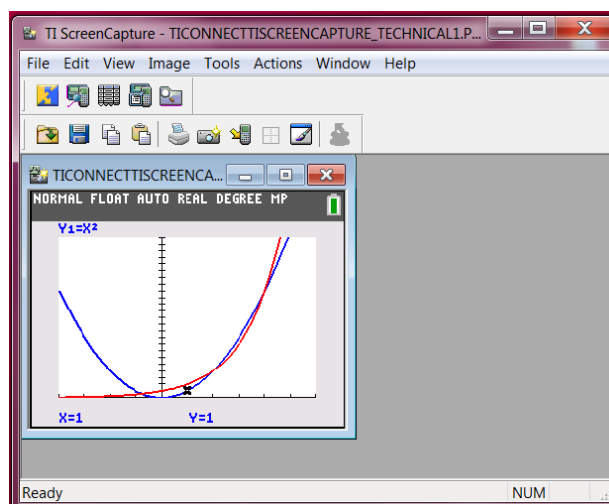The TI ScreenCapture window will open.
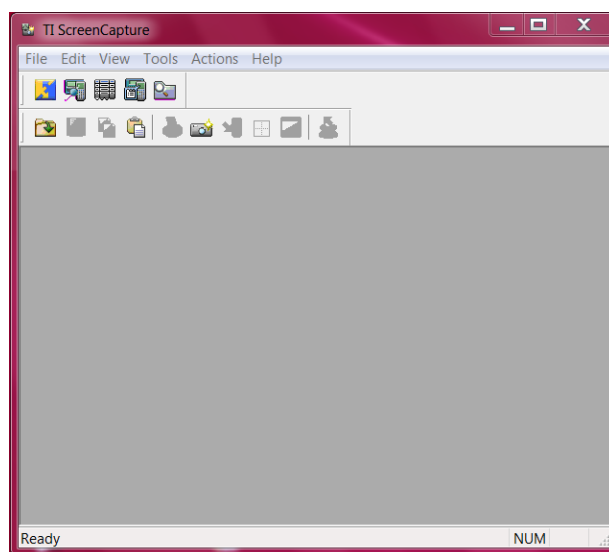
Getting Started with the TI Connect™ Software

TI PROFESSIONAL DEVELOPMENT

**Step 3:**

Click the camera icon.

- The TI Connect software will establish connectivity with the TI-84 Plus C Silver Edition with a screen capture.

- Capture additional screens by clicking the camera icon.

- TI Screen Capture can be used to send a background image to the calculator, or it can be saved and loaded into the TI SmartView Software.
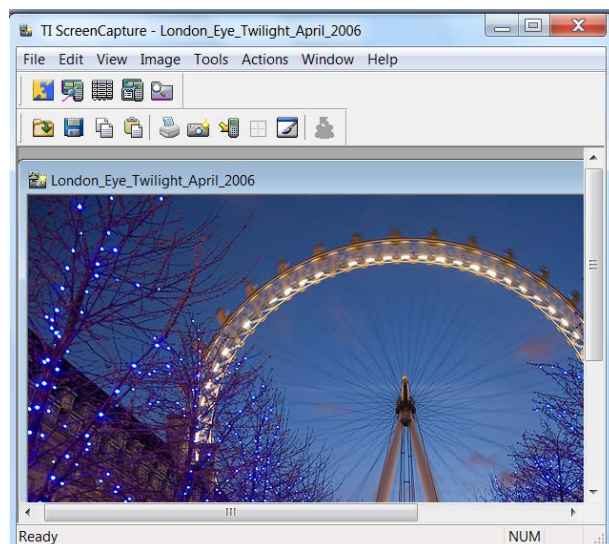
Step 4:

From the **File** menu, click **Open Image**.

Note: Any image in *.jpg, *.bmp, *.tif, *.png, *.gif, or existing TI picture formats can be opened in TI ScreenCapture.
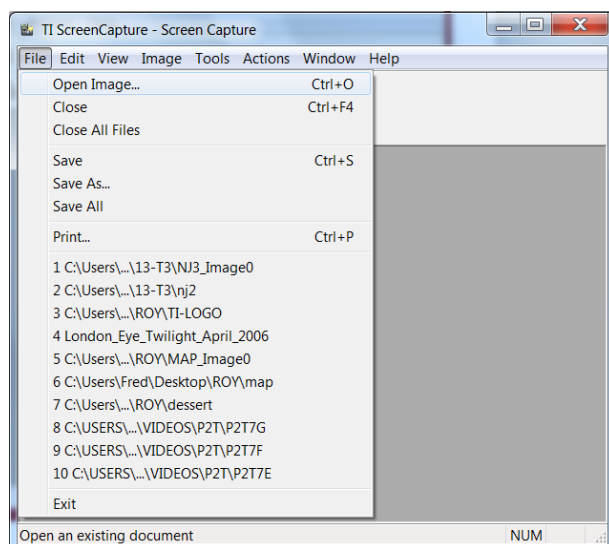
Step 5:

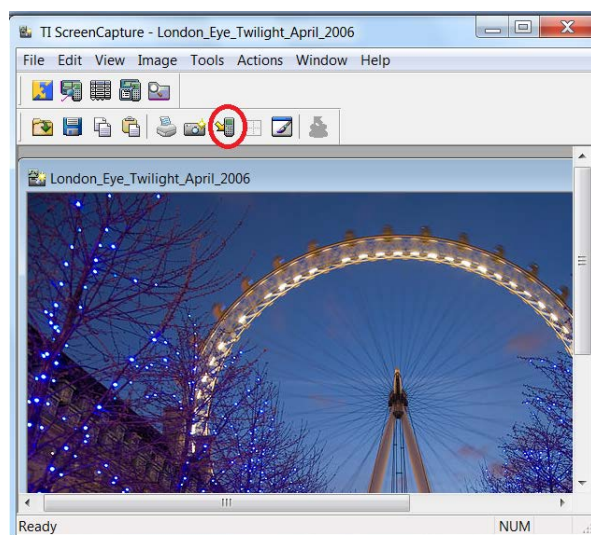The image will open in the TI Connect Screen Capture Window.

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Step 6:

Click on the Send to Calculator Icon to send the image to your connected TI 84 Plus C Silver Edition.

Step 7:

A Send Picture Window will open. Select the image variable number you want to use for your image.

- Remember Images 1-5 are preloaded on the TI-84 Plus C Silver Edition.

- Follow the on screen prompts. When transferring is complete, the image file can be accessed on the TI-84 Plus C Silver Edition.
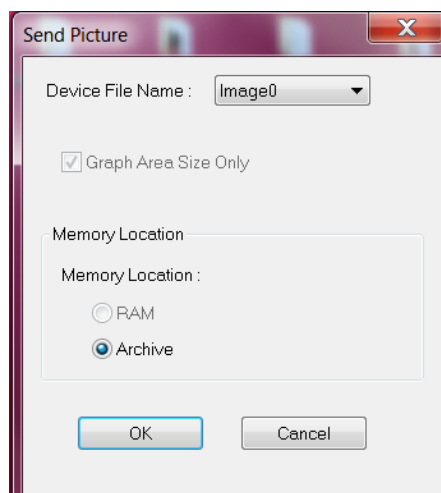
Step 8:

To save the picture as an image for use with the TI SmartView emulator software or as a backup:

- Select **File** > **Save As** > **Save as type**

- Select **TI-84 Plus C Image (*.8ca)**

- Click **Save.**

- The background image is now ready to **Load** into the TI SmartView software.
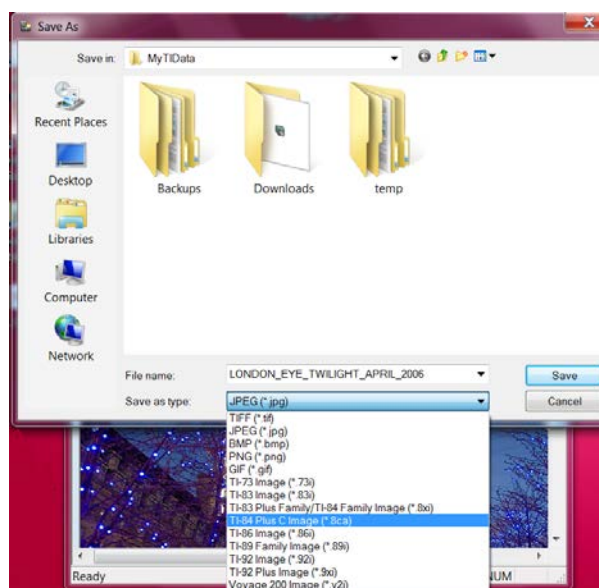
Getting Started with the TI Connect™ Software
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Part Five – The Backup and Restore Features

The Backup and Restore feature in the TI Connect™ software provides an easy way for students and teachers to back-up the files on their graphing calculator and restore them at a later time.

With the Backup tool you can:

- Back up the calculator's RAM

- Back up the calculator's Archive

- Back up the calculator's Apps

With the Restore tool you can:

- Restore the calculator's RAM

- Restore the calculator's Archive

- Restore the calculator's Apps.

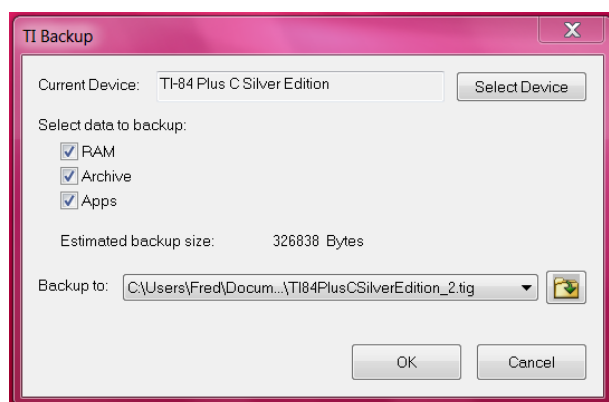**Step 1:**

To Use the Backup feature:

- Connect your graphing calculator to the computer using either the Silver Link or black USB cable.

