Open Tube

Harmonic _____

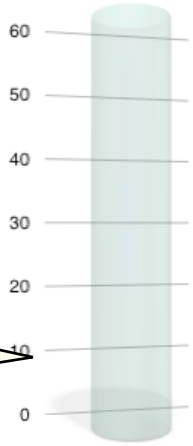
Overtone 1st

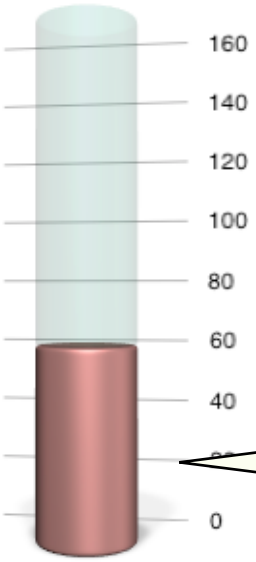
Wavelength _____

Frequency _____

Length 60 cm

Velocity 341 m/s





Closed Tube

Harmonic 5th

Overtone _____

Wavelength _____

Frequency _____

Length 100 cm

Velocity 341 m/s

Open Tube

Harmonic 4th

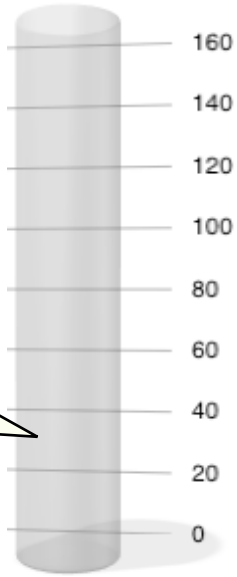
Overtone _____

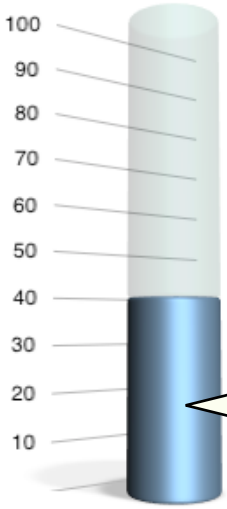
Wavelength _____

Frequency _____

Length 160 cm

Velocity 341 m/s





Closed Tube

Harmonic _____

Fundamental Frequency

Wavelength _____

Frequency _____

Length 60 cm

Velocity 341 m/s

Guitar String

Harmonic _____

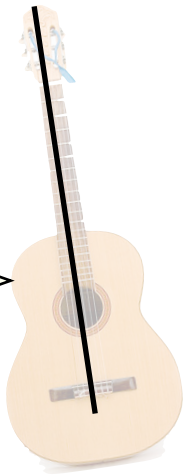
Fundamental Frequency

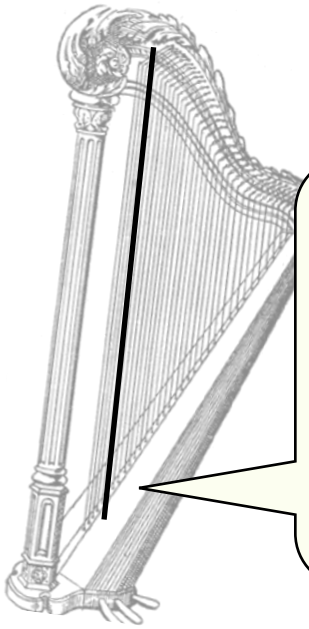
Wavelength 1.8 m

Frequency _____

Length _____

Velocity 140 m/s





Harp String

Harmonic 3rd

Overtone _____

Wavelength _____

Frequency _____

Length 2.1 m

Velocity 180 m/s

1. What is the fundamental frequency of a mandolin string that is 42.0 cm long when the speed of waves on this string is 329 m/s?

2. What is the fundamental frequency of a cello string that is 0.85 m long when the speed of waves on this string is 499 m/s?

3. An organ pipe that is open at both ends has a fundamental frequency of 370.0 Hz when the speed of sound in air is 331 m/s. What is the length of this pipe?

4. A pipe that is open at both ends has a fundamental frequency of 125 Hz. If the pipe is 1.32 m long, what is the speed of the waves in the pipe?

5.A saxophone plays a tune in the key of B-flat. The saxophone has a second harmonic frequency of 466.2 Hz when the speed of sound is 331 m/s. What is the length of the pipe that makes up the saxophone? A saxophone should be treated as a pipe closed at one end.

6. A penny whistle plays a tune in the key of G with a fundamental frequency of 392.0 Hz. The speed of sound in air is 331 m/s. What is the length of the penny whistle? Treat the penny whistle as a pipe closed at one end.