

Lesson 16

Traveling Through the Solar System

Approximate time needed for lesson:
Two 50-minute class periods or one 90-minute class period

NCTM Standards

- ▶ **Measurement:** Apply appropriate techniques, tools, and formulas to determine measurements
- ▶ **Data Analysis and Probability:** Develop and evaluate inferences and predictions that are based on data
- ▶ **Algebra:** Analyze change in various contexts
- ▶ **Connections:** Recognize and apply mathematics in contexts outside of mathematics
- ▶ **Problem Solving:** Build new mathematical knowledge through problem solving

Goals for Students

- ▶ To use calculator and non-calculator methods for analyzing data
- ▶ To apply data collection and analysis in a study of mass and weight
- ▶ To enhance and apply the concept of line of best fit

Description or Summary of Lesson

Middle grade students are the intended audience; however, portions of the lesson may be appropriate only for those enrolled in Pre-algebra or Algebra I. Using appropriate technology and working in small groups, students collect data by measuring the mass of various objects. Using calculator and non-calculator methods, students will represent and analyze data to determine relationships, make predictions using a line of best fit, and formulate written conclusions. The line of best fit portions of the lesson may be used to introduce the concept of line of best fit and its applications in making predictions.

Background Information

Students should have mastered graphing in a plane, be familiar with using a balance scale, have mastered using formulas, and be familiar with basic graphing calculator keys. The portions on line of best fit assume some prior knowledge of the concepts of slope and y-intercept.

Materials and Equipment

- | | |
|---|------------------------------------|
| ▶ Overhead projector and calculator and view screen | ▶ Balance scale |
| ▶ Raisins | ▶ A few uncooked spaghetti noodles |
| ▶ Centicubes or other gram weights | ▶ Grid paper |
| ▶ Each pair of students will need | ▶ Construction paper |
| • access to a graphing calculator | ▶ Glue |
| • handouts | |

Lesson 16: Outline

- I. Teacher reviews graphing points, slope as change in the dependent variable divided by the change in the independent variable, and y-intercept as the y-coordinate of the point where the line crosses the y-axis.
- II. Students measure the mass of different amounts of raisins.
- III. Students use Activity 1, Handout 1, to record and graph the results by hand and with the calculator.
- IV. Students analyze the data and complete Activity 1, Handout 1, using a graphing calculator and the Calculator Instructions in Activity 1, Handout 2.
- V. Teacher and students agree on the formula:
planet weight = Earth weight x the planet's gravitational factor.
- VI. The teacher will choose a celebrity and guide all students through an example including using the steps on Activity 2, Handout 2.
- VII. Working in small groups, students perform the same calculations for a second celebrity and record on Activity 2, Handout 1.
- VIII. To complete Activity 2, Handout 1, students find their own weight on all planets and graph the resulting data.

Teacher's Notes

Activity 1. Raisins: Collecting Data to Explore Mass

Handout 1: Data Sheet

If using raisins presents a problem, paper clips or other items could be substituted.

Sample Answers:

1. Find the measures of the following using a balance scale. Place the given number of raisins on one side of the balance. Place centicubes (or other gram weights) on the other side of the balance until both sides are the same. The raisins weigh the number of centicubes. Remember 1 centicube has a mass of 1 gram. Write the results in the table.

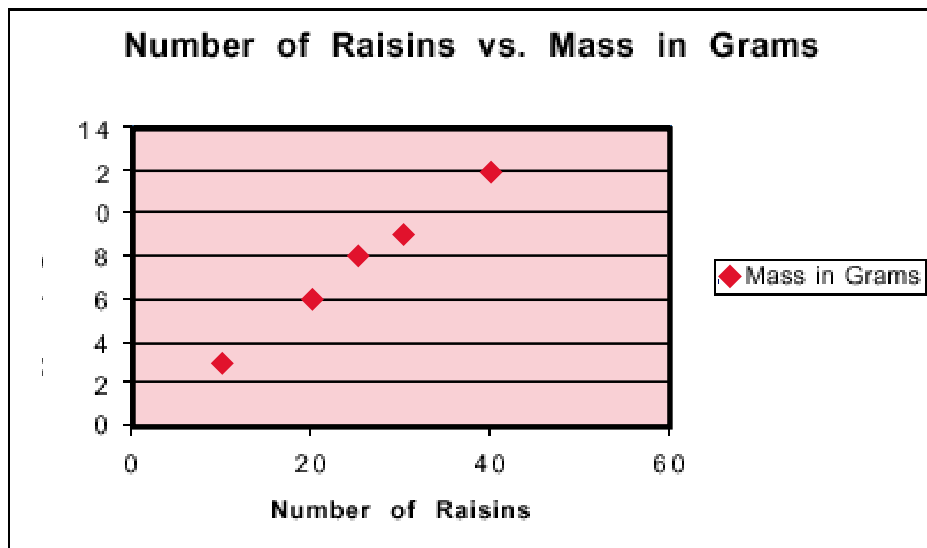
Number of Raisins	Mass in grams
10	3
20	6
25	8
30	9
40	12

Sample Answers for Activity 1, Handout 1 (continued):

2. What is the independent variable? **The number of raisins**
3. What is the dependent variable? **The mass in number of grams**
4. Are these variables related? **Yes**

If so, how are they related? **As the number of raisins increases, the mass in grams increases. For every 10 raisins, the mass goes up about 3 grams.**

5. On grid paper, graph the number of raisins vs. the corresponding mass. Choose an appropriate scale.



6. What relationship is shown by the data points? **A linear or line-like relationship. As the number of raisins (x-values) increases, so do the grams (y-values).**
7. Is there a positive relationship (that is, does the dependent variable increase/decrease when the independent variable increases/decreases), a negative relationship (that is, does the dependent variable increase/decrease when the independent variable decreases/increases), or no consistent relationship? **A positive relationship.**
8. Even though the data points may not be in exactly one straight line, there may be a line that is close to most, if not all points. This is called **the line of best fit**. Use the spaghetti to find this line of best fit. Does the spaghetti intersect with every point, come close to most points, or not intersect any point? **Answers will vary. The spaghetti or line may miss a few of the data points (only misses one in the sample graph in #5) but should be close to most of the points.**
9. What number value is the slope? To find the slope, choose any two of the data points that fall on or very close to the spaghetti and use the slope formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

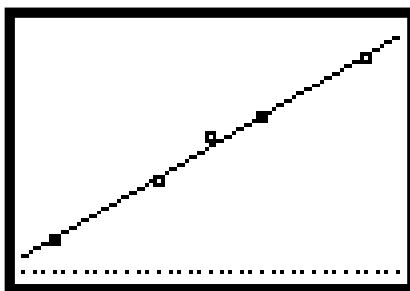
Example: If the two data points chosen are (10, 3) and (30, 9) and are substituted in the formula for slope, then Slope = $\frac{9-3}{30-10}$ or 6/20 or 3/10

Sample Answers for Activity 1, Handout 1 (continued):

10. What does the slope represent in this problem? **The rate of change of mass in grams to change in number of raisins, or the ratio of grams to raisins. Weight of one raisin.**
11. According to the data, what should the y-intercept be? **0 since 0 raisins would weigh 0 grams.**
12. What is the y-intercept according to the line of best fit (spaghetti)? **0 or close to it.**
13. Is the value of #11 different from the value of #12? Why/Why not? **Because there is always error in measurement, there may be some difference in the values, but they will be close.**
14. Write an equation for the line made by the spaghetti in the form $y = mx + b$ where m is the slope and b is the y-intercept. **$Y = .3x + 0$ or just $Y = .3x$ or $Y = 3/10 x$**
15. Predict the missing values in the table by using the linear equation you found in #14.

Number of Raisins	Mass in grams
10	3
4	1.2
53.333...	16
316.666...	95

16. Make a real-life graph. On a piece of heavier paper (construction paper, poster board), create an appropriate title for this graph. Draw axes for the first quadrant. Draw the hash marks along the axes and choose an appropriate scale. Glue the raisin pieces at the data points from #1. Glue on spaghetti as the line of best fit. Label the line of best fit with the equation from #14.
17. Use the graphing calculator and the Calculator Instructions in Handout 2 to find the value of the slope (a) and y-intercept (b). (Round to the hundredths place)
- Slope = .3
- Y-intercept = .1
- The equation for a line is $y = mx + b$ (m = slope and b = y-intercept)
18. What is the equation of this line? $y = .x + .1$
- (*Hint:* use substitution)
19. Sketch the graph of the line from your calculator screen.



Sample Answers for Activity 1, Handout 1 (continued):

20. How does the calculator slope and y-intercept compare with the slope and y-intercept from the spaghetti and pencil-and-paper calculations?

The two graphs, as well as the slope and y-intercept, should be similar.

21. Name three new concepts that you learned from the experiment and/or three things that you now understand better because of the experiment.

Answers will vary. Examples: Learned that slope is a ratio or the rate of change of one variable in terms of the other variable; that slope is positive if the dependent variable increases as the independent variable increases; that the y-intercept is the y-coordinate when the x-coordinate is 0 or that the y-intercept is the y of the point where the line crosses the y-axis; that a line of best fit will hit or come close to most of the points; that the line of best fit can be used to predict other data points; that the equation of a line depends on the slope and the y-intercept.

Suggestions for Assessment

ASSESSMENT POINTS

Students write journal entries as described below:

- A. Summarize the experiment.
- B. What relationship did the centicubes have with the mass?
- C. What conclusions can be made about the number of raisins and their mass?
- D. What did the line of best fit (spaghetti) tell about this relationship?
- E. How would someone find the mass of 100 raisins?
- F. How would someone find out how many raisins weigh 200 grams?

