

Crickets-Temperature-TI-82

Abstract Students hypothesize about the relationship between the temperature and the number of times a cricket chirps per minute. They listen to a tape of crickets chirping at six different temperatures. (Tape source available in activity.) They count the number of chirps per minute and record and graph the results. Then, they listen to two more crickets chirping at unknown temperatures and record the number of chirps per minute. They use the graph to estimate the temperatures at which the crickets are chirping. They check these values using the equation $T = 50 + (N-40)/4$, where T represents temperature in degrees Fahrenheit and N represents number of chirps per minute. Finally, students use the graphing calculator to manipulate the data.

DIRECTIONS:

Students hypothesize about the relationship between the temperature and the number of times a cricket chirps per minute. They listen to a tape of crickets chirping at six different temperatures. They count the number of chirps per minute and record and graph the results. Then, they listen to two more crickets chirping at unknown temperatures and record the number of chirps per minute. They use the graph to estimate the temperatures at which the crickets are chirping. They check these values using the equation $T = 50 + (N-40)/4$, where T represents temperature in degrees Fahrenheit and N represents number of chirps per minute. Finally, students use the graphing calculator to manipulate the data.

Sample Data

Temp.°F	Chirps per minute
77	136
64	84
81	148
55	60
73	132
58	65
cricket 1	84
cricket 2	68

SECTION 1

Set up the X and Y axes for your graph and choose the type of mark to graph your points.

1. Push 2nd, then STAT PLOT (this key is above the y = key).
2. See if PLOT 1 is on. If it is, press enter and skip to Step 4. If it is off, press enter and go to Step 3.

3. Use the left arrow key to turn L1 on and hit enter. Press the down arrow key to TYPE.
4. Check the TYPE, use the arrow keys to darken the 1st type (scattergram). Press enter, and arrow down to XLIST.
5. XLIST needs to have L1 darkened. If it is not, use the arrow keys to move and darken it. Arrow down to YLIST.
6. L2 needs to be darkened for YLIST. If it is not, use the arrow keys to move and darken it.
7. Arrow down to MARK. Use the arrow keys to darken the 1st mark. Press enter.

SECTION 2

Enter the data onto the spreadsheet.

1. Press STAT, then ENTER. If there is no data, skip to step 3.
2. If there is data in L1, you need to clear it out. Arrow up to L1, press CLEAR, then ENTER. This will clear the entire column. Repeat this step for L2, L3, etc. if necessary.
3. Enter the list of temperatures (X values) in the L1 column by typing in each temperature and pressing ENTER.
4. Arrow over to L2 and enter the number of chirps per minute (Y values).
5. Make sure your pairs of temperatures and chirps match in each column.

SECTION 3

Set the minimum and maximum values for the X and Y axes.

Press ZOOM, then 9. Your graph will appear on the screen.

SECTION 4

Check the coordinates on your graph.

Press TRACE. Use the right arrow keys to move to the next point. At the bottom of the screen, you will see each temperature and its corresponding number of chirps.

SECTION 5

Produce a best fit line and predict the number of chirps at different temperatures.

A. BEST FIT

1. Press STAT. Use right arrow key to darken CALC. Press 5 for LinReg. This will give you an equation for a Linear Regression (bests fit line). Press ENTER. The equation for the line will appear.
2. Press the Y = key. If there are any equations there, clear them out by using the arrow keys to place the cursor right after the = sign. Press CLEAR.
3. Press VARS. Press 5 for statistics.
4. Use the right arrow key to darken EQ which stands for equation.
5. Press 7 for RegEq (Regression Equation). The equation for Y1= will appear.
6. Press GRAPH. This will display your original points PLUS your line of best fit.

B. TABLE OF PREDICTIONS

7. Press 2nd, then WINDOW.
8. Set TbIMin at 40.
9. Set Tbl at 1.
10. Press 2nd, then GRAPH. This will display a table that allows you to predict the number of chirps at different temperatures, according to the line of best fit.