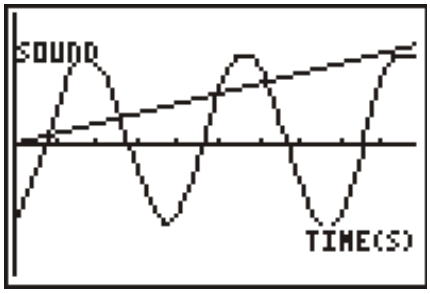
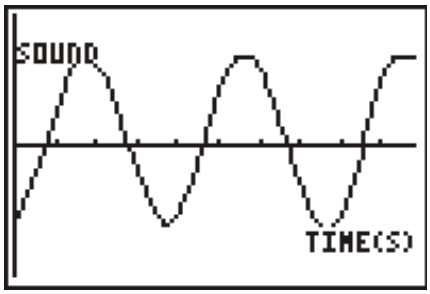
Stay Tuned (Adapted from Real World)



Connect the TI84 to the CBL2 and the microphone to the CBL2. Run the APPS CBLMath6. Select Tuned from the list of programs. When given the option collect data. You can answer yes to receive directions on setting up the equipment to make sure it is correctly connected. You will receive an OK window when all the connections have been verified.

You will told to strike the tuning fork on the table and to hold it just above the sensor. When you have struck the fork and placed it over the sensor, press ENTER. The data will be collected and then analyzed. A graph will appear for the data you have collected. Press ENTER and select Quit and then select Quit again.

You can share the lists of data from L1 and L2 with other calculators.



Once you have the graph on each screen look at the graph and notice it is probably a sine or cosine graph.

Let's try to fit the data with a sine equation.

In Y1 enter Asin(B*(x - C)) + D.

To write the graph you will need to understand what each of these constants do to the graph y = sin(x).

Write a brief description of each:

A:

B:

C:

D:

Currently the calculator has a value of zero for each of these variables. You might want to change a few of to equal 1. Store the following values for each: A = 1, B = 1, C = 0 and D=0.

If you press GRAPH after these values are stored you should see a graph of the normal sine function with the data.

Let's try to determine the correct value of A. What do you notice about the current value of A and what the real value of A should be?

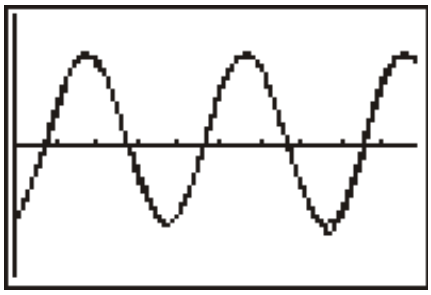
How can we determine the value for A? Trace along the graph to determine the value of A. Store this value in the calculator for A. Regraph the function to see how it fits the data.

How can we determine the value for B? Trace along the graph to determine the value of B. Remember that $B = \frac{2\pi}{Period}$. Store this value in the calculator for B. Regraph the function to see how it fits the data.

How can we determine the value for D? Trace along the graph to determine the value of D. Store this value in the calculator for D. Regraph the function to see how it fits the data.

We have one more constant to determine. How can we determine the value for C? Trace along the graph to determine the value of D. Store this value in the calculator for C. Regraph the function to see how it fits the data.

When you press GRAPH you should have a graph that closely resembles the graph for the slinky.



What is the meaning of A? How does it relate to the tuning fork? You may recall that the frequency of a sound wave is the number of cycles per second. The period of a sound wave is the number of seconds per cycle. Therefore the frequency is 1/period. Let's find the frequency of the tuning fork from the equation.

$$\text{Frequency} = \frac{1}{\qquad} =$$

Determine the percent error in your calculation from the true frequency.

Assignment: Obtain a new set of data from your teacher and determine the equation that fits the data. Determine the frequency of the data.