Name	Date	Period	
	<b>AP Waves Worksheet 8</b>		

1. A string is fixed between the wave driver and pulley located 50.0 cm apart. A 200. g mass is attached to the end of the string providing the tension. When a wave generator vibrates at 150. Hz the string resonates in the third mode.



- a. Sketch the first 5 modes of vibration for this setup
- b. Find the wavelength for each of these modes
- c. Determine the speed of the wave for each of these modes
- d. Determine the frequency for each of these modes

Number of antinodes	DIAGRAM	WAVELENGTH	FREQUENCY	WAVE SPEED
1	50.0 cm			
2				
3			150. Hz	
4				
5 <sup>th</sup>				

2. The same string later found to have a wave speed of 100.0 m/s. What could have caused this to happen?

Number of antinodes	DIAGRAM	WAVELENGTH	FREQUENCY	WAVE SPEED
1	50.0 cm			
2				
3				
4				

b. Complete the chart for the first four modes of vibration when the wave speed is 100 m/s.

- 3. Eric Clapton plucks an A on a guitar string, which causes the string to vibrate with a standing wave that has 4 nodes and has a frequency of 440 Hz. The wave travels down the string at 176 m/s.
  - a. How long is a wave on the string? Draw a diagram of the standing wave.

- b. How long is the vibrating string?
- 4. Describe some factors that a guitar player can change to vary the frequency (pitch) of the sound produced by a guitar. Describe the change that each one would produce in the pitch of the sound. (Hint: you should be able to identify four changes that affect the pitch.)