- Click the Backup icon.

- If the Current Device does not display, press the Select Device button.
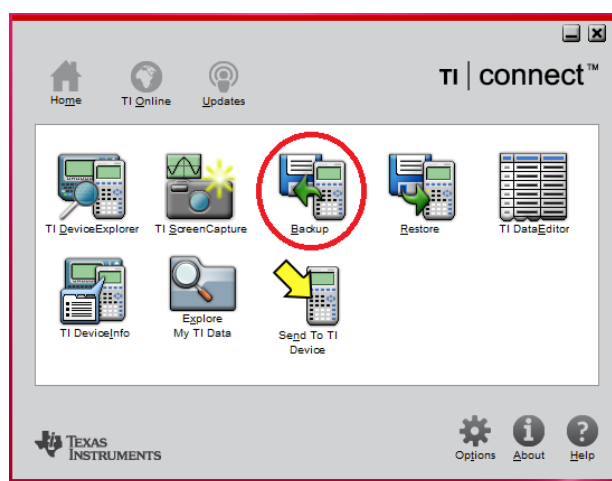
Step 2:

Select data to back up by using the checkboxes.

- Accept the default name, or type a new name for the backup file.

- Accept the default "Backup to" location, or navigate to a new location.
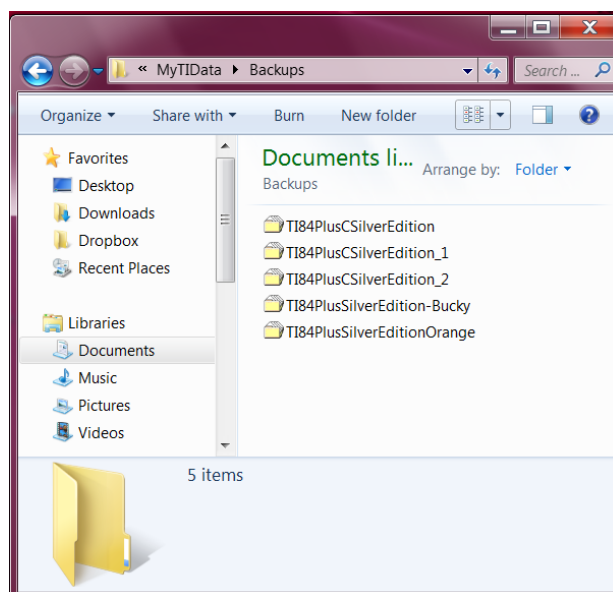
- Press **OK**.

Getting Started with the TI Connect™ Software
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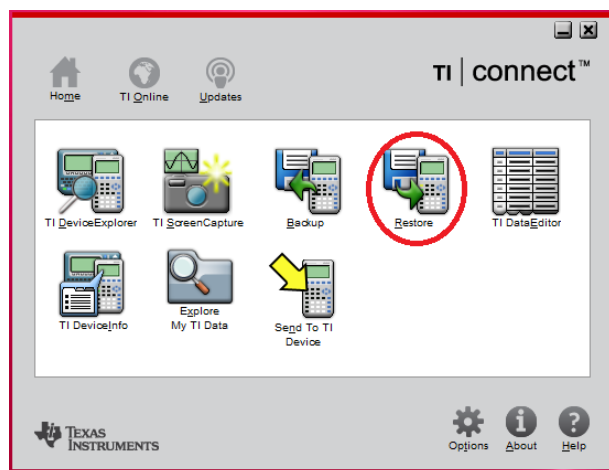**Step 3:**

A Transferring window appears.

- When the transferring is complete, the window closes.

- You can find the backup file in the location where it was saved with a .tig file extension.

Step 4:

To use the Restore feature;

- Connect your graphing calculator to the computer using either the Silver Link or black USB cable.

- Click the Restore icon.

Step 5:

Two dialog boxes open.

- In the Open dialog box, select the backup file (navigating to the location of the backup file if needed) and press **Open**.

- If the Current Device does not display in the TI Restore dialog box, press the Select Device button.

- Select data you want to restore by using the checkboxes. Press **OK**.
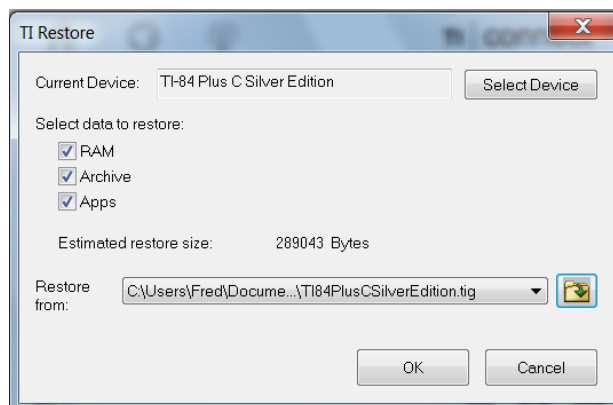
Getting Started with the TI Connect™ Software

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Step 6:

A Transferring window appears.

- A TI Device Data Transfer Warning window might appear. Press the appropriate button to continue.

- When the transferring is complete, the window closes.

- Your graphing calculator now contains the restored information.
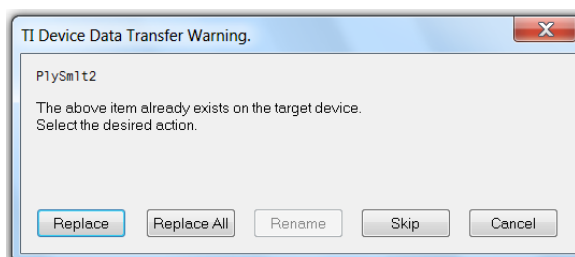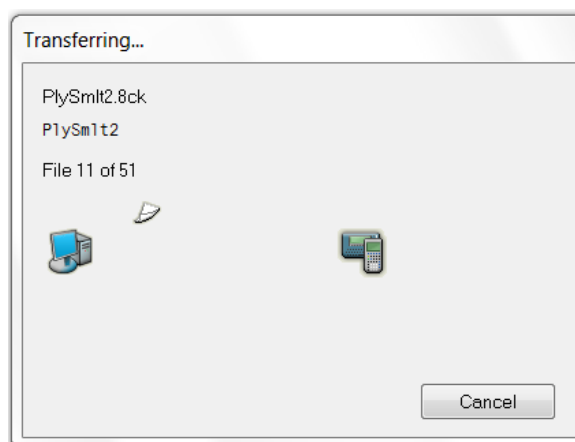
Keep In Mind:

- Backups should be done periodically.

- Remember the location where you saved the backup.

- Backup can only backup RAM, Archived, and Apps. You cannot back up an operating system.

- Before restoring, it is a good idea to check that you have the latest operating system installed.

- Restore copies the device files in the backup file to the connected calculator.

- Do not unplug TI connectivity cables while using Backup or Restore.

Part Six – TI Data Editor

The TI DataEditor feature in TI Connect™ provides an easy way for students and teachers to work with data variables on their TI-84 Plus C Silver Edition.

With the TI DataEditor tool you can:

- Create number, list and matrix variables.

- Edit the variables.

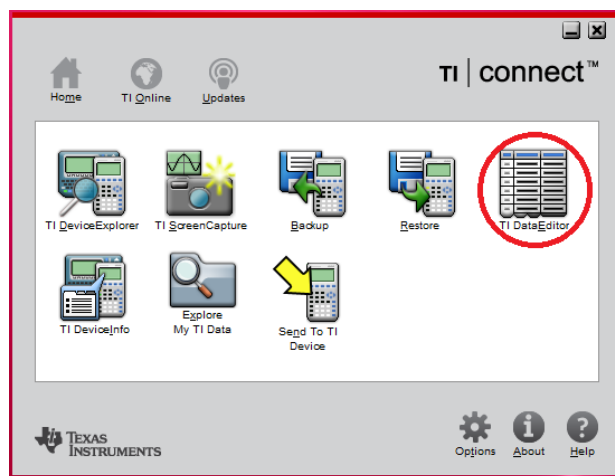- Share the variables with the graphing calculator and computer.

Getting Started with the TI Connect™ Software

TI PROFESSIONAL DEVELOPMENT

Step 1:

To use the TI DataEditor feature:

- Connect your graphing calculator to the computer using either the Silver Link or black USB cable.

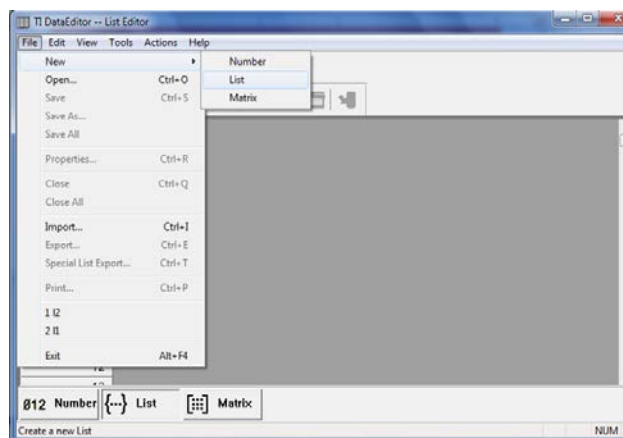- Click on the TI DataEditor icon.