Adaptations / Extensions

- ◆ Graph the following data using either paper and pencil or the graphing calculator.

Number of Paper Clips	Weight
20	22 g
30	30 g
40	46 g
50	54 g
60	67 g

- ◆ Sketch your graph on grid paper.
- ◆ Is there a linear relationship between the number of paper clips and the weight?
- ◆ Predict the weight of 35 paper clips.
- ◆ Predict the weight of 74 paper clips.
- ◆ More advanced classes could compute the line of best fit using the graphing calculator.
- ◆ The lesson referenced below uses a CBL and a force sensor to measure and form the lists for such an experiment. The lesson is very similar to the raisin activity and is lots of fun.

Activity 2, “Making Cents of Math” in *Real World Math with the CBL System* by Chris Brueninger, Bill Bower, Linda Antinone, Elisa Bruening, copyright 1994 by Texas Instruments.

Teacher's Notes

Activity 1. Raisins: Collecting Data to Explore Mass

Handout 2: Calculator Instructions

Give students copies of the appropriate version of Handout 2. Students will use the Calculator Instructions to find the answers to #17 - 20 in Handout 1.

Teacher's Notes

Activity 2. Weight Through the Solar System

Handout 1: Data Sheet

The math teacher may want to collaborate with the science teacher (if he/she does not teach science) for this activity.

Hopefully, your students will identify with, or at least readily recognize, the people you send through the solar system in the last activity. You may wish to choose important people in your school or community. We have included mostly athletes since their weights are readily available on the Internet (just search for a name you wish to include). Following is a sample list of people whose weights were found on the Internet.

Unofficial Celebrity Earth Weight List

Lisa Leslie	165 pounds
Rebecca Lobo	185 pounds
Brett Favre	225 pounds
John Stockton	175 pounds
Jackie Joyner-Kersey	154 pounds
Oprah Winfrey	150 pounds
Anfernee Penny Hardaway	210 Pounds

The teacher may want to use Oprah's weight as an example and work through the Calculator Instructions as a teacher-led activity.

1. Choose a celebrity from the list above.

Answers will vary. For example: Oprah Winfrey

2. On which planet would you expect the celebrity you chose to weigh the most?

Jupiter, no matter which celebrity is chosen.

3. On which planet would you expect the celebrity you choose to weigh the least?

Pluto, no matter which celebrity is chosen.

Sample Answers for Activity 2, Handout 1 (continued):

- Calculate (calculator is optional) the values for the following table.

The following formula will be useful:

$$\text{Planet Weight} = \text{Earth Weight} * \text{Planet's Gravitational Factor}$$

(Gravitational factors are in comparison to the gravity on Earth; i.e., Earth = 1)

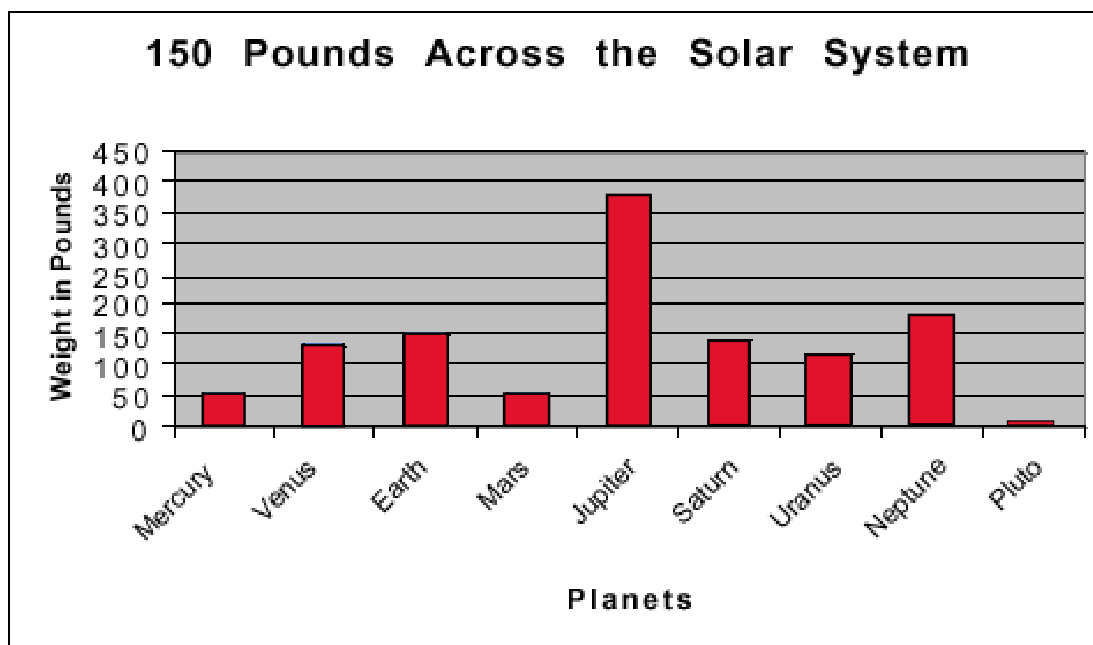
Answers will vary. For example, the numbers in the chart below are based on a weight on Earth for Oprah of 150 pounds and are rounded to one decimal place.

Planets	Gravitational Factor*	Earth Weight * Gravitational Factor	Weight
Mercury	0.38	150*.38	57 lbs.
Venus	0.91	150*.91	136.5 lbs.
Earth	1	150*1.0	150 lbs.
Mars	0.38	150*.38	57 lbs.
Jupiter	2.54	150*2.54	381 lbs.
Saturn	.93	150*.93	139.5 lbs.
Uranus	0.8	150*.8	120 lbs.
Neptune	1.2	150*1.2	180 lbs.
Pluto	0.04	150*.04	6 lbs.

**Different sources may give different values for gravitational factors: the ones in the table are approximate.*

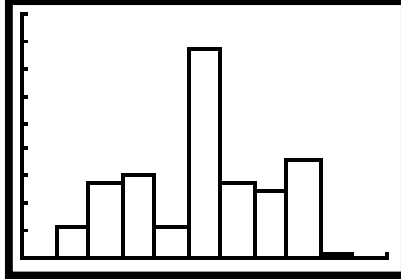
- Create a bar graph using the results of the data showing the weight of the person on each planet.

Give the bar graph a title. Label the x-axis as the planets and the y-axis as the weight of the person. Choose an appropriate scale.



Sample Answers for Activity 2, Handout 1 (continued):

6. Use your graphing calculator and the Calculator Instructions in Handout 2 to make a bar graph on the calculator using the same data.



7. Which planet produced the highest weight? **Jupiter**
8. Which planet produced the lowest weight? **Pluto**
9. What was the range of the weights? **Answers will vary.**
10. What is the relationship between mass and weight? **Weight is mass times the gravitational factor for each planet. Since Earth's factor is 1.0, the weight and mass are the same on Earth. Weight for the same mass varies as the gravitational factor varies.**
11. What surprised you the most about the differences in the weights? **Answers will vary. For example: the range was greater than I expected.**
12. Name the planets that have similar gravitational pull. List the reason(s).
Mars and Mercury because they are somewhat the same size, although size is not the only factor. The Earth and Venus, which have similar gravitational pull, are similar in size, density, and somewhat the same distance from the sun.
13. Name three differences between the handmade bar graph and the calculator bar graph.
Answers will vary. Spaces between the bars on the handmade. Titles and axis labels on the handmade. The calculator is interactive by using the **TRACE key.**
14. Name three similarities in the process of making a handmade bar graph and the calculator bar graph. **Each involves a chart or lists of data. An appropriate window or appropriate scales must be chosen for each axis.**
15. Why would you want to know what you weigh on different planets? **It would be important if you were going to travel to another planet.**
16. Use your graphing calculator to find your own weight across the solar system and to make a bar graph showing the data. Record your data in the following chart and sketch the bar graph in the space below the chart. **Answers will vary per student.**

DISCUSSION POINTS

- What seems to be related to a person's weight on a planet?

The size of the planet seems to be related. The distance from the sun seems unrelated.

- If you know that Joe weighs 200 lbs. on Saturn, what does he weigh on Mercury?

$$\frac{200}{.93} = \frac{x}{.38}$$

Thus, Joe's weight on Mercury = 81.7 or 82 lbs.

- What is the relationship between mass and weight?

Answers will vary. For example: mass is always the same, whereas, weight depends on gravitational pull. You (your mass) would balance with the same number of, say, paper clips no matter where in space you go; but if you are weighed by a device that depends upon the pull of gravity, your weight will be different on different planets, etc.

- How does gravitational pull affect weight?

The greater the gravitational pull, the greater the weight.

- When are the mass and weight the same (if they ever are)?

As long as we remain on Earth, our weight and our mass are, for all practical purposes, the same. Of course our weight would be slightly different at different elevations.

- When you step on the scale, what are you measuring? **Weight.**

- If you could choose to live on any planet, which planet would you choose, now that you know your weight will change? Why?

Answers will vary. Those who want to weigh more will likely answer one of the planets larger than Earth. Those who want to weigh less will answer one of the planets smaller than Earth. Of course a person would look the same; it's just that the bathroom scales would read a different number.

Suggestion for Assessment

ASSESSMENT POINT

Given that the moon's gravitational pull is $\frac{1}{6}$ that of the earth, have students find their chosen celebrity's weight on the moon.

—Is this comparable to any planet?

—Who would use this information and why would they use it?

