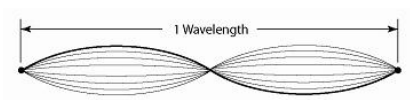
Name: ________________________ Period:__________________________

Chapter 23B Lab: Natural Frequency and Resonance (50 pts)

1. I have already set up the equipment for you. In order to get started, you need to turn on your Data Collector and press the Data Collection icon. Go to "settings" and it should be set to frequency (reading in Hz).
2. If the reading is 10Hz, that means the wiggler is oscillating back and forth 10 times per second.
3. At certain frequencies the vibrating string will form wave patterns. Each one of these patterns occurs at a *resonance* of the string. The resonances are called harmonics and they are described by the number of 'bumps' on the string. The following is a picture of one wavelength with '2 bubbles'.



4. Our string is one meter long. Knowing this information and what you learned in the picture above, what would be the wavelength of each one of the pictures below?

_____ m

_____m

_____m

5. Fill in the following table. To do this, change the frequency the wiggler moves so that you create 1,2,3,4,5, and 6 "bubbles" in the string. Record this frequency, wavelength, and amplitude.

Harmonic #	Frequency (Hz)	Wavelength (m)	Frequency* Wavelength	Amplitude (cm)

6. In one or two sentences, describe how the frequencies of the different harmonic patterns are related.

7. Propose a meaning for the answers you got in the 'Frequency * Wavelength' column.

8. If the frequency increases by a factor of two, what happens to the wavelength?

9. What happened to the amplitudes as you increased the frequency?