Sound pre-lab **Name: _____** **Date: _____** **Section/Table: ____**

The philosophy behind the Sound experiment is a little different from other experiments in that we're strongly encouraging you to simply come to the lab and play with sound. In the lab you will record different sounds and analyze them, so you'll need sources of interesting sounds to investigate. Your voice is an excellent source, so be sure to bring that with you. We will provide some things you can examine but please bring one or more items of your own. Musical instruments (from kazoos to tubas) would be useful, but anything that produces an interesting sound should be fine.

What source or sources of sound will you bring with you to the lab?

For the pre-lab, we will use this PhET simulation: http://phet.colorado.edu/en/simulation/fourier

The simulation has three tabs, but we will only use the first one, labeled "Discrete".

In the lab, you will record a sound, and the computer shows you the wave associated with the sound as well as the different frequencies the wave is made up of. With the simulation, in some ways we are doing the opposite, choosing the various amounts of different frequencies and then seeing the result.

[0.8 points] (a) Turn on A_1 only (drag the A_1 bar up from zero). For this wave (wave 1), what is the…

(i) wavelength? (Include units) _____ **(Make sure the "Math form" box is NOT checked)**

(ii) period? (Include units) _____ Hint: select "Function of time", not "Function of space"

(iii) frequency (round to 2 sig. figs.) _____ Hz

(iv) wave speed (round to 2 sig. figs.) _____ m/s

[0.4 points] (b) The other waves are harmonics of wave 1. What does it mean to be a harmonic?

[0.2 points] (c) For instance, when you turn on wave 5, how does its frequency compare to that of wave 1?

[0.4 points] (d) Turn on A_3 only, to see wave 3. Which waves are harmonics of wave 3?

[0.2 points] (e) If you turn on only waves 10 and 11, you can see the phenomenon of beats displayed in the bottom graph. The beat frequency is the difference between the frequencies of the two waves. What is the beat frequency in this case?

Note that you can turn the sound on – listen to how the sound changes as you adjust the settings.