Adaptations / Extensions

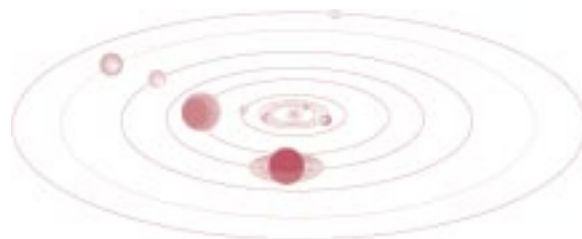
On grid paper, make a scatterplot using the same data where the independent variable is the planets and the dependent variable is the weight. Give the scatterplot a title and label the axes. Discuss if the scatterplot or the bar graph gives a better picture of the data.

Teacher's Notes

Activity 2. Weight Through the Solar System

Handout 2: Calculator Instructions

- ◆ Give students the appropriate version of Handout 2 for the graphing calculator they are using.
- ◆ In the instructions, students will make a bar graph with the categories on the x-axis representing the nine planets and with the weights calculated for the various planets as the frequencies on the y-axis.



Lesson 16: Traveling Through the Solar System

Activity 1. Raisins: Collecting Data to Explore Mass

Handout 1: Data Sheet

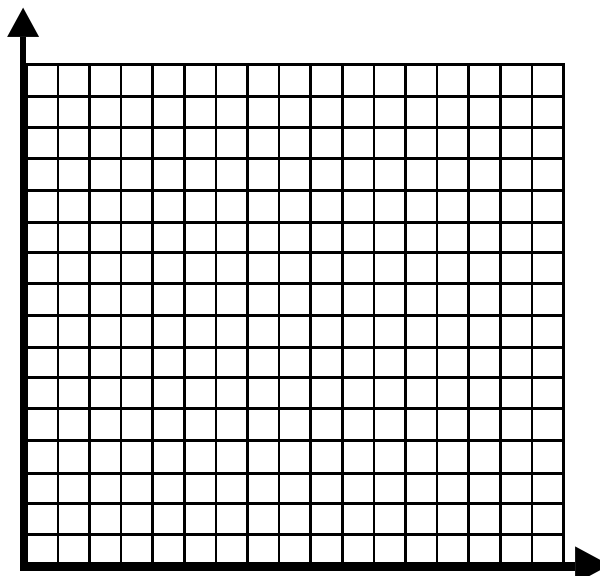
- Find the measures of the following using a balance scale. Place the given number of raisins on one side of the balance. Place centicubes (or other gram weights) on the other side of the balance until both sides are the same. The raisins weigh the number of centicubes. Remember, 1 centicube has a mass of 1 gram. Write the results in the table.

Number of Raisins	Mass in grams
10	
20	
25	
30	
40	

 Handout 1: Data Sheet
 ACTIVITY 1

- What is the independent variable? _____
- What is the dependent variable? _____
- Are these variables related? How? _____

- On the grid paper below, graph the number of raisins vs. the corresponding mass. Choose an appropriate scale.



Activity 1, Handout 1 (continued):

6. What relationship do these data points show? _____

7. Is there a positive relationship (that is, does the dependent variable increase/decrease when the independent variable increases/decreases), a negative relationship (that is, does the dependent variable increase/decrease when the independent variable decreases/increases), or no consistent relationship? _____
8. Even though the data points may not be in exactly one straight line, there may be a line that is close to most, if not all points. This is called the line of best fit. Use the spaghetti to find this line of best fit. Does the spaghetti intersect with every point, come close to most points, or not intersect any point? _____

9. What number value is the slope? To find the slope, choose any two of the data points that fall on or very close to the spaghetti and use the slope formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

10. What does the slope represent in this problem? _____

11. According to the data, what should the y-intercept be? _____
12. What is the y-intercept according to the line of best fit (spaghetti)? _____
13. Is the value of #11 different from the value of #12? _____ Why/Why not? _____

14. Write an equation for the line made by the spaghetti in the form $y = mx + b$ where m is the slope and b is the y-intercept.

Activity 1, Handout 1 (continued):

15. Predict the missing values in the table by using the linear equation you found in #14.

Number of Raisins	Mass in grams
10	
4	
	16
	95

16. Make a real-life graph. On a piece of heavier paper (construction paper, poster board), create an appropriate title for this graph. Draw axes for the first quadrant. Draw the hash marks along the axes and choose an appropriate scale. Glue the raisin pieces at the data points from #1. Glue on spaghetti as the line of best fit. Label the line of best fit with the equation from #14.

17. Use the graphing calculator and the Calculator Instructions in Handout 2 to find the value of the slope (a) and y-intercept (b). (Round to the hundredths place.)

Slope = _____

Y-intercept = _____

The equation for a line is $y = mx + b$ ($m = \text{slope}$ and $b = \text{y-intercept}$)

18. What is the equation of this line? _____

(*Hint:* Use substitution.)

19. Sketch the graph of the line from your calculator screen.

20. How does the calculator slope and y-intercept compare with the slope and y-intercept from the spaghetti and pencil-and-paper calculations?

21. Name three new concepts that you learned from the experiment and/or three things that you now understand better because of the experiment.

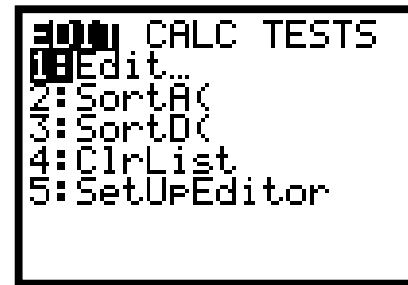
Activity 1. Raisins: Collecting Data to Explore Mass

Handout 2: TI-83 Plus Calculator Instructions

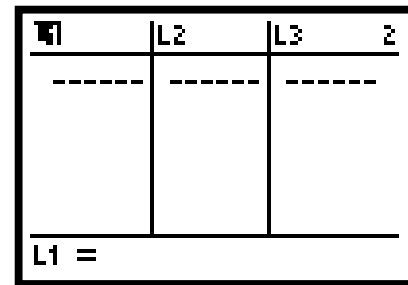
1. Clear any stat plots or equations that are in the calculator.
 - ◆ Press **2nd** **Y=** (STATPLOT)
 - ◆ Press **4** (Plotsoff). This returns the cursor to the **Homescreen**.
 - ◆ Press **ENTER**. This will turn all of the stat plots off.
 - ◆ Press **Y=**. If any of the = signs are highlighted, move the cursor on top of the = and press **ENTER**. Doing this will make the graph of this equation invisible. If you do not want that equation anymore, keep the cursor on top of the equation and press **CLEAR**. Do one of these two things for any equation that is in any **Y**.

2. Enter the data into your calculator for the number of raisins that were weighed.

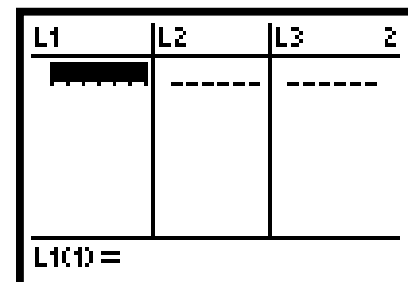
- ◆ Press **STAT** **1** (EDIT).



- ◆ If the lists have data already entered in the columns, use the up arrow key to highlight **L₁**.



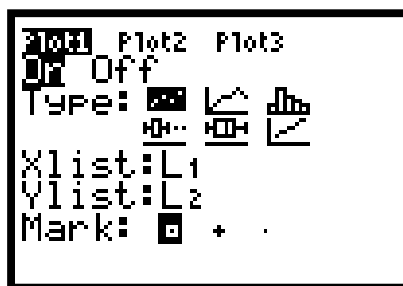
- ◆ Press **CLEAR** **ENTER**. This should clear the data from that column. You may clear each of the columns this way.
- ◆ When the lists have been cleared, the data can be typed into the lists.
- ◆ If necessary, use arrow keys to move the cursor to the first place in **L₁**.



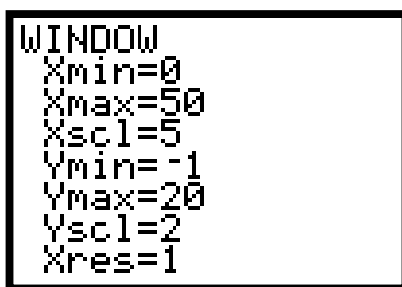
Handout 2: TI-83 Plus
ACTIVITY 1

TI-83 Plus Keystrokes (continued):

- ◆ Enter the number of raisins in **L1** and the mass in grams in **L2**.
 - ◆ After each entry, press **ENTER**.
3. Instruct the calculator to make the scatterplot (see the calculator screen that follows).
- ◆ Press **2nd** **Y=** (STATPLOT) and then **ENTER** with the cursor on **Plot 1**. Press **ENTER** while the cursor is flashing on top of the **ON**.
 - ◆ Press **▼** once. Move the cursor on top of the scatterplot, which is the first graph choice. Press **ENTER** to select this type of graph.
 - ◆ Arrow down once to **Xlist**. Press **2nd** **1** (L_1), **▼** **2nd** **2** (L_2).
 - ◆ Press **▼** and choose the type of mark you want to represent your data.



4. Set an appropriate window for viewing the scatterplot.
- ◆ Press **WINDOW** to set an appropriate window (see sample window settings that follow).
 - ◆ Be sure to use numbers that include all data points. Buffer these points on all sides in order to see a complete graph.



- ◆ Press **GRAPH**. To look at the values of the points, press **TRACE**. A flashing cursor will appear on top of the first data point. At the bottom of the screen, **X=** and **Y=** will appear. To see the rest of the data points, press the **▶** key.