Step 2:

The DataEditor will open. The Data Editor Window has three modes:
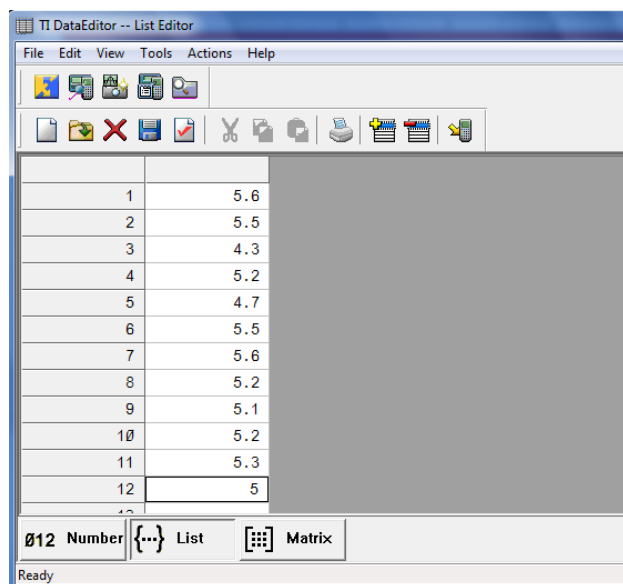
- Number Editor

- List Editor

- Matrix Editor

To open the List Editor, click **View**, and choose **List** or click on the List button at the bottom of the window. To create a list, click **File** > **New** > **List**.

Step 3:

Data can now be entered into the list.

Getting Started with the TI Connect™ Software
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Step 4:

When the data has been entered, click **File** > **Save As**. A Variable Properties window opens.

- Select the Device Type and Variable Name. Then press **OK**.

- The File Save As window opens. Verify the file name and location, and press **Save**.

- The Number Editor and Matrix Editor work in a similar fashion.
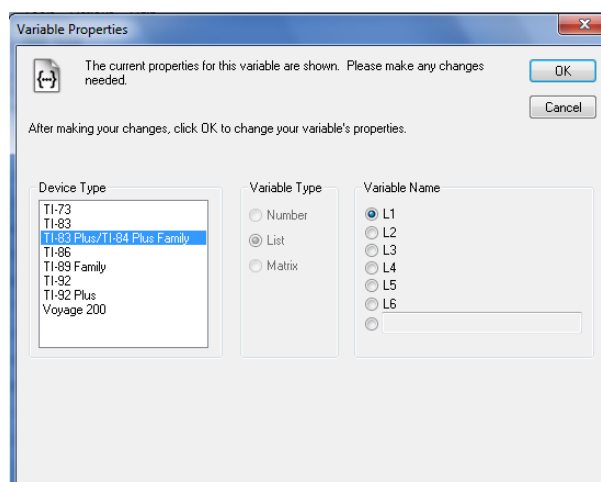
Keep In Mind

- Once a List, Number, or Matrix is saved, it can be opened in the Editor for editing.

- Once a List, Number, or Matrix is saved, it can be sent to the calculator using the Send to Device icon or dragging and dropping into TI Device Explorer.

- The TI DataEditor supports importing and exporting of data in .txt and .csv file formats.

- The TI DataEditor supports copying and pasting.

- The TI DataEditor can also be opened from TI ScreenCapture and TI DeviceExplorer.

Part Seven – TI DeviceInfo

The TI DeviceInfo feature in TI Connect provides an easy way for students and teachers to find out information about their TI-84 Plus C Silver Edition. The TI DeviceInfo tool can:

- Find general information about your calculator.

- Find applications on your calculator.

- Find the ID list on your calculator.

- Create information files.

- Open information files.
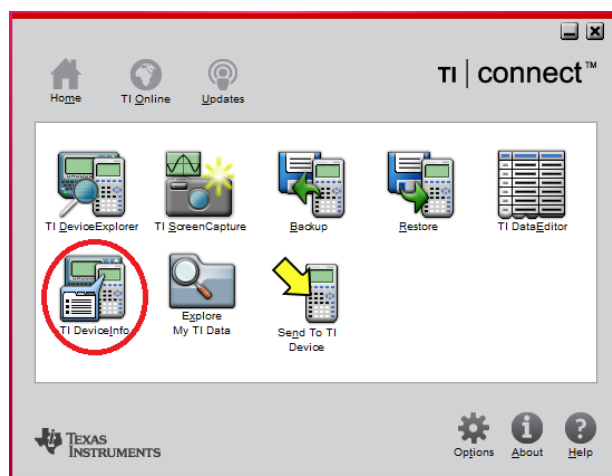
- Change communication settings.

Getting Started with the TI Connect™ Software
TI PROFESSIONAL DEVELOPMENT

Step 1:

To use the TI DeviceInfo feature:

- Connect your TI-84 Plus C Silver Edition to the computer using either the Silver Link or black USB cable.
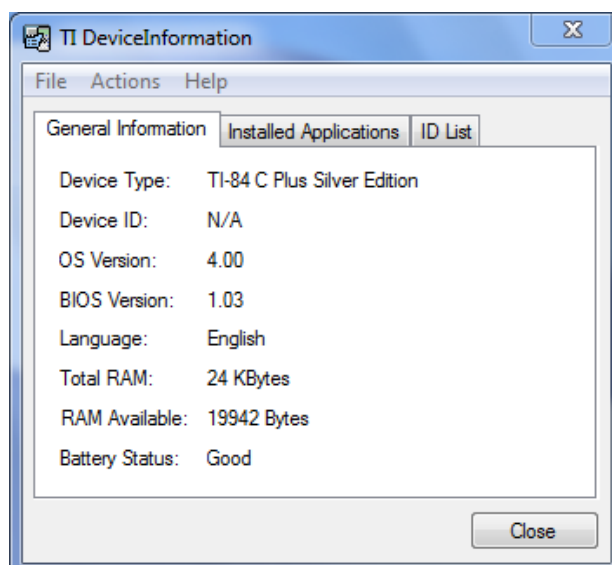
- Click on the TI DeviceInfo icon.

Step 2:

The TI DeviceInfo window will open and communicate with the calculator. If necessary, Select Device.

The TI DeviceInformation Window has three tabs:

- General Information

- Installed Applications

- ID List

Information files can be saved and opened using the **File** menu.

Keep in Mind

You can find calculator type, calculator ID, OS version, BIOS version, language, RAM information, battery status, installed applications, and ID list.

Part Eight – Explore My TI Data

The Explore My TI Data feature lets students and teachers create and work with Group files.

With the Explore My TI Data tool you can:

- Create Group files

- Edit Group files

- Send group or device files to a connected TI-84 Plus C Silver Edition.

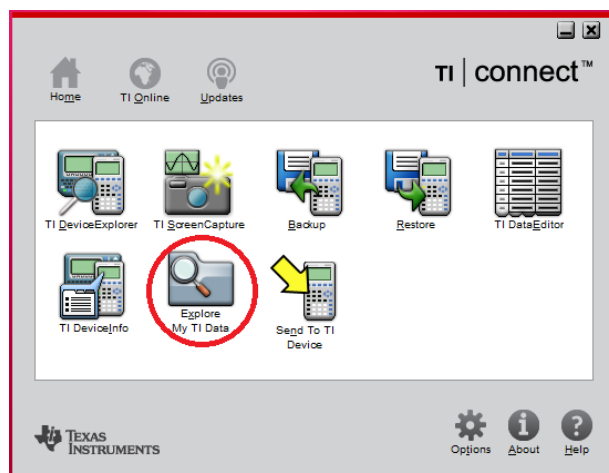# Getting Started with the TI Connect™ Software
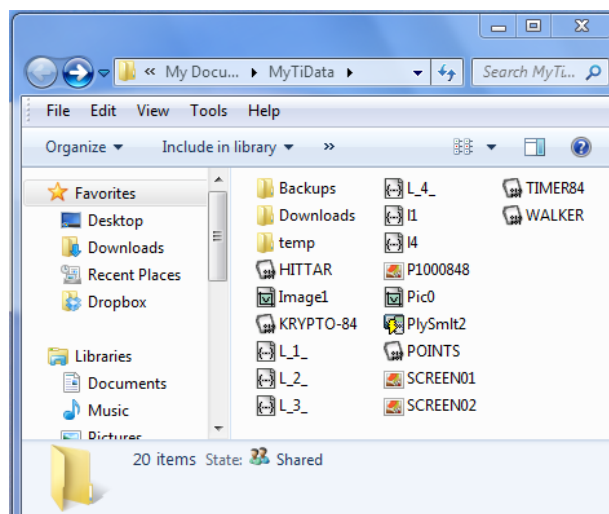## TI PROFESSIONAL DEVELOPMENT

Step 1:

To use the Explore My TI Data feature, click on the Explore My TI Data icon.
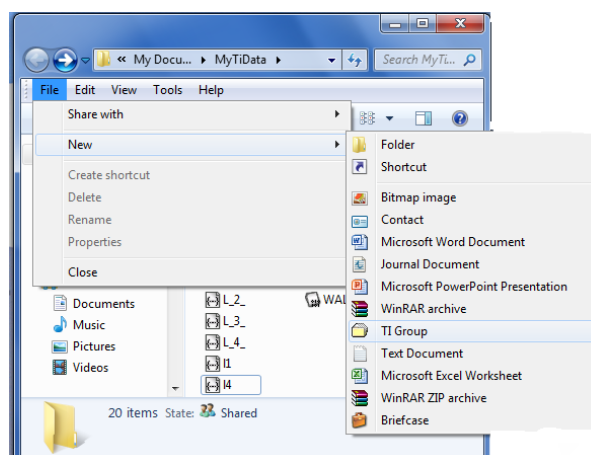
Step 2:

The Windows Explorer window opens.

You can also create a Group file containing one or more related calculator files.

