

Wave Tank Lab

Recording Data

During the lab in the break room on the third floor of Ridley Hall, you will observe waves in a wave tank for the following frequencies:

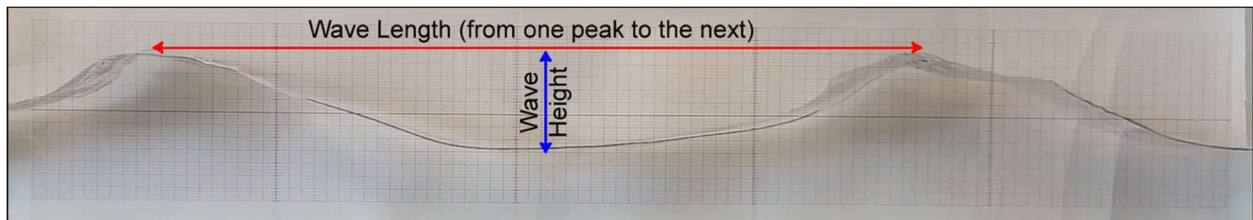
- 60 beats per minute
- 90 beats per minute
- 120 beats per minute

One team member will use an online metronome, which is a practice tool that produces a steady pulse (or beat) to help musicians play rhythms accurately, to guide the movement of the paddle. The second team member will move the paddle back and forth in time with the metronome to create waves at the specified number of beats per minute. The team member moving the paddle should make sure to move the paddle the full range of motion allowed by the paddle stops. The team members will then swap roles and repeat the process.

1. Do the heights of the waves vary at 60, 90, and 120 beats per minute?
2. If yes, why do these differences in wave heights occur ?

Analyzing Data

After completing the lab using the wave tank, use frames taken from a separately recorded video to measure the amplitude and wavelength at different frequencies. These images are available on Canvas. For each of the seven frames, use the grid taped to the front of the wave tank to measure the wave amplitude (as measured from the peak of one wave to its trough) and the wavelength (as measured from the top of one peak to the top of the next peak).



- Record the amplitudes for each frequency in a table similar to the one below.
- Record the wavelengths for the frequencies for which two full peaks are visible (i.e., waves generated from 90 through 120 beats per minute).

Frequency (BPM)	Amplitude (cm)	Wavelength (cm)
60		
70		
80		
90		
100		
110		
120		

Use the numbers in the table to create a graph on a sheet of paper for amplitudes at the recorded frequencies, with amplitude on the vertical axis and frequency on the horizontal axis in the manner shown in the image below.

Reflection

Then reflect on the following based on your observations:

1. What is the overall shape of the *amplitude* graph?
2. How does the change in *amplitude* compare to the change in *wavelength* as frequency increases?
3. In previous labs, you have observed waves in mechanical, electrical, acoustic, and optical systems. What properties have you observed hold true across these different wave forms and how are they responsible for the pattern of *amplitudes* recorded?
4. What properties that hold true across waves in mechanical, electrical, acoustic, and optical systems are responsible for the pattern of *wavelengths* recorded?