TI-83 Plus Keystrokes (continued):

5. Find the slope and y-intercept for the line of best fit.

- ◆ Press **STAT** **▶** to CALC and press **4** for **LinReg(ax + b)**.
- ◆ Press **2nd** **1** (L_1) **,** and **2nd** **2** (L_2).

```

EDIT [2nd][DEL] TESTS
1:1-Var Stats
2:2-Var Stats
3:Med-Med
4:LinReg(ax+b)
5:QuadReg
6:CubicReg
7↓QuartReg
  
```

```

LinReg(ax+b) L1,
L2
  
```

- ◆ Press **ENTER** and record the values for a (slope) and b (y-intercept) on Handout 1, #17, to use as you complete Handout 1.
6. Graph the line of best fit and compare to the scatterplot.
- ◆ To look at this graph, press **Y=**.
 - ◆ Type in the equation you wrote on Handout 1, #17. The window still contains the data points from above. Press **GRAPH**.
 - ◆ Sketch the graph on Handout 1, and then complete Handout 1.

Activity 1. Raisins: Collecting Data to Explore Mass

Handout 2: TI-73 Calculator Instructions

1. Clear any stat plots or equations that are in the calculator.

- ◆ Press **2nd** **Y=** (PLOT)
- ◆ Press **4** (Plotsoff). This returns the cursor to the **Homescreen**.
- ◆ Press **ENTER**. This will turn all of the stat plots off.
- ◆ Press **Y=**. If any of the = signs are highlighted, move the cursor on top of the = and press **ENTER**. Doing this will make the graph of this equation invisible. If you do not want that equation anymore, keep the cursor on top of the equation and press **CLEAR**. Do one of these two things for any equation that is in any **Y**.

2. Enter the data into your calculator for the number of raisins that were weighed.

- ◆ Press **LIST**.
- ◆ If the lists have data already entered in the columns, use the up arrow key to highlight **L₁**.

L1	L2	L3	Z
-----	-----	-----	
L1 =			

- ◆ Press **CLEAR** **ENTER**. This should clear the data from that column. You may clear each of the columns this way.
- ◆ When the lists have been cleared, the data can be typed into the lists.
- ◆ If necessary use arrow keys to move the cursor to the first place in **L₁**.

L1	L2	L3	Z
██████	-----	-----	
L1() =			

- ◆ Enter the number of raisins in **L1** and the mass in grams in **L2**.
- ◆ After each entry, press **ENTER**.

TI-73 Keystrokes (continued):

- Instruct the calculator to make the scatterplot (see the calculator screen that follows).
 - Press **2nd** **Y=** (PLOT) and then **ENTER** with the cursor on **Plot 1**. Press **ENTER** while the cursor is flashing on top of the **ON**.
 - Press **▼** once. Move the cursor on top of the scatter plot, which is the first graph choice. Press **ENTER** to select this type of graph.
 - Arrow down once to **Xlist**. Press **2nd** **LIST** (STAT) **1** (L_1), **▼** **2nd** **LIST** (STAT) **2** (L_2).
 - Press **▼** and select the type of mark you want to represent your data.

```

Plot1 Off
Type: Scatter
Xlist: L1
Ylist: L2
Mark: +
  
```

- Set an appropriate window for viewing the scatterplot.
 - Press **WINDOW** to set an appropriate window (see sample window settings that follow).
 - Be sure to use numbers that include all data points (the calculator will set ΔX automatically). Buffer these points on all sides in order to see a complete graph.

```

WINDOW
Xmin=0
Xmax=50
ΔX=.5319148936...
Xscl=5
Ymin=-1
Ymax=2
Yscl=1
  
```

- Press **GRAPH**. To look at the values of the points, press **TRACE**. A flashing cursor will appear on top of the first data point. At the bottom of the screen, **X=** and **Y=** will appear. To see the rest of the data points, press the **▶** key.

TI-73 Keystrokes (continued):

5. Find the slope and y-intercept for the line of best fit.

- ◆ Press **2nd** **LIST** (STAT) and **▶** to **CALC** and press **5** for **LinReg(ax + b)**.
- ◆ Press **2nd** **LIST** (STAT) **1** (L_1) **,** and **2nd** **LIST** (STAT) **2** (L_2).

```

Ls OPS MATH [MODE]
1:1-Var Stats
2:2-Var Stats
3:Manual-Fit
4:Med-Med
5:LinReg(ax+b)
6:QuadReg
7:EXPREg
  
```

```

[2ND] OPS MATH CALC
[5] L1
2:L2
3:L3
4:L4
5:L5
6:L6
7↓NRC
  
```

```

LinReg(ax+b) L1,
L2
  
```

- ◆ Press **ENTER** and record the values for a (slope) and b (y-intercept) on Handout 1, #17 to use as you complete Handout 1.

6. Graph the line of best fit and compare to the scatterplot.

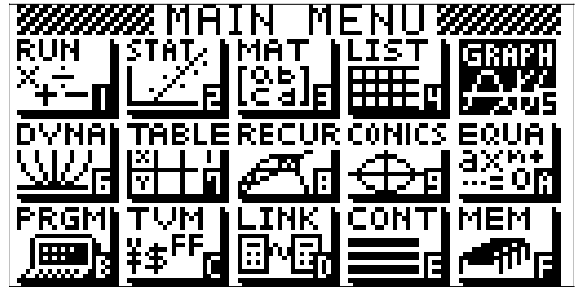
- ◆ To look at this graph, press **Y=**.
- ◆ Type in the equation you wrote on Handout 1, #17. The window still contains the data points from above. Press **GRAPH**.
- ◆ Sketch the graph on Handout 1, and then complete Handout 1.

Activity 1. Raisins: Collecting Data to Explore Mass

Handout 2: Casio CFX-9850GB Plus Calculator Instructions

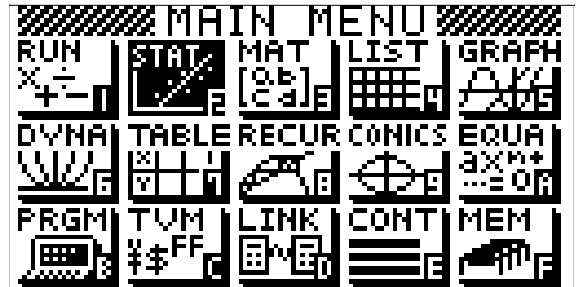
1. Clear any equations that are in the calculator.

- Beginning from the **Main Menu**, press **5**. If any of the = signs are highlighted, move the cursor on top of the = and press **F1**. Doing this will make the graph of this equation invisible. If you do not want that equation anymore, keep the cursor on top of the equation and press **F2** **F1**. Do one of these two things for any equation that is in any **Y**.



2. Enter the data into your calculator for the number of raisins that were weighed.

- Press **MENU** **2** to go to lists.



- If the lists have data already entered in the columns, press **F6** **F4** **F1**.

	List 1	List 2	List 3	List 4
1	0	0		
2	0	15		
3	-15	0		
4	0	0		
5	0	-4		

DEL

GRAPH CALC TEST INTR DIST D

	List 1	List 2	List 3	List 4
1	0	0		
2	0	15		
3	-15	0		
4	0	0		
5	0	-4		

DEL

SRTA SRTD DEL DELN INS D

	List 1	List 2	List 3	List 4
1	0	0		
2	0	15		
3	-15	0		
4	0	0		
5	0	-4		

DEL

YES NO

	List 1	List 2	List 3	List 4
1	0	0		
2		15		
3		0		
4		0		
5		-4		

DEL

SRTA SRTD DEL DELN INS D

Handout 2: CFX-9850GB Plus
ACTIVITY 1

CFX-9850GB Plus Keystrokes (continued):

- ◆ This should clear the data from that column. You may clear each of the columns by using the right arrow key to move to the desired list and pressing **F4** **F1**.

- ◆ When the lists have been cleared, the data can be typed into the lists. If necessary use arrow keys to move the cursor to the first place in **List 1**.

	List 1	List 2	List 3	List 4
1				
2				
3				
4				
5				

SRTA SRTD DEL DELA INS ▸

- ◆ Enter the number of raisins in **List 1** and the mass in grams in **List 2**. After each entry, press **EXE**.

- Instruct the calculator to make the scatterplot (see the calculator screen that follows).

- ◆ Press **F6** **F1** **F6**. Use the arrow key to move to **Graph Type** and choose **Scat**. Set the window as below, setting **Xlist** to **List1**, **Ylist** to **List2**, and selecting a **Mark Type** to represent your data. Press **EXE** to return to lists.

StatGraph1	
Graph Type	:Scatter
Xlist	:List1
Ylist	:List2
Frequency	:1
Mark Type	:. .
Graph Color	:Green

Scat XY NFP ▸

- To set an appropriate window, press **SHIFT** **MENU** (SET UP), set **Stat Wind** to **Auto**, and turn **Coord** to **On**.

- ◆ Press **EXE** to return to lists, *or* set **Stat Wind** to **Man** and turn **Coord** to **On**. Press **EXE** **SHIFT** **F3** and set an appropriate window. Be sure to use numbers that include all data points. Buffer these points on all sides in order to see a complete graph.

- ◆ Store these settings by pressing **F4** **STO** **F1**. Press **EXE** **EXIT** to return to lists and original list menu.

- ◆ Press **F1** **F4** and turn **StatGraph1 On** and the others **Off**. Press **F6** to draw the graph. To look at the values of the points, press **SHIFT** **F1** (Trace). A flashing cursor will appear on top of the first data point, and the (x,y) coordinates will appear at the bottom of the screen. To see the rest of the data points, press the **▶** key.

