Sound Waves:

Speed of Sound = $\sqrt{\frac{B}{\rho}}$

B ← Bulk Modulus of a material

ρ → density of medium

In air @ 20°C

$V_{sound} = 343\ m/s$

Water @ 20°C

$V_{sound} = 1482\ m/s$

A pipe open @ both ends will resonate @ frequencies:

$$f = \frac{v}{\lambda} = \frac{nv}{2L} \quad n = 1, 2, 3, 4\ldots$$

[Similar to transverse standing waves...]

A pipe open @ one end & closed on the other will resonate @ frequencies:

$$f = \frac{v}{\lambda} = \frac{nv}{4L} \quad n = 1, 3, 5, \ldots$$

n=1  $\lambda = 4L$

closed

only odd harmonics!

n=3  $\lambda = 4L/3$

Beat frequencies: When two waves have really similar frequencies.

$$f_{Beat} = f_1 - f_2$$