Thurs: Discussion / Ex Quiz

   Ex 351, 352, 353, 354, 356, 357, 358

Fri: Review Final Exam

      Weds, Dec 13 8am

      Comprehensive!

Sound waves

Sound propagates through air as a result of oscillatory motion of air particles.

DEMO: PhET Waves Intro
   * Sound Tab
   * Particles Button ⟶ no waves   random oscillations
                       ⟶ waves   patterns of oscillations.

As with other waves, sinusoidal sound waves can be described in terms of wavelength and frequency. It is true that

$$v = \lambda f$$

The wave speed for sound waves generally depends on the temperature of air and at 20°C

$$V = 343 \, m/s.$$
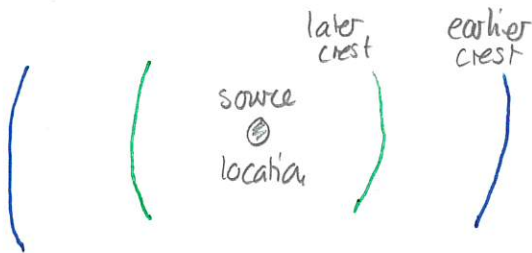
The frequency of sound waves corresponds to their pitch.
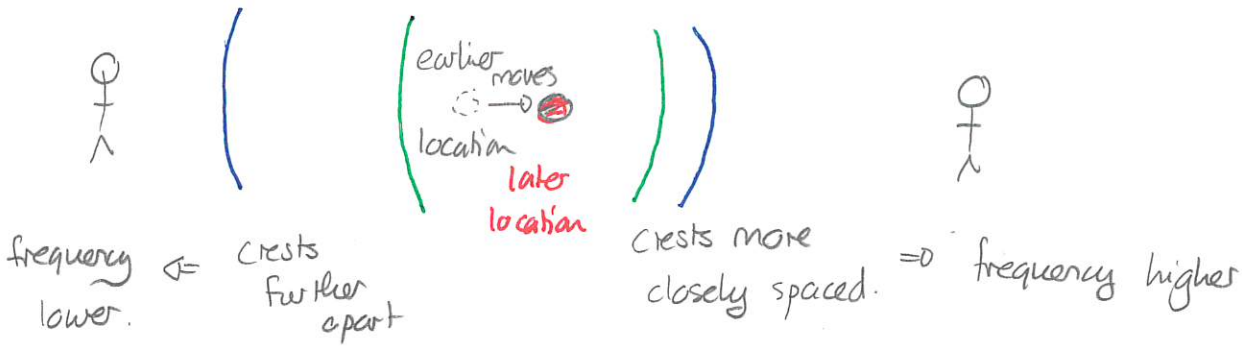   - higher frequency ⟹ higher pitch

Warm Up 1

   DEMO: Show with PhET demo.

Doppler effect

The motion of a source of sound waves relative to the observer will affect the perceived frequency of the sound. This is called the Doppler effect. Consider a stationary source. We can map the crests produced at two instants.

If the source is moving then it produces crests from different locations

frequency $\Leftarrow$ Crests further apart — frequency lower.

Crests more closely spaced. $\Rightarrow$ frequency higher

DEMO: oPhysics animation

In general:

If the source + detector approach each other $\Rightarrow$ frequency increases

If the " + " move away from each other $\Rightarrow$ frequency decreases

Warm Up 2

DEMO: Low landing

DEMO: Doppler ball.

DIAGNOSTIC