

Drop, Drop Fizz, Fizz

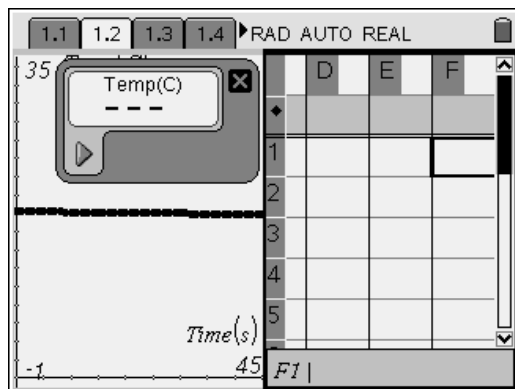


In this activity, you will be determining what (if any) relationship exists between alka-seltzer and water temperature. You will be observing the temperature of water during a 30 second time period.

Begin by gathering your supplies—

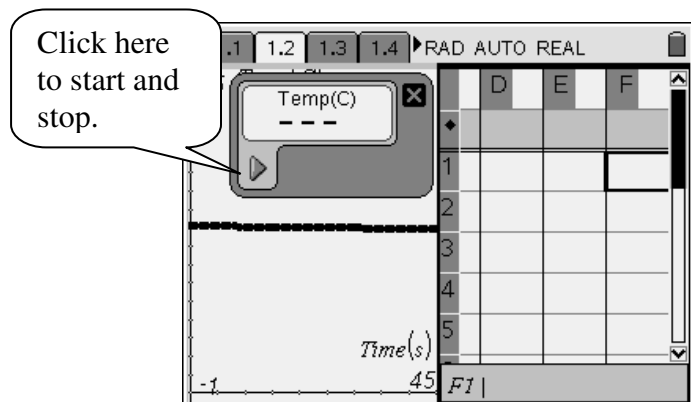
Cup of water (about half full), package of Alka-Seltzer, your TI-Nspire, EasyTemp probe

Turn your calculator on and connect your temperature probe to your calculator. When you do so, a split screen should appear on your calculator. The left-hand side will be a graph and a Temp(C) box. The right-hand side is a table. Column A is for the time (stored as *run0.time_s*); Column B is for the temperature (stored as *run1.time_c*)

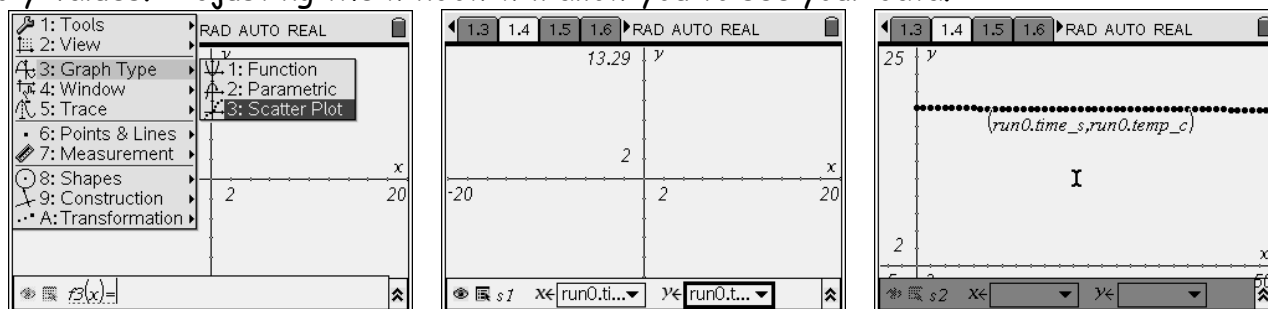


Change the scale on the scatter plot to reflect the situation. Arrow to the maximum time and double-click it. Type in the desired value. Press tab to move to the next value and change it also. Continue until all values have been changed.

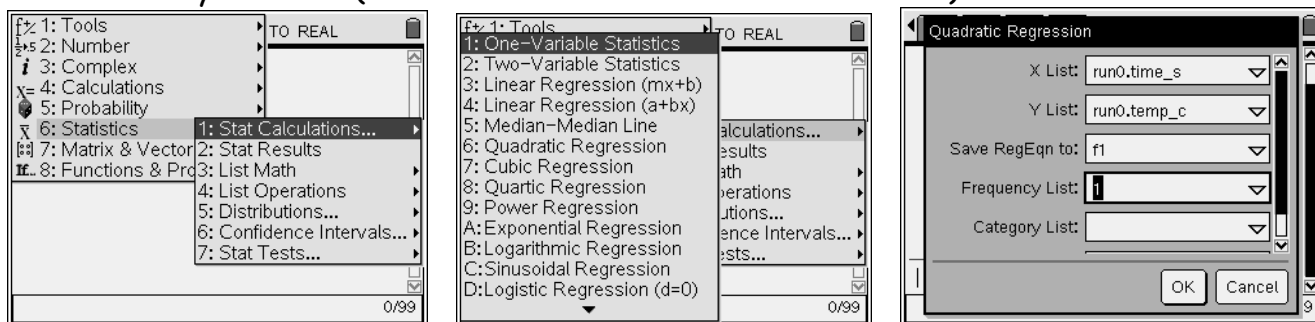
Place your probe in the glass of water and wait for the temperature (in the Temp(C) box) to stabilize. Once the temperature has stabilized, drop an alka-seltzer tablet into the water and click on the arrow to start. After the fizzing stops (or about 30 seconds), click the box to stop the recording. While the probe is recording, columns A and B should fill up with data.



From the data you recorded, you can create a full-screen scatter-plot. To do so, insert a graph screen. You will need to change the graph type to scatter plot and select your x- and y-values. Adjusting the window will allow you to see your data.



To find the equation that best fits your data, insert a calculator screen. Since you will be analyzing data, you will need to use the statistics feature. Press 2ND , choose statistics, stat calculators, and linear regression ($mx+b$). You will then need to select the correct x-variable and y-variable (remember what was in columns A and B).



Your calculator will provide you with the slope and y-intercept. It will also give you an r value to determine if you have a good fit.

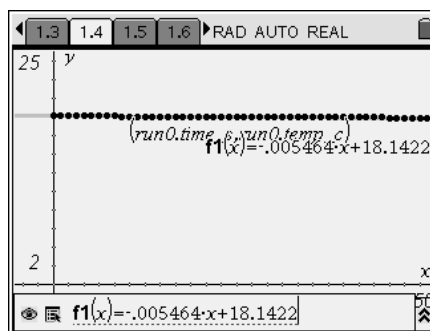
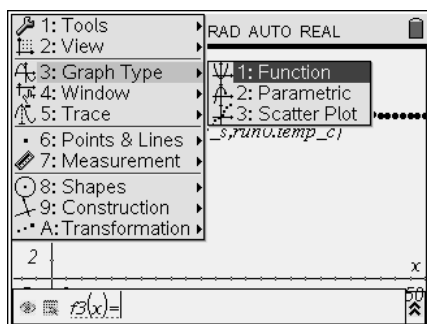
Record the following information:

Slope: _____ Y-intercept: _____

Equation of the Line of Best Fit: _____

R value: _____

To see your line through the points, go back to your scatter plot. Change the graph type to function and scroll to f1. Press enter and your line will appear. This is the line of best fit.



Using your data and expertise, answer the following questions.

1. What does it mean when $x = 0$?
2. In terms of this problem, what does the slope mean?
3. At a time of 2.1 seconds, what would you expect the water temperature to be?
4. How long would you anticipate for the temperature to decrease 1 degree?