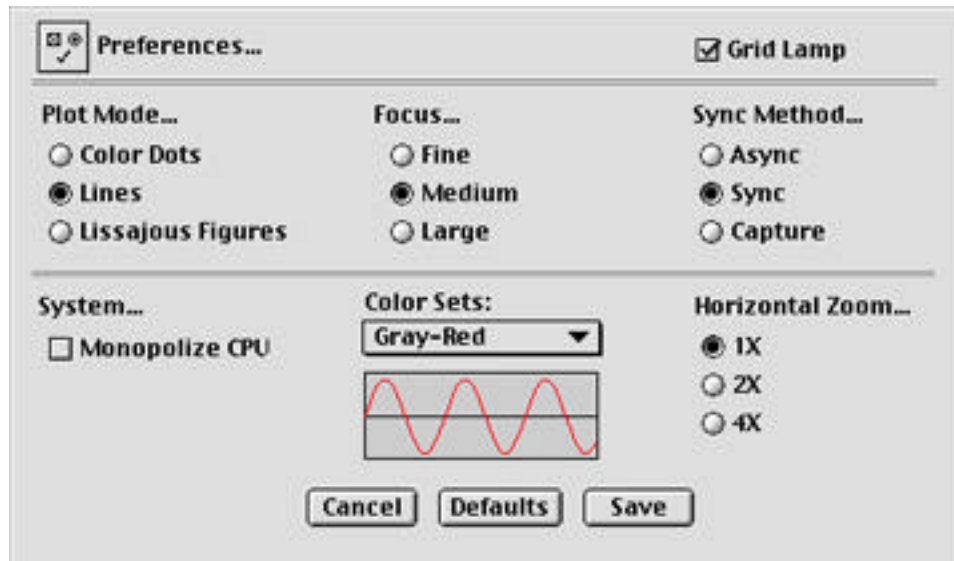


Objective: Use a computer to listen to a source which is producing a constant tone of unknown frequency, and measure its period. The student then determines the frequency and wavelength of the tone.

Materials: Macintosh computer with built in microphone, WaveWindow and Digital Oscilloscope software, tuning fork, thermometer.

Procedure:

Start WaveWindow Software. From the FILE menu, select "preferences". In the preferences window, make sure all the settings are as shown here:



Click the Save button.

Strike the tuning fork with the mallet. Hold the tuning fork about 1 cm from the microphone opening on the computer. Observe the wave in the window. Notice the time distance in milliseconds between each graduation on the window. When you have a good strong consistent wave form, click the stoplight icon to "freeze" the wave.

Determine the number of milliseconds between several complete waves, and calculate the average time from the crest of one wave to its first successive trough. This is the PERIOD of the wave. Note that the physical definition of period is slightly different but we are compensating for the software we are using. You may want to use the "screen ruler" to help you in measuring period.

From this data, calculate the frequency and wavelength of the sound produced by the tuning fork. SHOW ALL YOUR WORK. Correct speed of sound in air for the current temperature. (343 m/s +/- 0.6 m/s per degree from 20 Celsius)

Now, QUIT Wave Window and start the Digital Oscilloscope software. Strike the tuning fork again and hold it about 1 cm from the mic.

Being sure not to be noisy while the computer samples the sound, check the and r

the actual frequency of your tuning fork.

Compare this to the result you got by measuring period. Calculate the actual wave speed.
Calculate your percent error.

Exchange tuning forks with other lab stations until you have done at least 5 different tuning forks.

Make a data table that shows the number of each tuning fork, it's period, calculated frequency, sampled frequency, calculated wavelength, actual wavelength and speed of sound. Also record the current room temperature. Show all calculations in an ORGANIZED manner. "Bo" all relevant results.

Each student in group turns in the NEAT and organized results for your group. Sloppy work will be given an immediate zero with no opportunity to re-do.

Make sure you have QUIT all software currently running on your machine.