

# Algebra Activity 3: Plant Growth

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CALCULATORS: Casio: *fx-9750G Plus* • Casio: *CFX-9850G Series*

## Teaching Notes/Lesson Plan Level: Algebra 1

### Objective

Given a set of data, the students will be able to enter it into the Statistics Menu of the Casio calculator, graph the data using a scatter plot, find the Line of Best Fit for the scatter plot, and calculate the measures of central tendency.

### Engage

Discuss with students the use of two-variable statistics and how they are used in real life to compare situations. Have students give examples of real life uses of two-variable statistics and why they are important.

### Explore

1. Using the calculator, model with the students how to enter the data below into List 1 and List 2.
2. Then model with the students how to draw a scatter plot.
3. Discuss and model how to find the Line of Best Fit for the data.
4. Show the students how to find the measures of central tendency for the data
5. Now model how to exit the Statistics Menu and go to the Table Menu and set up the table for the Line of Best Fit.
6. The students can then use the Table Function to answer questions about the data.

	Amount of Plant Growth Per Year									
Year	1	2	3	4	5	6	7	8	9	10
No. of Plants	12	25	38	42	56	68	71	85	92	107

### Explain

Students will describe the graph to include the shape, slope, and possible outliers. They will then discuss the measures of central tendency and how they relate to the graph. Finally, they will discuss what possible information could be obtained from the graph and the table.

### Elaborate

Students will be given several new graphs and asked to describe their shape and what the shape indicates about the given data.

### Evaluate

The student will be given data in which to make a table, input the results into a graphing calculator, find the Line of Best Fit, and describe the results of the data. Afterwards, they will be asked to make predictions based on the data.

### Extension

1. Have students research occupations that use statistics and discuss their use.
2. Have students record data from the newspaper such as weather, stock reports, or financial information and use the results to make predictions they can check later.

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### Student Worksheet Activity 3

#### Objectives

The student will be able to:

1. Enter data into a List of the Statistics Function of the graphing calculator,
2. Graph the data using a scatter plot,
3. Find the Line of Best Fit for the data, and
4. Copy the Line of Best Fit into the Table Function and make predictions.

#### Data

	Amount of Plant Growth Per Year									
Year	1	2	3	4	5	6	7	8	9	10
No. of Plants	12	25	38	42	42	68	71	85	92	107

#### Procedure

1. From the Main Menu, highlight **STAT** and press **EXE**. In List 1 put in the numbers from 1 to 10 to represent the number of years. In List 2 put the number of plants grown.
2. Press **F1(GRPH)** and **F6** to set up the calculator for a Scatter Plot. Press the **Down Arrow** key to Graph Type. If the calculator is not already showing Scatter, then press **F1**, otherwise press the **EXE** key. Now press **F1** again to graph the data as a scatter plot.
3. To get the Line of Best Fit, press **F1** which is below the X.
4. Press **F5** to copy the resulting equation for the Line of Best Fit into both the GRAPH Menu and the Table Menu. Press **EXE** to store it in Y1. Now press **F6** to draw the graph.
5. To find the measures of central tendency, press **EXIT** twice to get back to the STAT Menu. Press **F2 F6 F2** and **EXE**. Press **F1** to get the Measures of Central Tendency for List 2.
6. To make predictions using the Line of Best Fit, press the **Menu** key to get to the MAIN Menu. Now press the **Down Arrow** key once to highlight TABLE and press **EXE**. You will now be in the Table Function. Press F5 to set the range for the table. To see the results for the years 11 through 30, enter 11 for the Start and press **EXE**. Press **30** for the End and press **EXE**. Enter **1** to for the table to go up by 1 year each time. Press **EXE**. Press **EXE** and **F6** to see the table.

**Student Worksheet Activity 3**

**Problems**

1. What is the average growth for the given set of plants? \_\_\_\_\_  
What is the median growth rate for the given set of plants? \_\_\_\_\_  
What is the difference between the mean and median values? \_\_\_\_\_  
Looking at the table, what would be the reason for this difference?  
\_\_\_\_\_  
\_\_\_\_\_
2. What is the equation for the Line of Best Fit for the data? \_\_\_\_\_  
What is the r value for the equation? \_\_\_\_\_  
What does this mean? \_\_\_\_\_  
Using the Table function, find the estimation for the growth rate for year 15?  
\_\_\_\_\_  
For year 20? \_\_\_\_\_  
For year 30? \_\_\_\_\_
3. The amount of area needed for each plant to be successful is 2.5 ft.<sup>2</sup> .  
Calculate the amount of land needed for the initial number of plants.  
\_\_\_\_\_  
How much would be needed for the plants in 10 years? \_\_\_\_\_  
In 20 years? \_\_\_\_\_  
What implications would this have?  
\_\_\_\_\_  
\_\_\_\_\_

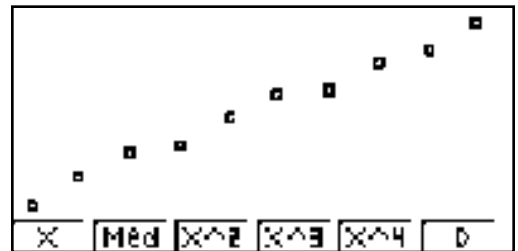
## Solutions to Activity 3: Plant Growth

Screen Shot for Table

	List 1	List 2	List 3	List 4
7	7	71		
8	8	85		
9	9	92		
10	10	107		
11				

GRAPH CALC TEST VARS DISTR D

Screen Shot of Scatter Plot



1. Average 59.6; Median 62; Difference 2.4; The data is slightly higher in the upper values.

```

1-Variable
x̄ = 59.6
Σx = 596
Σx² = 43916
x̄σn = 28.9730909
x̄σn-1 = 30.5403194
n = 10
SUM 2VAR 3RD SET
    
```

Screen Shot Showing Line of Best Fit

2.  $y = 10.05x + 4.33$ ;  $r = .996$ ; The equation is a good fit for the data. 155.06; 205.30; 305.78
3. 30 ft.²; 267.5 ft.²; 513.25 ft.²

```

LinearReg
a = 10.0484848
b = 4.33333333
r = 0.99616832
r² = 0.99235132
y = ax + b
COPY DRAW
    
```