

Station 1: Elastic Band

1.

Driving Frequency: 50Hz

Tension	Antinodes
0.8	7
1.0	6
1.2	5
1.4	5
1.6	4
1.8	4

2.

Tension: 1N

Driving Frequency	Antinodes
23	3
31	4
39	5
44	6
51	6
59	6

3.

$$v = \sqrt{\frac{T_s}{\mu}}$$

$$\lambda = \frac{v}{f}$$

$$\lambda \propto \frac{1}{\#A}$$

$$\frac{v}{f} \propto \frac{1}{\#A}$$

$$\frac{\sqrt{\frac{T_s}{\mu}}}{f} \propto \frac{1}{\#A}$$

$$\sqrt{\frac{T_s}{\mu}} \propto \frac{f}{\#A}$$

4. Our data closely matches the predicted result of following a linear relationship, although it started

5.

6.

7.

8.

9.

$$\lambda = \frac{2L}{\#A} = \frac{v}{f}$$

$$f = \frac{\#Av}{2L} = \frac{1(343m/s)}{2(1.265m)} = 135.57Hz$$

$$\rightarrow \{13.5KHz, 27KHz, 40.5KHz\}$$

10.

	Tube 1	Tube 2	Tube 3
Resonant frequency	20 KHz	16 KHz	13 KHz
2nd Harmonic	39 KHz	32 KHz	25 KHz
3rd Harmonic	60 KHz	48 KHz	38 KHz

11.

	Attached Mass	Resonant Frequency	Natural Frequency	% Difference
Stiff Spring	0.002	2.56	3.106	17.6%
Medium Spring	0.002	1.84	1.873	1.8%
Soft Spring	0.002	1.19	1.259	5.5%

12.

$$\sqrt{\frac{70g}{50g}} = 1.18$$

$$1.18 \cdot 2.56Hz = 3.02Hz$$

Real: 1.49 Hz, which is half of the predicted. We must have missed the first harmonic and got the second when we recorded.