- Find the slope and y-intercept for the line of best fit. Press **F1** for **LinearReg(y=ax+b)** and record the values for **a** (slope) and **b** (y-intercept) on Handout 1, #17, to use as you complete Handout 1.

- Graph the line of best fit and compare to the scatterplot. To look at this graph, press **F6**.

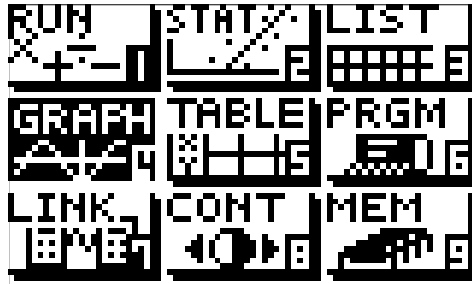
- ◆ Sketch the graph on Handout 1, and then complete Handout 1.

Activity 1. Raisins: Collecting Data to Explore Mass

Handout 2: Casio FX-7400GB Plus Calculator Instructions

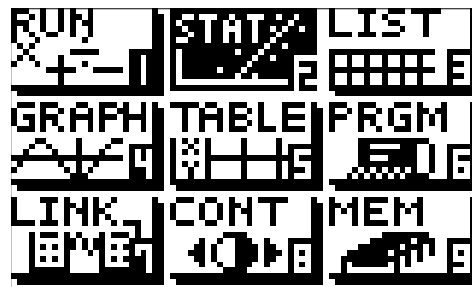
1. Clear any equations that are in the calculator.

- ◆ Beginning from the **Main Menu**, press **4**. If any of the = signs are highlighted, move the cursor on top of the = and press **F1**. Doing this will make the graph of this equation invisible. If you do not want that equation anymore, keep the cursor on top of the equation and press **F2** **F1**. Do one of these two things for any equation that is in any Y.

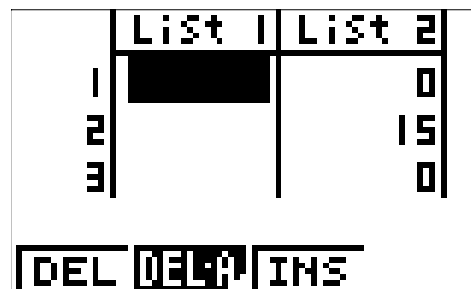
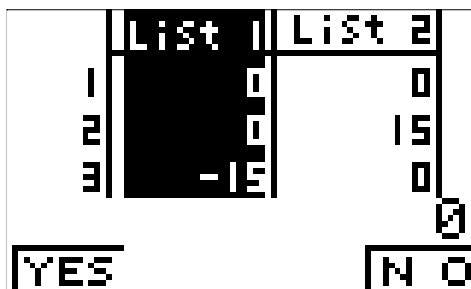
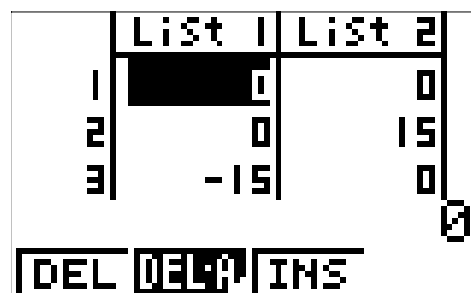
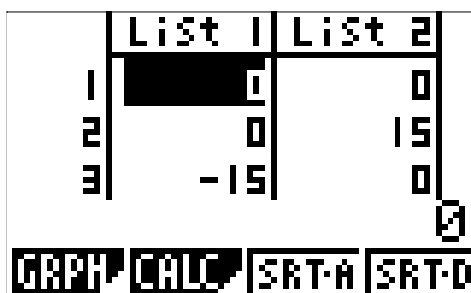


2. Enter the data into your calculator for the number of raisins that were weighed.

- ◆ Press **MENU** **2** to go to lists.



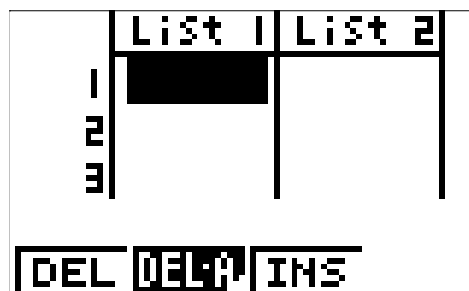
- ◆ If the lists have data already entered in the columns, press **F▶** **F2** **F1**.



Handout 2: FX-7400G Plus
ACTIVITY 1

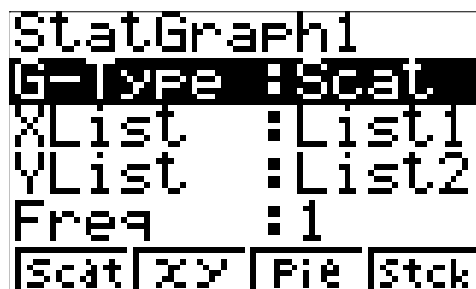
FX-7400G Plus Keystrokes (continued):

- ◆ This should clear the data from that column. You may clear each of the columns by using the right arrow key to move to the desired list and pressing **F2** **F1**.
- ◆ When the lists have been cleared, the data can be typed into the lists. If necessary use arrow keys to move the cursor to the first place in **List 1**.
- ◆ Enter the number of raisins in **List 1** and the mass in grams in **List 2**. After each entry, press **EXE**.



3. Instruct the calculator to make the scatterplot (see the calculator screen that follows).

- ◆ Press **F▶** **F1** **F▶** **F4**. Use the arrow key to move to **G-Type** and choose **Scat**. Set the window as below, setting **Xlist** to **List1**, **Ylist** to **List2**, and selecting an **M-Type** to represent your data. Press **EXE** to return to lists.



4. To set an appropriate window, press **SHIFT** **MENU** (SET UP) and set **S-Wind** to **Auto**, or set **S-Wind** to **Man**.

- ◆ Press **EXE** **SHIFT** **F3** to set an appropriate window. Be sure to use numbers that include all data points. Buffer these points on all sides in order to see a complete graph. Store these settings by pressing **F3** (Sto). Press **EXE** **QUIT** to return to lists and original list menu.
 - ◆ Press **F1** **F▶** **F1** and turn **S-Grph1 On** and the others **Off**.
 - ◆ Press **F4** to draw the graph.
 - ◆ To look at the values of the points, press **SHIFT** **F1** (Trace). A flashing cursor will appear on top of the first data point, and the (x,y) coordinates will appear at the bottom of the screen. To see the rest of the data points, press the **▶** key.
 - ◆ Find the slope and y-intercept for the line of best fit.
5. Press **F1** for LinearReg $y=ax+b$ and record the values for a (slope) and b (y-intercept) on Handout 1, #17, to use as you complete Handout 1.
6. Graph the line of best fit and compare to the scatterplot. To look at this graph, press **F4**.
- ◆ Sketch the graph on Handout 1, and then complete Handout 1.

Activity 2. Weight Through the Solar System

Handout 1: Data Sheet

Unofficial Celebrity Earth Weight List

Lisa Leslie	165 pounds
Rebecca Lobo	185 pounds
Brett Favre	225 pounds
John Stockton	175 pounds
Jackie Joyner-Kersey	154 pounds
Oprah Winfrey	150 pounds
Anfernee Penny Hardaway	210 Pounds

1. Choose a celebrity from the list above.
2. On which planet would you expect the celebrity you chose to weigh the most?
3. On which planet would you expect the celebrity you choose to weigh the least?
4. Calculate (calculator is optional) the values for the following table.
 The following formula will be useful:
 $\text{Planet Weight} = \text{Earth Weight} * \text{Planet's Gravitational Factor}$
 (Gravitational factors are in comparison to the gravity on Earth; i.e., Earth = 1)

Planets	Gravitational Factor*	Earth Weight *Gravitational Factor	Weight
Mercury	0.38		
Venus	0.91		
Earth	1		
Mars	0.38		
Jupiter	2.54		
Saturn	.93		
Uranus	0.8		
Neptune	1.2		
Pluto	0.04		

**Different sources may give different values for gravitational factors: the ones in the table are approximate.*

Handout 1: Data Sheet
ACTIVITY 2

Activity 2, Handout 1 (continued):

5. Create a bar graph using the results of the data showing the weight of the person on each planet.

Give the bar graph a title. Label the x-axis as the planets and the y-axis as the weight of the person. Choose an appropriate scale.



6. Use your graphing calculator and the Calculator Instructions in Handout 2 to make a bar graph on the calculator using the same data.

Activity 2, Handout 1 (continued):

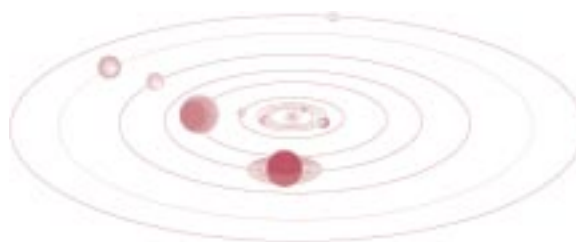
7. Which planet produced the highest weight?
8. Which planet produced the lowest weight?
9. What was the range of the weights?
10. What is the relationship between mass and weight?
11. What surprised you the most about the differences in the weights?
12. Name the planets that have similar gravitational pull. List the reason(s).
13. Name three differences between the handmade bar graph and the calculator bar graph.
14. Name three similarities in the process of making a handmade bar graph and the calculator bar graph.
15. Why would you want to know what you weigh on different planets?