Step 3:

To create a Group file with the Windows Explorer window open, click **File** > **New** > **TI Group**.
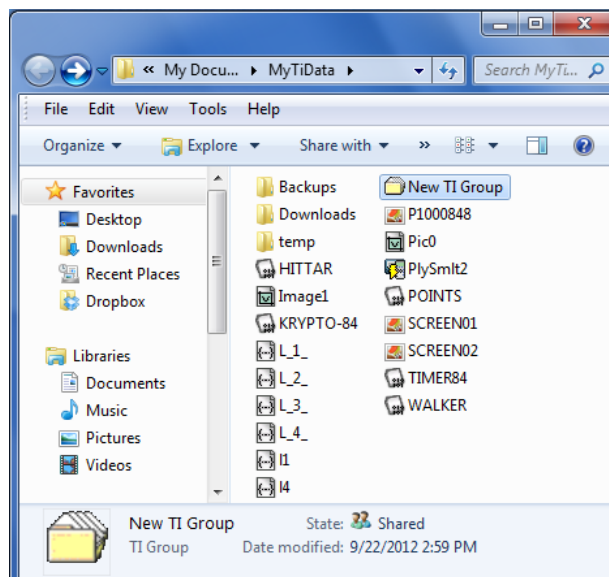
Getting Started with the TI Connect™ Software
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A Group file named "New TI Group" appears in the window.

- Drag or copy the calculator files you want in the group to the Group file.

- Rename the Group file if you want.

- The Group file can act as a backup and be restored to the calculator.

Keep in Mind

- Explore My TI Data provides quick access to the computer folder containing your TI Data and to the files in that folder.

- The Backup feature creates a Group file of a connected calculator. With Explore My TI Data, you can select which individual calculator supported files you want to put into a Group file. For instance, you might want to put all your programs in a Group file. The Group file would serve as a backup of your programs and the Restore feature could restore them to a connected TI-84 Plus C Silver Edition. You can also send the one Group file with all the programs in it to the calculator, simplifying the send process.

Other icons on the TI Connect Home Page include:

TI Online – If you are connected to the internet you will taken to the TI education portal

Updates – You can check to see if you have the latest operating system and Apps.

Options – You can set the options for the TI Connect software. The options you can set include the default application, the default directories, and automatic software update checking.

About – Displays the version of the TI Connect software that is installed on your computer.

Help – Opens a PDF help file with additional information about the TI Connect software.
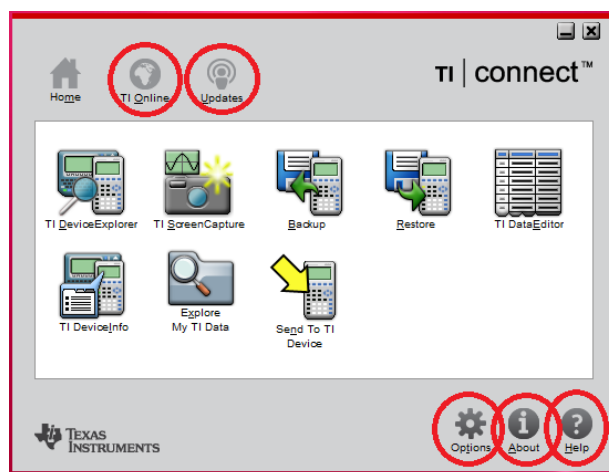
Getting Started with the TI-SmartView™ Emulator Software
TI PROFESSIONAL DEVELOPMENT

Activity Overview

You will explore basic features of the TI-SmartView™ emulator software. The TI-SmartView software gives you the complete functionality of both the TI-84 Plus and TI-84 Plus C Silver Edition graphing calculators on your computer. The software contains additional functionality that can be used to enhance presentations and classroom demonstrations.

Materials

- TI-SmartView emulator software (version 4.0)
- A Silver Link USB cable

Note: Although screen captures of the TI-84 Plus C Silver Edition are used throughout this activity, the TI-SmartView software contains two emulators: TI-84 Plus and TI-84 Plus C. If you are running version 3.0 or earlier, upgrade to version 4.0 and get all the features of both calculators.

TI-SmartView Software

To open the TI-SmartView software, click on the TI-SmartView TI-84 Plus icon on your computer. The software will open and is ready to be used.
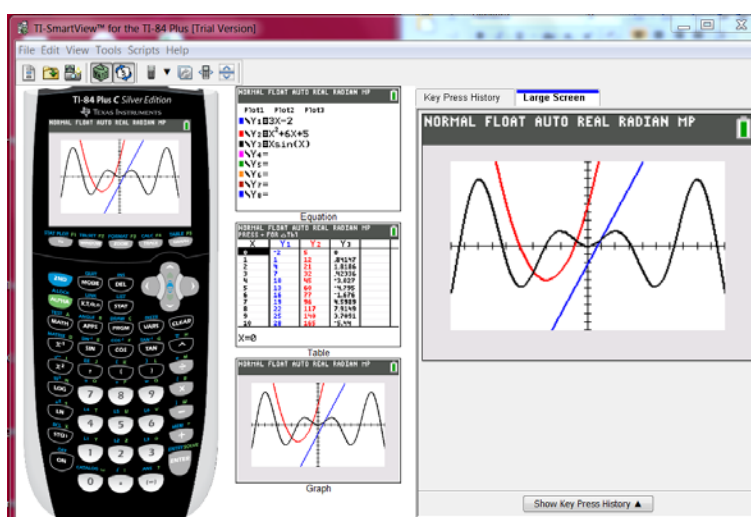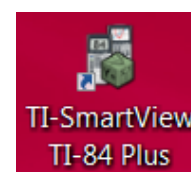
Notes:

Two new features for TI-SmartView:

- TI-SmartView contains dual emulators, one for the TI-84 Plus C and one for the TI-84 Plus.
  - The functionality of the emulators is the same as their respective graphing calculator.
  - If a teacher is changing between graphing calculator models, data is not shared between the emulators. Work done on one would need to be re-entered on the other.
- A Keypad and Large Screen view have been added. Additional updates include changes to the layout options, the emulator views, View[3] and large screen, and screen capture.

Getting Started with the TI-SmartView™ Emulator Software
TI PROFESSIONAL DEVELOPMENT

Dual Emulators

When TI-SmartView opens, it opens to its last emulator state. To change emulators:

- Click on the graphing calculator model icon on the tool bar.

-or-

- Click on **View** > **Graphing Calculator Model** > **TI-84 Plus C** or **TI-84 Plus**.

Note: When switching between emulators, a warning message appears stating that data is not shared between the emulators. The two emulators are independent of each other.
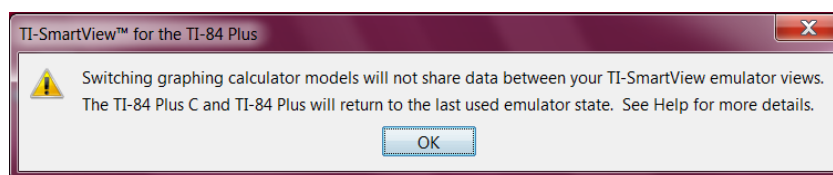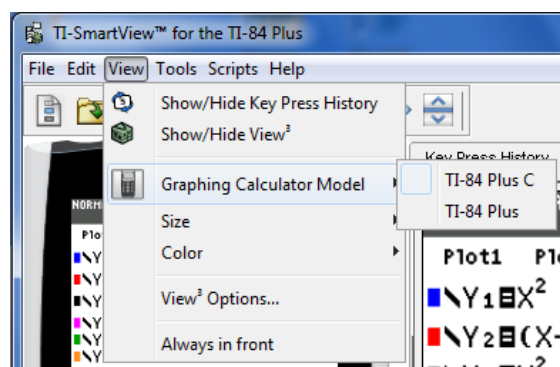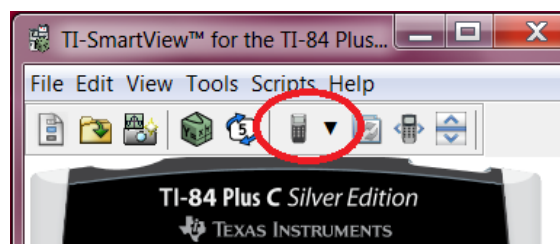
TI-SmartView Keypad View

The TI-SmartView Keypad View will display the keypad of the TI-84 Plus or TI-84 Plus C graphing calculator without the calculator screen. It can be used in conjunction with the Show/Hide Key Press History and Show/Hide View[3].

To use the TI-SmartView Keypad View:

- Click the **Keypad + Large Screen** icon on the tools bar.

- To change back to full calculator view, click the **Keypad + Large Screen** icon again.

Note: There is no menu option to access the **Keypad + Large Screen** feature. You can only access this feature by clicking the **Keypad + Large Screen** icon on the tool bar.
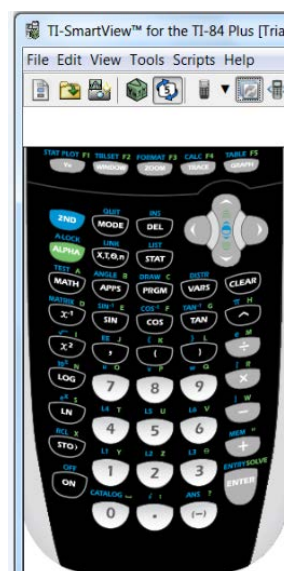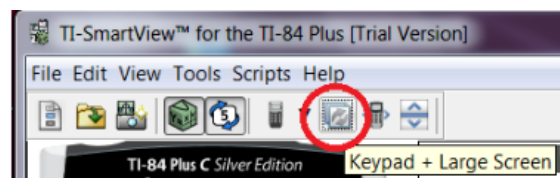
Getting Started with the TI-SmartView™ Emulator Software
TI PROFESSIONAL DEVELOPMENT

TI-SmartView Layout Options

The TI-SmartView Layout Options allows teachers to choose the location of both the emulator and the toolbar.

To change the position of the emulator from left to right:

- From the TI-SmartView™ toolbar, click on the **Emulator Position Left/Right** icon to change the layout.

- **The Emulator Position Left/Right** icon toggles the position of the emulator on the screen.

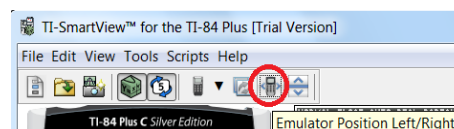To change the position of the tool bar from top to bottom:

- From the TI-SmartView™ toolbar, click on the **Tool Bar Top/Bottom** icon to change the layout.

