Name: _____Date: _____Period: __

Wave Generator Lab

Purpose: to calculate the speed of a standing transverse wave in a string driven by a small motor using the wavelength and frequency.

Materials: wave generator, IPC timer unit, motor driver unit, meter stick

Formulas: $v = d/t$ $v = f\lambda$ $f = 1/T$

Define these terms and give their units:

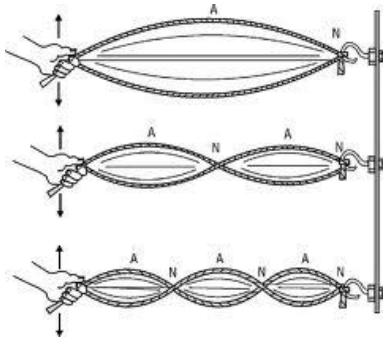
Frequency: _____

Period: _____

Wavelength: _____

Velocity: _____

Procedure:



1) Standing waves are produced when wave pulses are produced so that the reflected wave produces constructive interference. It is called a standing wave because the nodes appear to not be moving. There is also an optical illusion (persistence of vision) that makes it appear that there is a simultaneous crest and trough and that produces these segments:
2) Set the generator to waves and the timer to frequency. Turn on the generator and turn it up to the lowest frequency that produces a clear standing wave with obvious segments. Record the number of segments. 2 segments = 1 complete wave.
3) Record the frequency from the timer, in Hertz.
4) Measure the wavelength using a meter stick. It needs to be in meters. .76m, not 76 cm, please.
5) Calculate the velocity using $v = f\lambda$.
6) Repeat for three more settings, increasing the frequency as you go.

Data:

# of segments	frequency	wavelength	velocity
	Hz	m	m/s

Analysis:

1) Draw a transverse wave with amplitude of 2 cm, containing at least 2 wavelengths with magnitude of 6 cm each.

2) Label
   a) Amplitude
   b) Wavelength
   c) Crest
   d) Trough
   e) Node
   f) Anti-node

Conclusion:

1) Describe the type of wave that was generated: _____
   _____

2) On the sketch above, how many nodes are there? _____ How many anti-nodes? _____

3) A wave has a frequency of 252 Hz and a velocity of 355 m/s. Calculate the wavelength below, showing your work:

4) What is the period for this wave? Show your work.

5) As you turned up the speed of the motor and increased the frequency, what happened to the pitch you heard from the motor? How is pitch related to frequency? _____
   _____