Activity 2, Handout 1 (continued):

16. Use your graphing calculator to find your own weight across the solar system and to make a bar graph showing the data. Record your data in the following chart and sketch the bar graph in the space below the chart.

Planets	Gravitational Factor*	Earth Weight *Gravitational Factor	Weight
Mercury	0.38		
Venus	0.91		
Earth	1		
Mars	0.38		
Jupiter	2.54		
Saturn	.93		
Uranus	0.8		
Neptune	1.2		
Pluto	0.04		

Handout 1: Data Sheet
ACTIVITY 2



Activity 2. Weight Through the Solar System

Handout 2: TI-83 Plus Calculator Instructions

1. Number the planets in **L1** and enter the gravitational factors in **L2**.

- ◆ Press **STAT** **1** (EDIT). If the lists have data already entered in the columns, use the up arrow key to highlight **L₁**.
- ◆ Press **CLEAR** **ENTER**. This should clear the data from that column. You may clear each of the columns this way.
- ◆ Move the cursor to highlight the first entry under **L₁**.
- ◆ Press **1** **ENTER**, **2** **ENTER**, **3** **ENTER**, etc., until you have entered the numbers 1 through 9, which would represent the nine planets.
- ◆ **▶** to move to the first entry under **L₂**. Enter the gravitational factors for each planet from Handout 1.

L1	L2	L3
1	.38	
2	.91	
3	1	
4	.38	
5	2.54	
6	.93	
7	.8	
L3() =		

2. Give the calculator instructions to calculate the weights of your celebrity on each of the nine planets.

- ◆ Move your cursor up to highlight **L3**.
- ◆ Press **ALPHA** **+** (“). Then enter the Earth weight of your celebrity in pounds (the example below is for Oprah).
- ◆ Press **X** and **2nd** **2** (L2) to multiply the weight by the gravitational factors in **L2**.
- ◆ Press **ALPHA** **+** (“), and press **ENTER**.

L1	L2	L3
1	.38	
2	.91	
3	1	
4	.38	
5	2.54	
6	.93	
7	.8	
L3 =		

L1	L2	L3
1	.38	
2	.91	
3	1	
4	.38	
5	2.54	
6	.93	
7	.8	
L3 = "150*L2"		

L1	L2	L3
1	.38	57
2	.91	136.5
3	1	150
4	.38	57
5	2.54	381
6	.93	139.5
7	.8	120
L3() = 57		

Handout 2: TI-83 Plus
ACTIVITY 2

TI-83 Plus Keystrokes (continued):

- Give the calculator instructions for making a bar graph using **L1** (planet numbers) for **Xlist** and **L3** (weights across the planets) for **Freq**.
 - Press **Y=** and clear any **Y=** that is not clear.
 - Press **2nd** **Y=** (STAT PLOT), **ENTER** **ENTER** to turn on **Plot 1**.
 - ▼** to **Type**, **▶** until the 3rd graph is highlighted and press **ENTER**.
 - ▼** to **Xlist:** and press **2nd** **1** (L_1), **▼** to **Freq:** and press **2nd** **3** (L_3).

```

STAT Plot1 Plot2 Plot3
Off Off Off
Type: [BAR] [LINE] [POINT]
      [MARK] [MARK] [MARK]
Xlist:L1
Ylist:L3
Mark: [ ] + [ ]
  
```

- Set an appropriate window to view the bar graph.
 - Press **WINDOW**. Be sure to use numbers that include all of the data points. Buffer these points on all sides in order to see the complete graph (sample window is shown below).

```

WINDOW
Xmin=0
Xmax=11
Xscl=1
Ymin=0
Ymax=450
Yscl=50
Xres=1
  
```

- The Xlist is the horizontal axis, which will be the planets. The Freq (frequency) is the vertical axis, which will represent the weight of the person on the given planet.
- View the graph by pressing **GRAPH**.
 - To look at specific values of the bars, press **TRACE**. Use the right arrow key to move the cursor to the top of the first bar, which is Mercury. At the bottom right of the screen, there is an **n=**. This is the weight value for the planet. Press the right arrow key. The flashing cursor will jump to the top of the other bars. Look at the **n=** for the weight value.
 - To put in your weight or that of another celebrity, press **STAT** **1** (EDIT) and arrow up to **L3** and press **ENTER**. Change the Earth weight number to the new Earth weight and press **ENTER**. **L3** will now contain the weights across the planets for the new Earth weight.

Activity 2. Weight Through the Solar System

Handout 2: TI-73 Calculator Instructions

1. Number the planets in **L1** and enter the gravitational factors in **L2**.

- ◆ Press **LIST**. If the lists have data already entered in the columns, use the up arrow key to highlight **L1**.
- ◆ Press **CLEAR** **ENTER**. This should clear the data from that column. You may clear each of the columns this way.
- ◆ Move the cursor to highlight the first entry under **L1**.
- ◆ Press **1** **ENTER**, **2** **ENTER**, **3** **ENTER**, etc., until you have entered the numbers 1 through 9 which would represent the nine planets.
- ◆ **▶** to move to the first entry under **L2**. Enter the gravitational factors for each planet from Handout 1.

L1	L2	L3
1	.38	
2	.91	
3	1.48	
4	2.54	
5	3.68	
6	4.83	
7	6.86	
8	8.87	
9	9.80	
L3(1) =		

2. Give the calculator instructions to calculate the weights of your celebrity on each of the nine planets.

- ◆ Move your cursor up to highlight **L3**.
- ◆ Press **2nd** **MATH** (TEXT). Capture the quotation mark (") and then capture **DONE**.

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	<	>	"	_
=	≠	>	≥	<	≤	and	or		
Done									
" ■									

Handout 2: TI-73
ACTIVITY 2

TI-73 Plus Keystrokes (continued):

- ◆ Press **ENTER**. Then enter the Earth weight of your celebrity in pounds (the example below is 150 lbs. for Oprah).
- ◆ Press **X** and **2nd LIST** (STAT) **2** (L2) to multiply the weight by the gravitational factors in L2.
- ◆ Press **2nd MATH** (TEXT). Capture the quotation mark ("), press **ENTER**, then capture **DONE** and press **ENTER**.

L1	L2	3
1	.38	-----
2	.91	
3	1	
4	.38	
5	2.54	
6	.93	
7	.8	
L3="150*L2"		

A	B	C	D	E	F	G	H	I	J
K	L	M	N	O	P	Q	R	S	T
U	V	W	X	Y	Z	<	>	"	_
=	≠	>	≥	<	≤	and	or		
Done									
"■									

- ◆ Press **ENTER** again to see the weights across the planets (the example below shows Oprah's weights across the planets.)

L1	L2	L3	3
1	.38	57	
2	.91	136.5	
3	1	150	
4	.38	57	
5	2.54	381	
6	.93	139.5	
7	.8	120	
L3(1) = 57			

Handout 2: TI-73
ACTIVITY 2

3. Give the calculator instructions for making a histogram using **L1** (planet numbers) for **Xlist** and **L3** (weights across the planets) for **Freq**.

- ◆ Press **Y =** and clear any **Y =** that is not clear.
- ◆ Press **2nd Y =** (PLOT), **ENTER** **ENTER** to turn on **Plot 1**.
- ◆ **▼** to **Type**, **▶** until the **6th graph** is highlighted and press **ENTER**.
- ◆ **▼** to **Xlist:** and press **2nd LIST** (STAT) **1** (L₁), **▼** to **Freq:** and press **2nd LIST** **3** (STAT) (L₃).

Plot1	Off
Type:	L ₁ L ₂ L ₃ L ₄ L ₅ L ₆ L ₇
	1 2 3 4 5 6 7
Xlist:	L ₁
Freq:	L ₃

TI-73 Plus Keystrokes (continued):

4. Set an appropriate window to view the bar graph.
- ◆ Press **WINDOW**. Be sure to use numbers that include all of the data points. Buffer these points on all sides in order to see the complete graph (sample window is shown below).

```

WINDOW
Xmin=0
Xmax=11
eX=.1170212765...
Xscl=1
Ymin=0
Ymax=450
Yscl=50