- **The Tool Bar Top/Bottom** icon toggles the position of the toolbar on the screen.
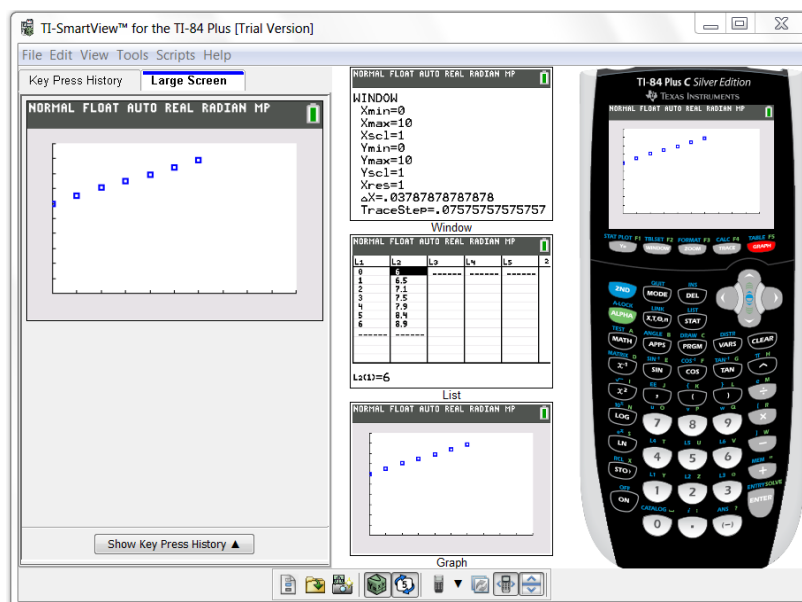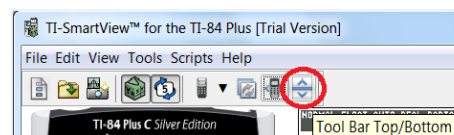
Notes:

- The **Emulator Position Left/Right** icon on the tool bar toggles the emulator position between the left and right sides.

- The **Tool Bar Top/Bottom** icon on the tool bar toggles the position of the tool bar from the top of the software to the bottom. The emulator will open in the same position as its last-used state.

- There are no menu items for these features. The only way to change the layout is by using the icons on the toolbar.

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Getting Started with the TI-SmartView™ Emulator Software

TI PROFESSIONAL DEVELOPMENT

TI-SmartView Emulator Views

The TI-SmartView Emulator allows you to display the TI-84 Plus C Silver Edition in three different views:

- Standard
- Contrast
- Outline

To change to a different emulator view, click **View** > **Color** > **Standard** or **Contrast** or **Outline**.
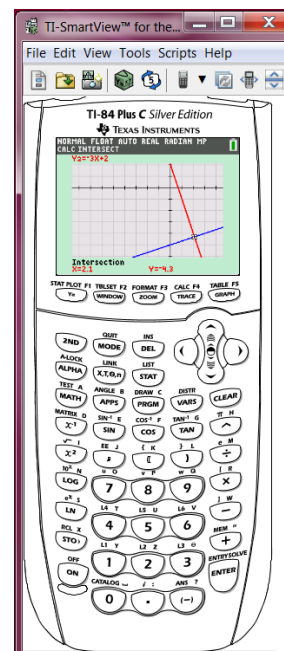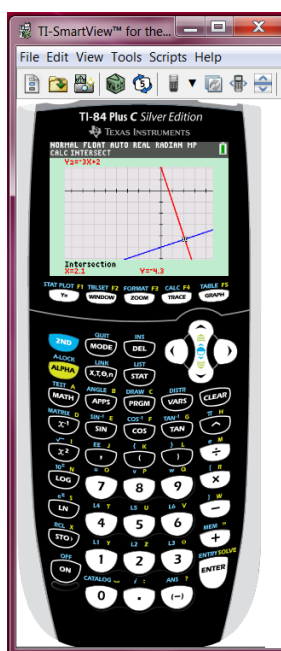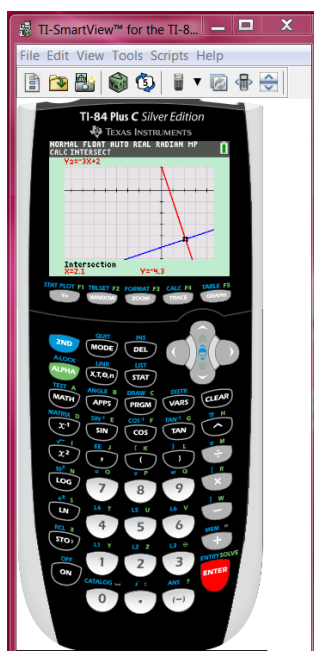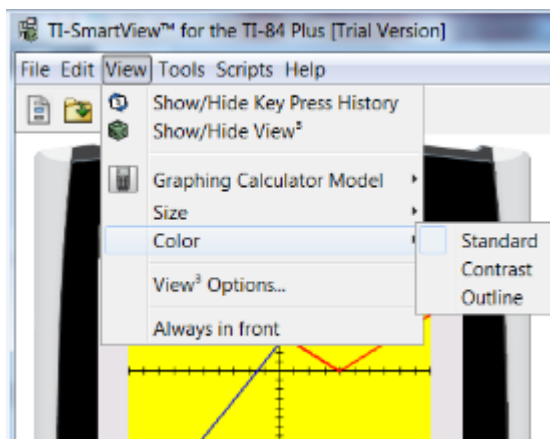
Notes:

- **Standard View** – Standard black faceplate matching the calculator keys in the appropriate colors.

- **Contrast View** – Brighter standard black faceplate with ALPHA keys in yellow and grey keys in white to help improve visibility.

- **Outline View** – White calculator with each key outlined in black. No color keys are displayed. The black and white nature of this view helps to reduce the amount of ink needed to print documents.

Getting Started with the TI-SmartView™ Emulator Software

TI PROFESSIONAL DEVELOPMENT

View[3] and Large Screen

The View[3] pane lets you display three additional TI-84 Plus C graphing calculator screens simultaneously. The teacher can choose from the Y= editor, table, graph, stat plot, list, or window. These screens update as you make changes on the emulator. The Large Screen tab lets the teacher display a larger view of the calculator screen. There is color support in View[3] and Large Screen displays in the TI-84 Plus C calculator model.

To show or hide the Key Press History/Large Screen tabs:

- Click **View** > **Show/Hide Key Press History**.

    -or-

- Click on the **Show/Hide Key Press History** icon on the tool bar.
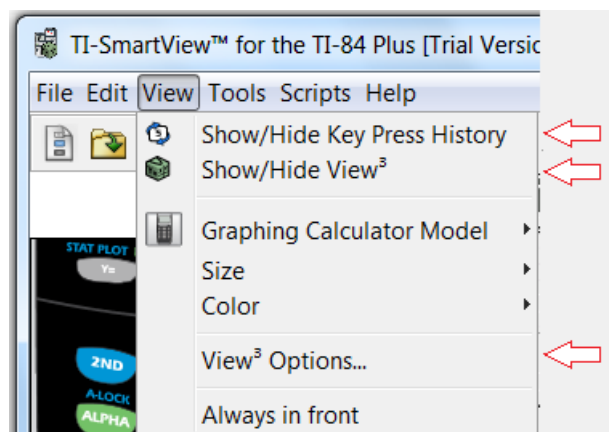
To show or hide the View[3] pane:

- Click **View** > **Show/Hide View[3]**.

    -or-

- Click on the **Show/Hide View[3]** icon on the tool bar.

5
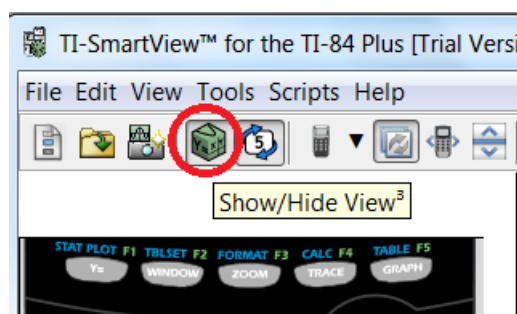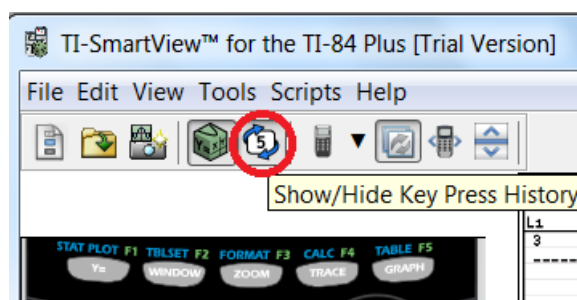
Getting Started with the TI-SmartView™ Emulator Software

TI PROFESSIONAL DEVELOPMENT

To select a calculator screen for each frame in the View^3 pane

- Click **View** > **View^3 Options**.

    o An options window will open. Use the pull down lists to make your selections. Click **OK**.
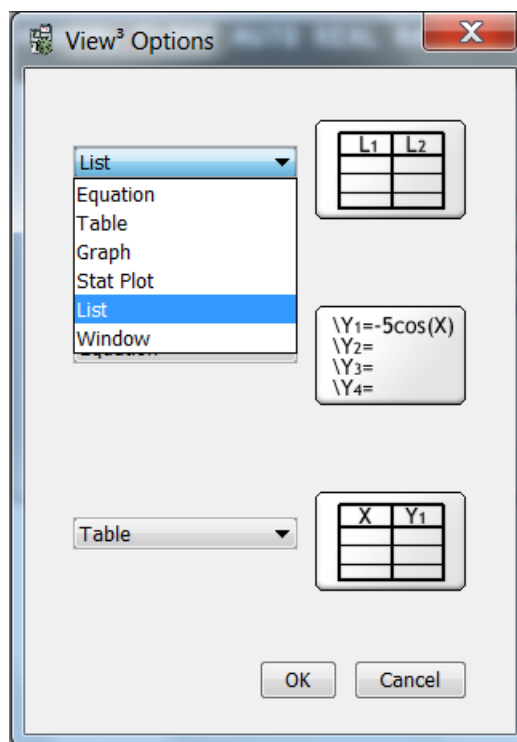
-or-

- Right Click on each frame in the View^3 pane to bring up the selection choices.
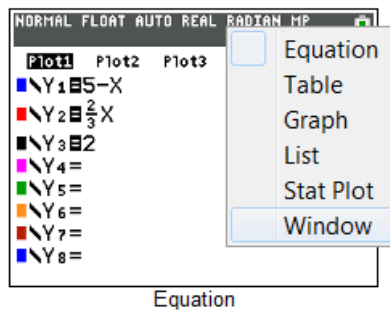
Notes:

- The View^3 pane and Large Screen tab update as you make changes on the emulator's calculator screen.

