

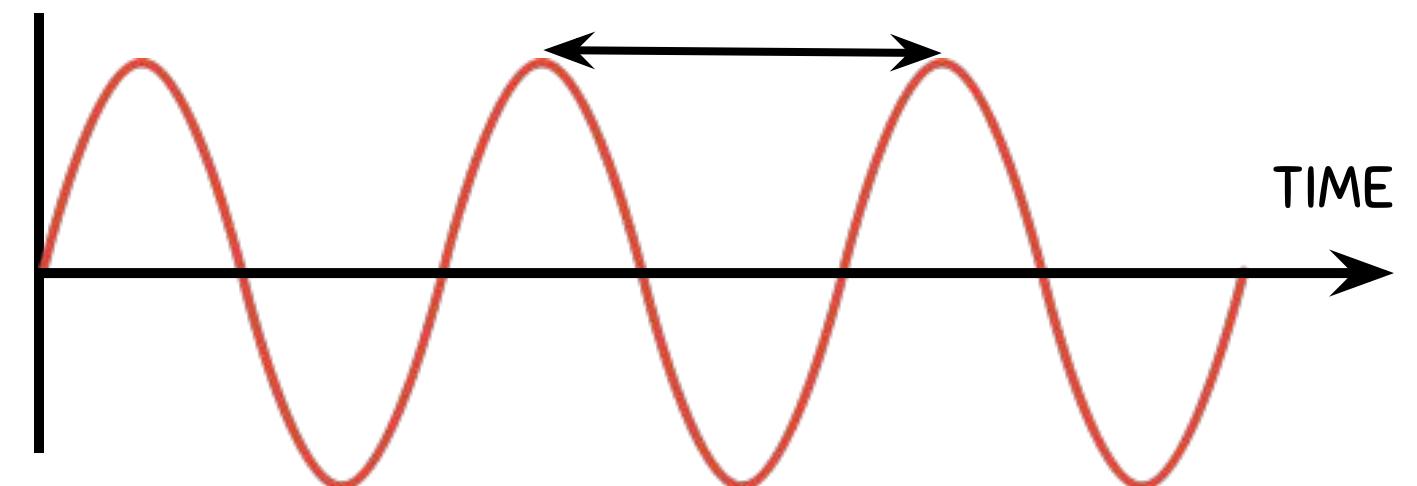
The Auditory Sensory System



Unit 2: Biological Bases of Behavior

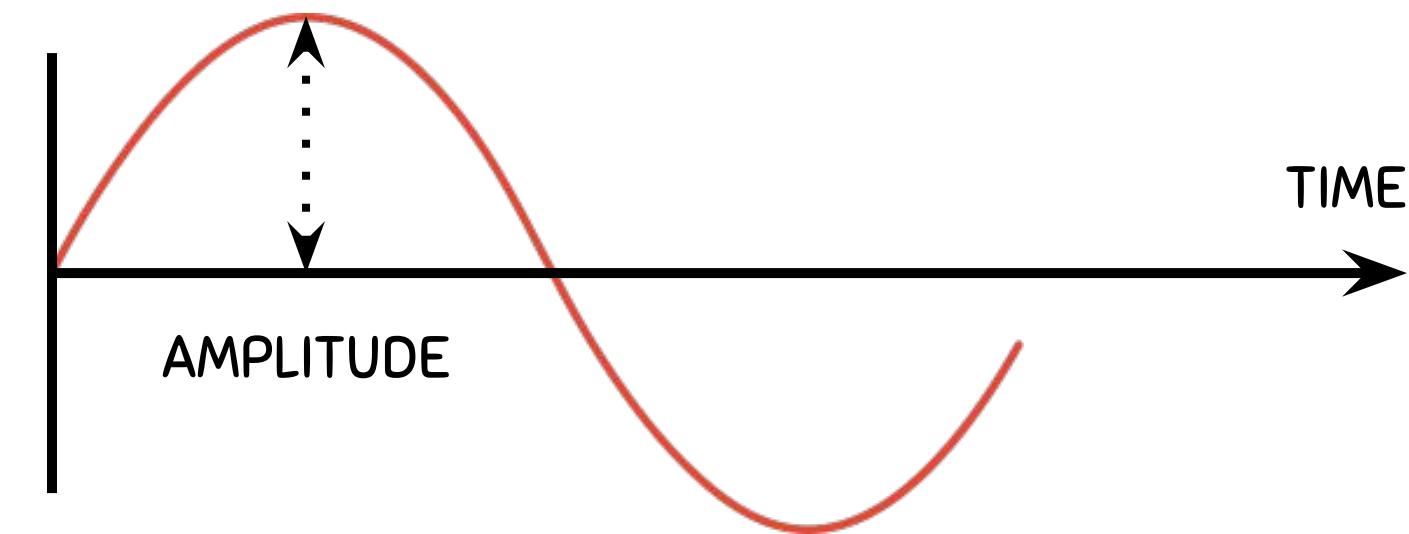
THE PHYSICAL PROPERTIES OF WAVES

Sound occurs through the movement of air molecules at different wavelengths and amplitudes.