```

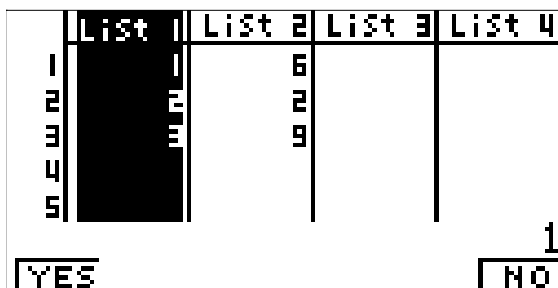
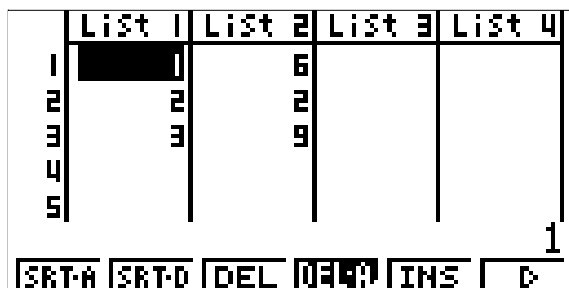
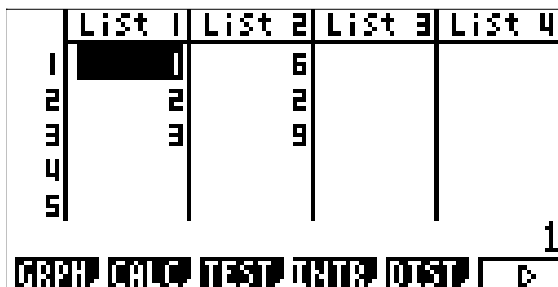
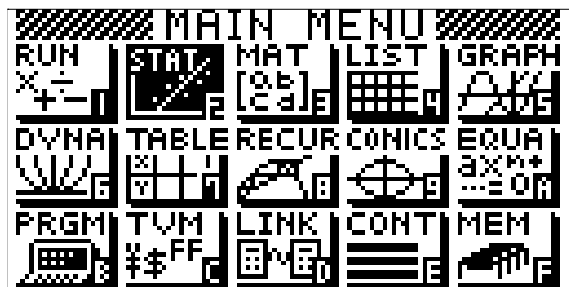
- ◆ The **Xlist** is the horizontal axis, which will be the planets. The **Freq** (frequency) is the vertical axis, which will represent the weight of the person on the given planet.
5. View the graph by pressing **GRAPH**.
- ◆ To look at specific values of the bars, press **TRACE**. Use the right arrow key to move the cursor to the top of the first bar, which is Mercury. At the bottom right of the screen, you'll see an **n=**. This is the weight value for the planet. Press the right arrow key. The flashing cursor will jump to the top of the other bars. Look at the **n=** for the weight value.
6. To put in your weight or that of another celebrity, press **LIST** and arrow up to **L3** and press **ENTER**. Change the Earth weight number to the new Earth weight and press **ENTER**. **L3** will now contain the weights across the planets for the new Earth weight.

Activity 2. Weight Through the Solar System

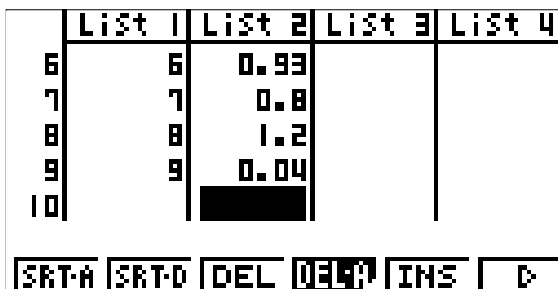
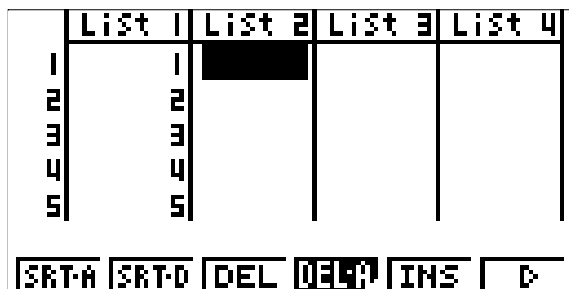
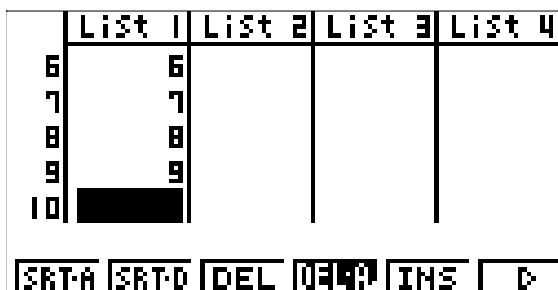
Handout 2: Casio CFX-9850GB Plus Calculator Instructions

1. Number the planets in **List 1** and enter the gravitational factors in **List 2**.

- ◆ From the **Main Menu** press **(2)**. If the lists have data already entered in the columns, press **(F6)** **(F4)** **(F1)**. This should clear the data from that column.



- ◆ Use the arrow key to move to another list and press **(F4)** **(F1)** to clear.
- ◆ When the columns are clear, move the cursor to highlight the first entry under **List 1**.
- ◆ Press **(1)** **(EXE)** **(2)** **(EXE)** **(3)** **(EXE)**, etc., until you have entered the numbers 1 through 9, which would represent the nine planets.
- ◆ **(▶)** to move to the first entry under **List 2**. Enter the gravitational factors for each planet from Handout 1.



Handout 2: CFX-9850GB Plus
ACTIVITY 2

CFX-9850GB Plus Keystrokes (continued):

2. Give the calculator instructions to calculate the weights of your celebrity on each of the nine planets.

- ◆ Move your cursor up to highlight **List 3**.
- ◆ Press **OPTN** **F1** **F1** **2** **X**, then enter the Earth weight of your celebrity in pounds (the example below is for Oprah). Press **EXE**.

	List 1	List 2	List 3	List 4
1	1	0.38		
2	2	0.91		
3	3	1		
4	4	0.38		
5	5	2.54		

SRTA SRTD DEL DELA INS >

	List 1	List 2	List 3	List 4
1	1	0.38		
2	2	0.91		
3	3	1		
4	4	0.38		
5	5	2.54		

List 2x150
List L→M Dim Fill Seq >

	List 1	List 2	List 3	List 4
1	1	0.38	57	
2	2	0.91	136.5	
3	3	1	150	
4	4	0.38	57	
5	5	2.54	381	

List L→M Dim Fill Seq >

Handout 2: CFX-9850GB Plus
ACTIVITY 2

3. Give the calculator instructions for making a bar graph using **List 1** (planet numbers) for **Xlist** and **List 3** (weights across the planets) for **Freq**.

- ◆ Press **SHIFT** **MENU** and set **Stat Wind** to **Auto**.

Stat Wind	:Auto	
Graph Func	:Off	
Background	:None	
Plot/Line	:Blue	
Angle	:Deg	
Coord	:On	
Grid	:Off	↓
Auto	Man	

CFX-9850GB Plus Keystrokes (continued):

- ◆ Press **EXE** to return to lists. Press **EXIT** **EXIT** **F1** **F6**. Set the **Graph Type** to **Hist** (**F6** **F1**), **Xlist** to **List1** (**F1**), and **Frequency** to **List3** (**F4**). Press **EXE**.

	List 1	List 2	List 3	List 4
1	1	0.38	57	
2	2	0.91	136.5	
3	3	1	150	
4	4	0.38	57	
5	5	2.54	381	

57

GRAPH CALC TEST DISTR DIST ▸

	List 1	List 2	List 3	List 4
1	1	0.38	57	
2	2	0.91	136.5	
3	3	1	150	
4	4	0.38	57	
5	5	2.54	381	

57

GRAPH1 GRAPH2 GRAPH3 SEL SET

```

StatGraph1
Graph Type :Hist
XList      :List1
Frequency  :List3
Graph Color:Green

1 List1 List2 List3 List4 ▸
    
```

Handout 2: CFX-9850GB Plus
ACTIVITY 2

- ◆ Press **F4** and turn **StatGraph1 On** and the others **Off**.

Press **F6** to draw the graph.

Set **Start** to **1**. Press **EXE**.

Set **Pitch** to **1**. Press **EXE** **F6**.

	List 1	List 2	List 3	List 4
1	1	0.38	57	
2	2	0.91	136.5	
3	3	1	150	
4	4	0.38	57	
5	5	2.54	381	

57

GRAPH1 GRAPH2 GRAPH3 SEL SET

```

StatGraph1 :DrawOn
StatGraph2 :DrawOff
StatGraph3 :DrawOff

On Off DRAW
    
```

```

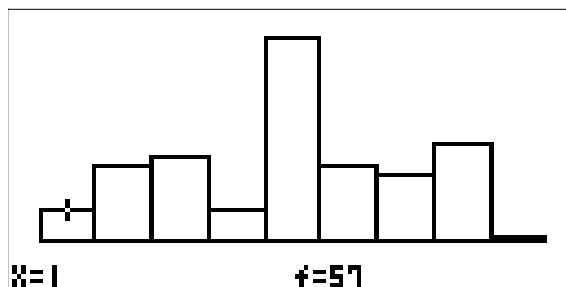
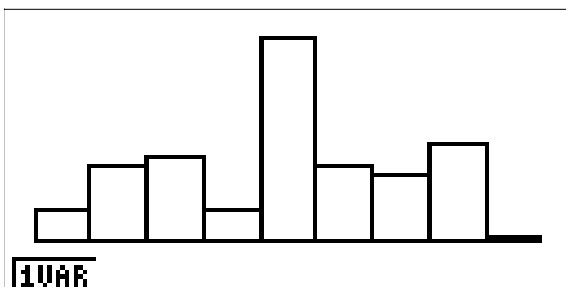
Set Interval

Start: 1
Pitch: 1

DRAW
    
```

CFX-9850GB Plus Keystrokes (continued):

4. To view the graph, follow the instructions below.
 - ◆ The **Xlist** is the horizontal axis, which will be the planets. The **Freq** (frequency) is the vertical axis, which will represent the weight of the person on the given planet.
 - ◆ View the graph by pressing **F6**.
 - ◆ To look at specific values of the bars, press **SHIFT F1**. Use the right arrow key to move the cursor to the top of the first bar, which is Mercury. At the bottom right of the screen, you'll see an **f=**. This is the weight value for the planet. Press the right arrow key. The flashing cursor will jump to the top of the other bars. Look at the **f=** for the weight value.



5. To put in your weight or that of another celebrity, press **EXIT EXIT** and move the cursor to the top of **List 3**. Press **OPTN F1 F1 2 X**, then enter the Earth weight in pounds.
 - ◆ Press **EXE**. **List 3** will now contain the weights across the planets for the new Earth weight.