- The View^3 pane and Large Screen tab are in color to reflect the TI-84 Plus C color features.

- There is flexibility in how and when these views are displayed.

Getting Started with the TI-SmartView™ Emulator Software

TI PROFESSIONAL DEVELOPMENT

Screen Capture

TI-SmartView™ Screen Capture allows the teacher to capture the current image displayed on the TI-SmartView emulator. When you capture a screen, the Screen Capture window is displayed. In this window, you can view, manipulate, and save screen images.

To access the Screen Capture feature:

- Select **Tools > Take a Screenshot**.

-or-

- Click the **Take a Screenshot** icon on the tool bar.
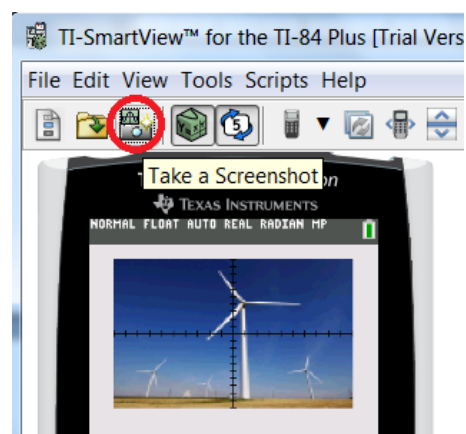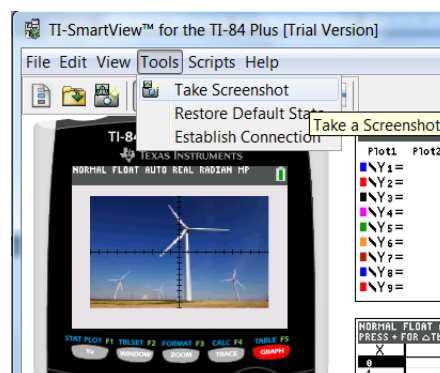
- The Screen Capture Window opens.

- There is also a **Take a Screenshot** icon on Screen Capture Window toolbar for repeat captures.
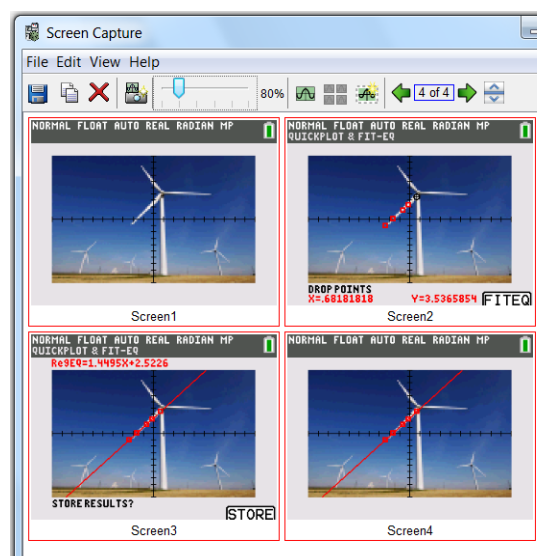
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TI PROFESSIONAL DEVELOPMENT

Notes:

- Screenshots can be saved in .jpg, .gif, .tif and .png file formats.

- Screenshots can be copied and pasted into a variety of other applications.

- Screenshots can be dragged and dropped into a variety of other applications.

- Screenshots can be resized using the slider in the screen capture window.

- Borders are automatically inserted for screenshots in the Screen Capture Window. Clicking the **Remove Border** icon on the toolbar will toggle between removing and inserting borders on the screenshot.

- The screen capture window can be used as a record of the steps you went through in a lesson.

Drag Screen

TI-SmartView™ DragScreen allows the teacher to drag a screen image from the TI-SmartView software to a 3rd party application such as Microsoft® Word and PowerPoint™.

Drag and drop any TI-SmartView™ screen image to paste it into another application. These images include the following:

- Saved or unsaved screen capture images from the screen capture window

- Emulator screen

- View^3™ pane screens

- Large Screen image

- Key Press History

To drag and drop an image into another application:

- Adjust the sizes of the windows of the two applications so that both of them fit on the computer screen.

- Click the screen image to select it.

- Drag the screen image from the TI-SmartView™ software and drop it into the other application.

To drag-and-drop the Key Press History:

- Use your mouse to select the keys you want to capture.

- Drag the selection from the TI-SmartView™ software and drop it into the other application.

Getting Started with the TI-SmartView™ Emulator Software

TI PROFESSIONAL DEVELOPMENT
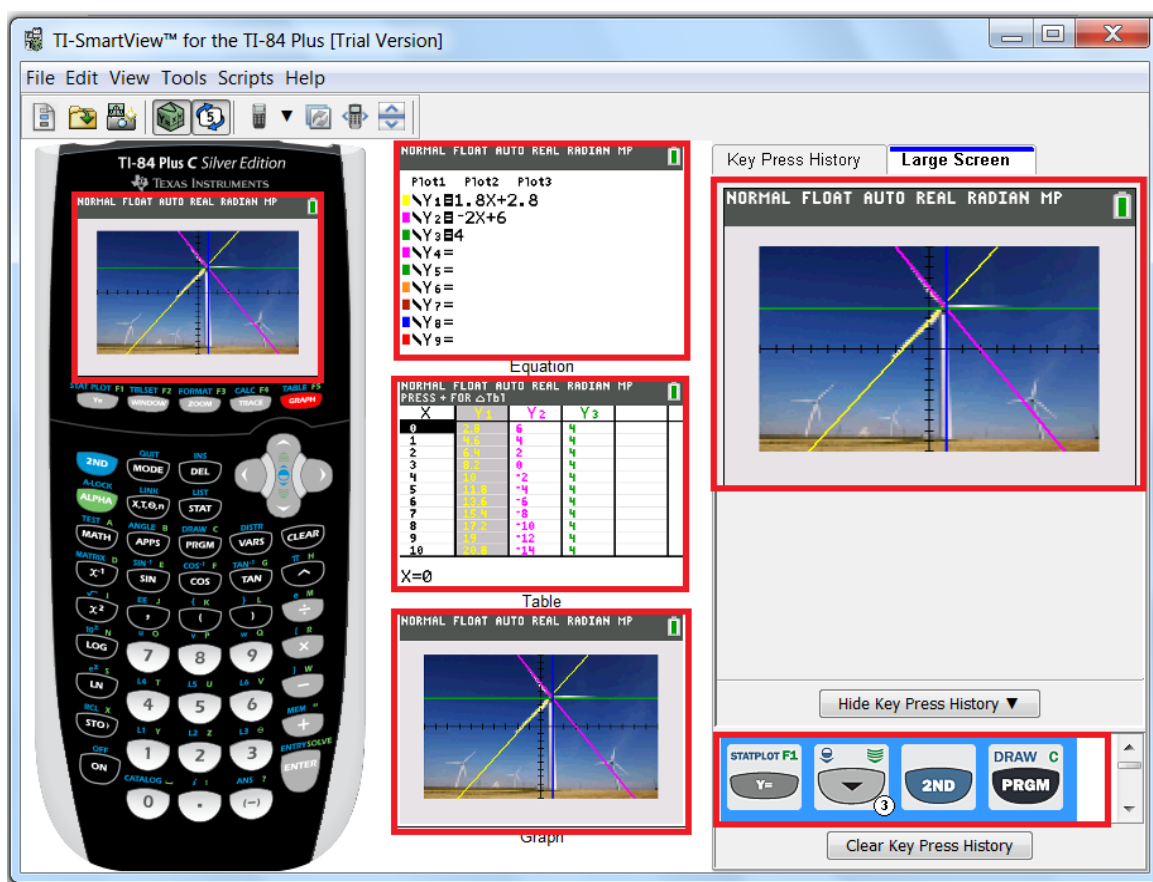
Notes:

When dragging a screen:

- From the View[3], a border is automatically created around the image by the receiving application.

- From the Calculator or Large Screen, panes will not contain a border in the receiving application.

- From Screen Capture, the border will be maintained by the receiving application.

- Images can be resized in either the Screen Capture window or by using the tools in the 3rd party application.

