Name _____ **Date** _____ **Period**_____

AP Waves, Worksheet 9

1. Minnie Sota hits the end of a bar 1.2 m long with a hammer. Sketch the standing wave on the bar for the following situations. The speed of waves in the bar is 6,500. m/s.

MODE	DIAGRAM	WAVELENGTH	FREQUENCY
Fundamental frequency (1^{st} harmonic)			
2^{nd} overtone (3^{rd} harmonic)			
Resonating with 4 nodes			
Resonating with 4 antinodes			

2. Justin Credable is singing in a shower that measures 2.40 meters from floor to ceiling, and notices his voice causes the shower to resonate with a fundamental frequency of 73 Hz.

   a. Sketch the standing wave and calculate the speed of sound in the shower?

   b. Sketch the standing wave for the first overtone and calculate the frequency.

3. Sketch the standing wave pattern on a resonating object that has a fixed boundary on one end and a free boundary on the other. The length of the resonating object is 90.0 cm.

MODE	DIAGRAM	Number of Waves	WAVELENGTH
Fundamental frequency (1^{st} harmonic)	Fixed boundary | Free boundary		
Resonating with 2 nodes	Fixed boundary | Free boundary		
Resonating with 3 antinodes	Fixed boundary | Free boundary		
Resonating in 5^{th} mode	Fixed boundary | Free boundary		

4. Amy Noacid performs a physics lab to determine the speed of sound inside a tube. She blocks off one end of the 120.0 cm tube with a book and places a microphone at the other end. When she snaps her finger she determines the time for the sound to get back to the microphone is 0.00695 s. What was the speed of sound that day?