	List 1	List 2	List 3	List 4
1	1	0.38	57	
2	2	0.91	136.5	
3	3	1	150	
4	4	0.38	57	
5	5	2.54	381	

List 2x
List L→M Dim Fill Seq | 0

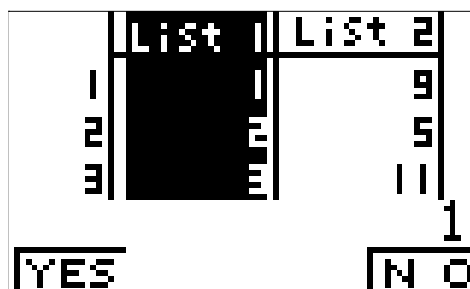
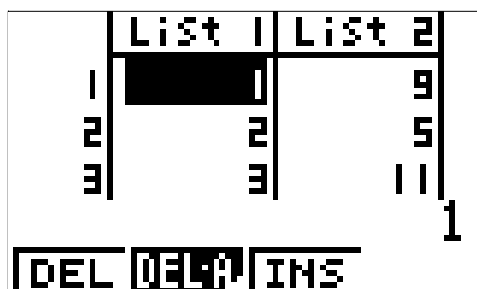
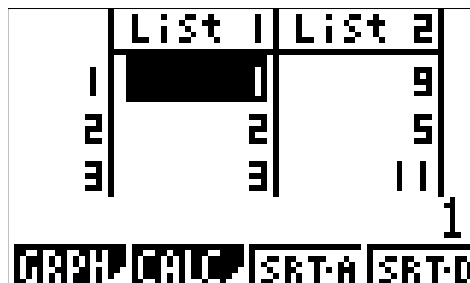
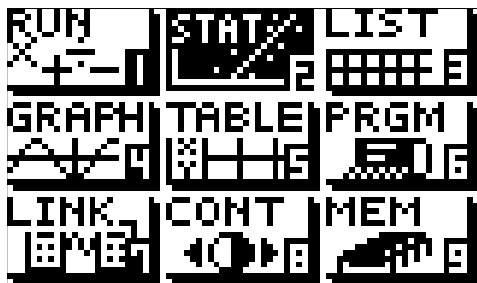
Handout 2: CFX-9850GB Plus
ACTIVITY 2

Activity 2. Weight Through the Solar System

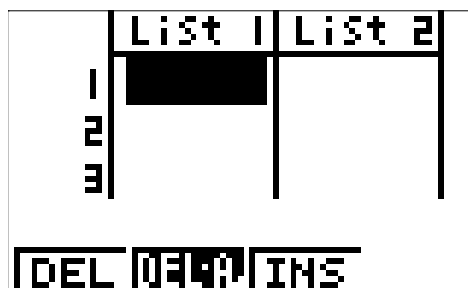
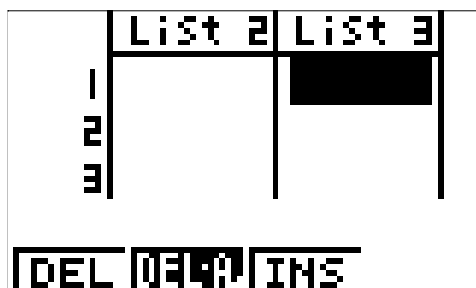
Handout 2: Casio FX-7400G Plus Calculator Instructions

1. Number the planets in **List 1** and enter the gravitational factors in **List 2**.

- ◆ From the **Main Menu** press **(2)**. If the lists have data already entered in the columns, press **(F▶)** **(F2)** **(F1)**. This should clear the data from that column.



- ◆ Use the right arrow key to move to another list and press **(F4)** **(F1)** to clear.
- ◆ When the columns are clear, move the cursor to highlight the first entry under **List 1**.



Handout 2: FX-7400G Plus
ACTIVITY 2

FX-7400G Plus Keystrokes (continued):

- ◆ Press **1** **EXE**, **2** **EXE**, **3** **EXE**, etc., until you have entered the numbers 1 through 9 which would represent the nine planets.
- ◆ **▶** to move to the first entry under **List 2**. Enter the gravitational factors for each planet from Handout 1.

	List 1	List 2
8	8	
9	9	
10		

DEL DEL▶ INS

	List 1	List 2
1	1	
2	2	
3	3	

DEL DEL▶ INS

	List 1	List 2
8	8	1.2
9	9	0.04
10		

DEL DEL▶ INS

2. Give the calculator instructions to calculate the weights of your celebrity on each of the nine planets.

- ◆ Move your cursor up to highlight **List 3**.
- ◆ Press **OPTN** **F1** **F1** **2** **X**, then enter the Earth weight of your celebrity in pounds (the example below is for Oprah). Press **EXE**.

	List 2	List 3
1	0.38	
2	0.91	
3	1	

DEL DEL▶ INS

	List 2	List 3
1	0.38	
2	0.91	
3	1	

List 2×150
List MEM Dim Fill

	List 2	List 3
1	0.38	57
2	0.91	136.5
3	1	150

List MEM Dim Fill

Handout 2: FX-7400G Plus
ACTIVITY 2

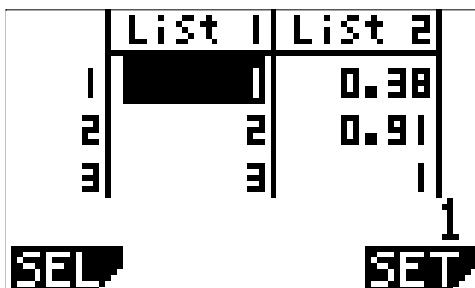
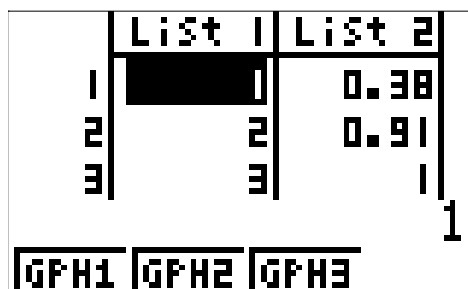
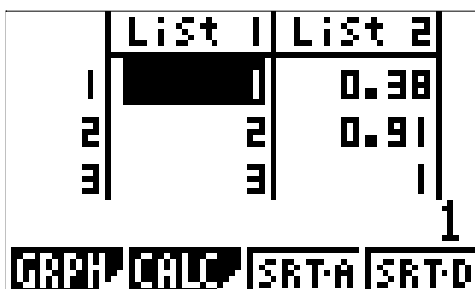
FX-7400G Plus Keystrokes (continued):

3. Give the calculator instructions for making a bar graph using List 1 (planet numbers) for **Xlist** and **List 3** (weights across the planets) for **Freq**.

- ◆ Press **SHIFT** **MENU** and set S-Wind to Auto.



- ◆ Press **EXE** to return to lists. Press **QUIT** **F1** **F▶** **F4**. Set **G-Type** to **Hist** by pressing **F▶** **F1**, **Xlist** to **List1**, and **Frequency** to **List3**. Press **EXE**.



Handout 2: FX-7400G Plus
ACTIVITY 2

FX-7400G Plus Keystrokes (continued):

- ◆ Press **F1** **F▶** **F1** and turn S-Grph1 On and the others Off.

The first screenshot shows the following data in List 1 and List 2:

List 1	List 2
0	0.38
2	0.91
3	1

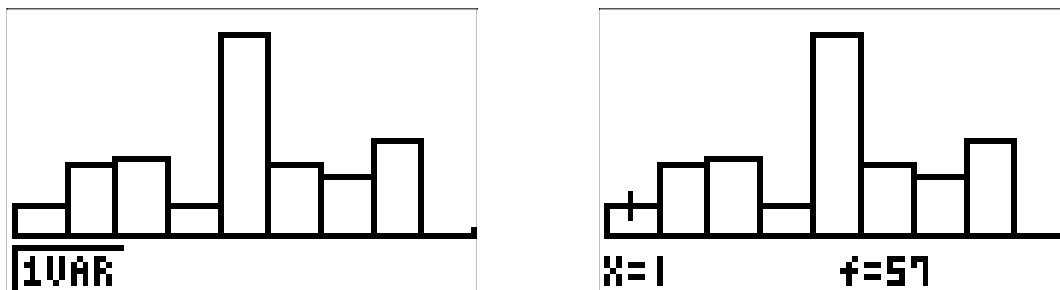
The second screenshot shows the 'SEL' and 'SET' options.

The third screenshot shows the following menu:

```

S-Grph1: On
S-Grph2: Off
S-Grph3: Off
On Off DRAW
    
```

- View the graph by pressing **F4**. The **Xlist** is the horizontal axis, which will be the planets. The **Freq** is the vertical axis, which will be the weight of the person on the given planet.
 - ◆ To look at specific values of the bars, press **SHIFT** **F1**. Use the right arrow key to move the cursor to the top of the first bar, which is Mercury. At the bottom right of the screen, you'll see an **f=**. This is the weight value for the planet. Press the right arrow key. The flashing cursor will jump to the top of the other bars. Look at the **f=** for the weight value.



- To put in your weight or another celebrity, press **QUIT** and move the cursor to the top of **List 3**. Press **OPTN** **F1** **F1** **2** **X**, then enter the Earth weight in pounds. Press **EXE**. **List 3** will now contain the weights across the planets for the new Earth weight.

The screenshot shows the following data in List 2 and List 3:

List 2	List 3
0.38	57
0.91	136.5
1	150

The bottom of the screen shows the text: **List 2x** and **List UNDP Dim Fill**.

Handout 2: FX-7400G Plus
ACTIVITY 2