Getting Started with the TI-SmartView™ Emulator Software
TI PROFESSIONAL DEVELOPMENT

Loading an Image into the TI-SmartView Software

We have just seen one way to get an image onto the TI-SmartView emulator. Here is another way. In Step 8 of the Screen Capture section of Getting Started with TI Connect, you saw how to save a picture as an image. Here is a recap:

From Getting Started with TI Connect - Step 8

After an picture has been opened in TI Connect Screen Capture, save the picture as an image for use with TI SmartView or as a backup:

- Click **File** > **Save As** > **Save as type**

- Select **TI-84 Plus C Image (*.8ca)**

- Click **Save.**

- The background image is now ready to **Load** into the TI SmartView emulator.
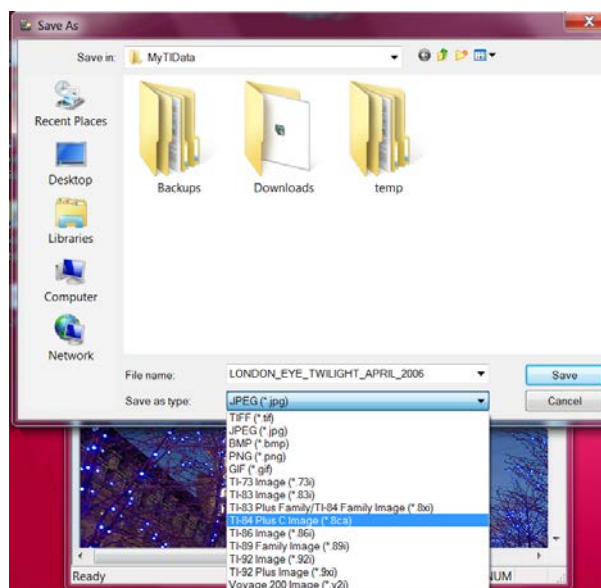
In the TI-SmartView software. Click **File** > **Load File**. In the dialog box:

- Navigate to the folder that contains the file you want to load.

- Click the file name to highlight it.

- Click **Open**.

- If the TI-SmartView™ program already contains a data item with that name, you are prompted whether to overwrite the existing file.
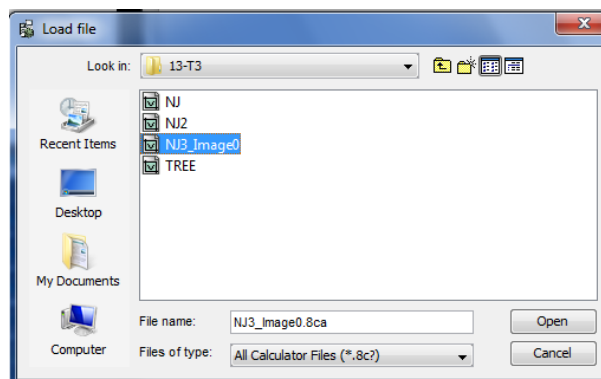
A Sending screen will be displayed. When the sending is complete, you can access the loaded file on your emulator.
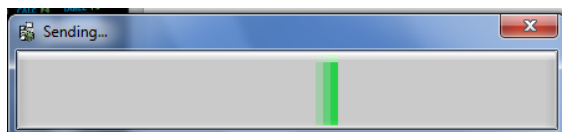
Memory Management in the TI-84 Plus Family
TI PROFESSIONAL DEVELOPMENT

Activity Overview

This activity features how memory can be managed in the TI-84 Plus family of graphing calculators. This includes working with memory in RAM, archiving memory, and grouping files, lists, and variables for later retrieval.

Note: The TI-84 Plus C Silver Edition is referenced throughout this activity, but the information applies to the entire TI-84 Plus graphing calculator family.

Introduction

The TI-84 Plus C Silver Edition is equipped with FLASH memory: special hardware that allows you to upgrade the operating system, install special software called APPS, and utilize additional memory features. This extends the use life of the device and expands its functionality.

This document explains two ways in which you can use the memory of the calculator for backing up your work.

Archiving and Grouping

Memory in the TI-84 Plus family is divided into two sections:

1. RAM (an acronym for **R**andom **A**ccess **M**emory) is the "working memory" for most of the things that you do on the calculator: programs, lists, matrices, functions, and other data are kept in RAM. Each of these "things" that you work with in RAM is called a variable. Each variable has three properties: a name, a type, and a value.

2. ARCHIVE memory is a separate, but connected, portion of memory used for APPS, GROUPS, and "safe" storage (archiving) of your RAM variables. Memory management is important because you might need to "free up" RAM to make room for other data or programs.

Notes: Archiving protects your files from intentional or inadvertent resets.

Grouping allows you to make copies of files, such as one student's Lists, so that another student can use the calculator for the same activity.

Accessing Memory Features

1. Press [2nd] [MEM] (on the [+] key) to access the MEMORY menu.


```
NORMAL FLOAT AUTO REAL RADIAN MP        ▯

MEMORY
1:About
2:Mem Management/Delete…
3:Clear Entries
4:ClrAllLists
5:Archive
6:UnArchive
7:Reset…
8:Group…
```
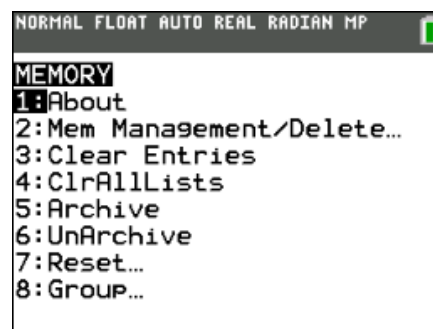
Memory Management in the TI-84 Plus Family

TI PROFESSIONAL DEVELOPMENT

2. Select 2:Mem Mgmt/Del. With this option, you can delete variables or move variables between the RAM and Archive areas of memory.

```
NORMAL FLOAT AUTO REAL RADIAN MP

RAM FREE          19687
ARC FREE          3280K
1:All…
2:Real…
3:Complex…
4:List…
5:Matrix…
6:Y-Vars…
7:Prgm…
8↓Pic & Image…
```

- When a variable is in RAM, it is "usable". The variable is available for general use as a "normal" variable.

Archiving

1. When the variable is in Archive memory, it is not available for use generally.

   - Apps, Pic, and Image variables are stored in Archive memory and can be used.

   - Why put a variable in archive? The main reason is to free up RAM for something else without deleting any variables.

```
NORMAL FLOAT AUTO REAL RADIAN MP

RAM FREE          19687
ARC FREE          3280K
▶ HITTAR            304
  KRYPTO            306
*Image1          22256
*Image2          22256
*Image3          22256
*Image4          22256
*Image5          22256
 L₁                48
```

   - You will usually put programs and lists into archive because these variables take up the most memory.

2. To archive, press [2nd] [MEM]. Then select 2:Mem Mgmt/Del. Next, select 1:All to see all of the variables in the TI-84 Plus C.

The variable list screen contains a lot of information.

- The two numbers at the top, RAM FREE and ARC FREE, are the numbers of bytes available in each portion of memory, RAM and Archive.

- On the left side of the screen is the "selection pointer" pointing to a particular variable. Move the selection pointer down or up with the arrow keys, [▲] and [▼].

- The second column (just to the left of the variable names) is the indicator that tells you whether a variable is in RAM or Archive. **A blank space indicates that it is in RAM, and an asterisk (*) indicates that it is in Archive**.

- The number on the right of the screen is the size of the variable in bytes.

Memory Management in the TI-84 Plus Family
TI PROFESSIONAL DEVELOPMENT

3. Press ENTER when the selection pointer is pointing to the variable.

- ENTER switches the location of the variable.

- "Archiving" is the act of moving a variable from RAM to Archive. "Unarchiving" is the opposite process.

- As you move between RAM and ARCHIVE, notice the numbers at the top of the screen change to indicate new memory-free values. When you move a variable from RAM to Archive, the RAM FREE value increases and the ARC FREE value decreases by the size of the variable.

- APPS and Pic & Image variables remain in archive and cannot be unarchived.

The Memory Management variable list screen is also used for deleting variables, although it is seldom necessary to delete variables on the TI-84 Plus. It is more convenient to move it into Archive memory.

4. To delete a variable, make sure the "selection pointer" is pointing to it, then press DEL.

5. Some variables, programs, and anything in Archive memory provide you with one last chance to change your mind: "Are You Sure?"

- To finally delete the variable, select 2:Yes.

- If you decide not to delete the variable, press ENTER or select 1:No.
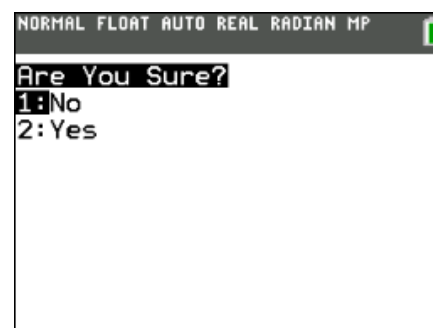
When a variable is in Archive, an asterisk appears to the left of its name in the List menu (2nd STAT) too.

- The List menu shown has two archived lists: L4 and KRYPT.

- Since L4 is in Archive memory, it is not available for regular use. If you try to make a Stat Plot using L4 while it is in Archive, you get an error message. This error message will appear whenever you try to use an archived variable.

- If a program is archived, it is not available for regular use. If you try to run the program while it is in Archive, you get an error message. This error message will appear whenever you try to use an archived program.

- If you need to use an archived variable, you must move it from Archive to RAM using the Memory Management tool.
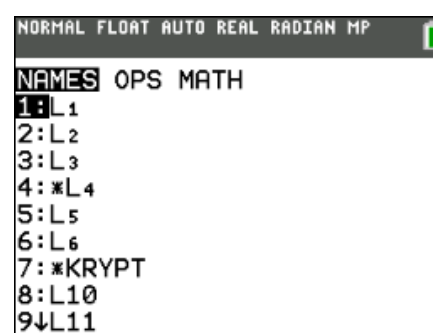
Memory Management in the TI-84 Plus Family

Grouping

The second useful memory management tool on the TI-84 Plus C is the ability to "group" variables into a Group file. This is identical to the computer linking technique of grouping variables into a single file using TI Connect™ software (*.8xg files), but a computer is not needed here.

Grouping makes a file in the calculator containing copies of the variables that you want. Grouping does not "free up" memory. The Group file resides in Archive, so it does not use any RAM. This is a very handy tool for backing up your TI-84 Plus C variables, especially programs and lists.

1. Select [2nd] [MEM] 8:Group.

2. Select "Create New," enter any name up to eight characters long for the GROUP file, and press [ENTER].

   • The next screen works like the LINK-selection screen.

3. Selecting 2:All gives a list of all variables in the TI-84 Plus C (that can be put into a Group file), unselected.
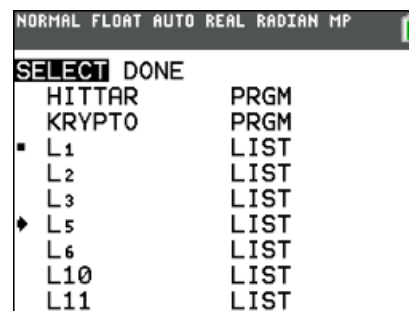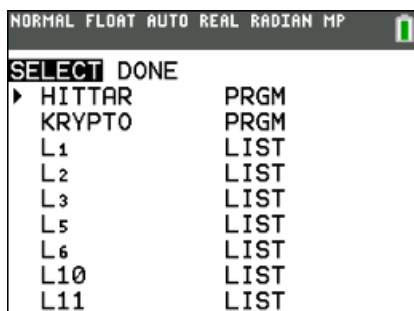
Memory Management in the TI-84 Plus Family
TI PROFESSIONAL DEVELOPMENT

Just as in linking, use ▲ and ▼ to point to variables and press ENTER to select (or deselect) them for copying into the Group file.

NORMAL FLOAT AUTO REAL RADIAN MP	
SELECT DONE	
▶ HITTAR	PRGM
KRYPTO	PRGM
L₁	LIST
L₂	LIST
L₃	LIST
L₅	LIST
L₆	LIST
L10	LIST
L11	LIST

NORMAL FLOAT AUTO REAL RADIAN MP	
SELECT DONE	
HITTAR	PRGM
KRYPTO	PRGM
▪ L₁	LIST
L₂	LIST
L₃	LIST
◆ L₅	LIST
L₆	LIST
L10	LIST
L11	LIST

- The two lists, L1 and L5, have been "selected" for this Group file (note the square mark).

- You might choose mixed data types as well. For instance, choose some lists, some programs, and some matrices.

- Pic & Image variables cannot be grouped.

- When you have selected all your variables, press ▶ to go to the "DONE" menu, and press ENTER to finish making the Group file.

- The Home Screen displays the message: "Copying Variables to Group: yourname", and then displays "Done" on the right side of the screen.

- The key word here is "copying"— your variables are undisturbed in RAM. The Group file contains copies of the selected variables, just as linking transmits copies of your variables to another TI-84 Plus C.

Note: You cannot have a group with just one object. Each group must contain at least two objects.

The Group files reside in Archive, so a "normal" Reset, "2nd [MEM], 7:Reset, 1:AllRam, 2:Reset", will not disturb any Group files. These Group files can be linked (sent) to other TI-84 Plus units, and can be stored on a computer using TI Connect™ software.

Memory Management in the TI-84 Plus Family

TI PROFESSIONAL DEVELOPMENT

Ungrouping

"Ungrouping" is the act of putting copies of the variables in a
Group file back into RAM. The Group file remains intact while
the variables are copied back into RAM.

1. Select [2nd] [MEM] 8:Group.

2. Press ▶ to UNGROUP, and select your Group file from the
   listing using ▼ and ▲ (notice the asterisks – all Group files
   reside in Archive).

   • Press [ENTER]. If any of the variables in the Group file
     are already in RAM, then you get a "DuplicateName"
     menu of choices.

   • Just as in Linking, choose 2:Overwrite to overwrite the
     variable with the one from the Group file.
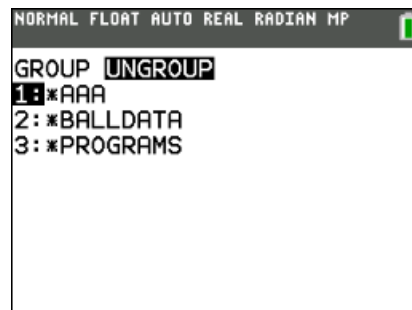
Notes:

   • You cannot put an Archived variable into a Group file.
     Unarchive it first, then make the Group file.

   • Once a Group file is established, it cannot be modified,
     only UNGROUPED or DELETED. Thus you cannot add
     variables to a group file afterward.

   • When linking to a computer, you cannot make a
     group file on the computer containing a Group file
     from the TI-84 Plus.

Tip: Make a Group file of all your programs to prevent loss
           from inadvertent resets. When you add programs to the
           TI-84 Plus C that you want to keep, delete the
           programs Group and then make it again.

   • It is convenient to Group everything on your handheld
     before resetting RAM. You can quickly restore
     everything after resetting the RAM by ungrouping the
     file. You can then delete that group.
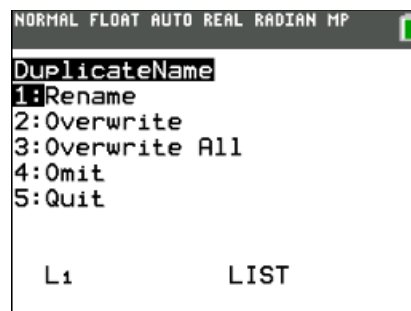
Memory Management in the TI-84 Plus Family
TI PROFESSIONAL DEVELOPMENT

Deleting A Group

1. Selecting [2nd] [MEM], 2:Mem Mgmt/Del, and C:Groups gives the list of Group files.

2. Press [▼] next to one of them to delete it, and press the appropriate choice at the "Are You Sure?" menu.

Reminder: Use [2nd] [MEM], 8:Group for Grouping and Ungrouping.

Use [2nd] [MEM], 2:Mem Mgmt/Del, and C:Groups for viewing the size of and deleting Group files.

Tip: When the archive gets full, consider putting large Group files on a computer, and then deleting them from the TI-84 Plus.

Summary of Memory Management

- Two sections of memory: RAM and Archive.

- Archiving/Unarchiving moves variables.

- Grouping/Ungrouping copies variables.

- Archived variables are unavailable for use, except for Pic & Image.

- Grouped variables are still available for use.

- You cannot put an archived variable into a group file.

- Archived variables and group files can be transferred to other compatible calculators or a computer.

- Ungrouping leaves the group file intact.

- Rather than deleting to free up RAM, consider moving to Archive first.

- Normal Reset—[2nd] [MEM], 7:Reset, 1:AllRam, 2:Reset—leaves archived variables and group files intact.

Memory Management in the TI-84 Plus Family
TI PROFESSIONAL DEVELOPMENT

Memory Management Keystroke Summary

Archive/Unarchive:

- [2nd] [MEM], 2:Mem Mgmt/Del.

- 1:All (or choose your variable sub-type).

- [▼][▲] to point to a variable.

- [ENTER] to move a variable (note the * toggle).

Group:

- [2nd] [MEM], 8:Group, 1:CreateNew.

- Enter a group name.

- [▼][▲] [ENTER] to select multiple variables (note the squares).

- [▶] to DONE.

- [ENTER] to execute the grouping.

Ungroup

- [2nd] [MEM], 8:Group, [▶] to UNGROUP.

- [▼][▲] to point to the desired group file.

- [ENTER] to execute the ungrouping.

Deleting Variables

- [2nd] [MEM], 2:Mem Mgmt/Del.

- 1:All (or choose your variable sub-type).

- [▼][▲] to point to a variable.

- [DEL], possibly "Are You Sure?" will appear.

One Final Note …

On the [2nd] [MEM] menu, there are two menu items, 5:Archive and 6:UnArchive. These are used in programs so that the program can manipulate specific variables' locations.

For example, a program might contain the statement 'Archive L1, L2, L3, L4, L5, L6' which will move these six lists from RAM to Archive. You do not need to use these two commands unless you are programming.

TI graphing calculators are permitted on important college entrance exams.

education.ti.com/go/testprep

TEXAS INSTRUMENTS

	TI-Nspire™ CX	TI-Nspire™ CX CAS	TI-Nspire™	TI-Nspire™ CAS	TI-84 Plus C Silver Edition	TI-84 Plus Silver Edition	TI-84 Plus	TI-83 Plus	TI-89 Titanium
	SAT*	SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT
	AP*	AP	AP	AP	AP	AP	AP	AP	AP
	ACT®*		ACT		ACT	ACT	ACT	ACT	
	IB®* Exam		IB Exam		IB Exam	IB Exam	IB Exam	IB Exam	
	Praxis™*		Praxis		Praxis	Praxis	Praxis	Praxis	

SAT*

MAY 2013	JUN 2013	OCT 2013	NOV 2013
4	1	5**	2**

DEC 2013	JAN 2014	MAR 2014	MAY 2014
7**	25**	8**	3**

For deadlines and registration, visit **collegeboard.com/testing**.

** These anticipated test dates are provided for planning purposes and are subject to final confirmation. The finalized, confirmed test dates, when announced, may differ from the dates shown.

ACT®*

JUN 2013	SEP 2013	OCT 2013	DEC 2013
8	21	26	14

FEB 2014	APR 2014	JUN 2014	SEP 2014
8***	12	14	13

For deadlines and registration, visit **act.org**.

***No test centers are scheduled in New York for the February test dates.

International Baccalaureate®* (IB) Exam/Praxis™*

For information on the IB test and test dates, visit ibo.org.

For information on the Praxis test and test dates, please visit ets.org/praxis.

AP*

MAY 2013	MAY 2013	MAY 2013	MAY 2013
6 *Chemistry*	8 *Calculus AB|BC*	10 *Statistics*	13 *Physics B|C*

MAY 2014	MAY 2014	MAY 2014	MAY 2014
5 *Chemistry*	7 *Calculus AB|BC*	9 *Statistics*	12 *Physics B|C*

For deadlines and registration, visit **apcentral.collegeboard.com**.

Testing agencies are responsible for respective testing dates; Texas Instruments is not responsible for any testing date changes.

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