Wavelength

It refers to how fast the wave vibrates or the number of cycles per second. The wavelength determines the pitch of the sound.

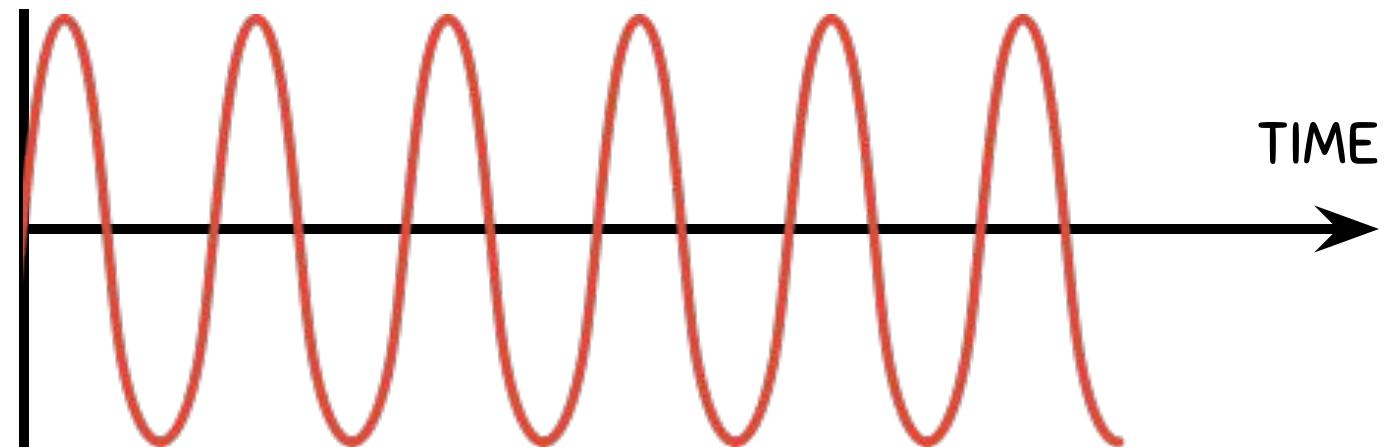


Amplitude

It refers to the height of the wave from the centre line. It tells the loudness of the sound.

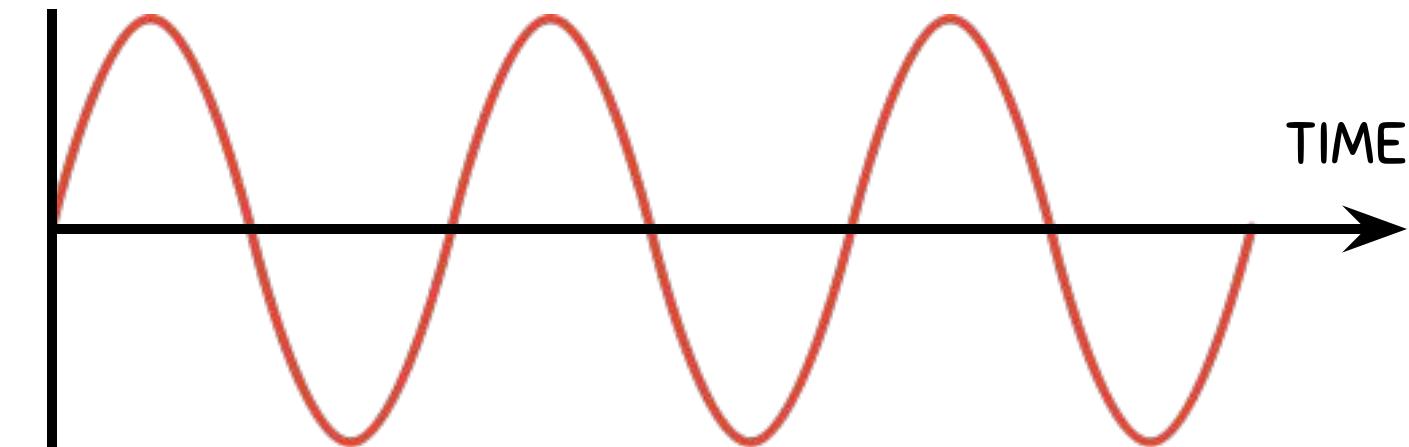
THE PHYSICAL PROPERTIES OF WAVES

Wavelength and Pitch



Higher pitch

More waves passing through a point per second results in a higher-pitched sound (like the chirp of a bird).

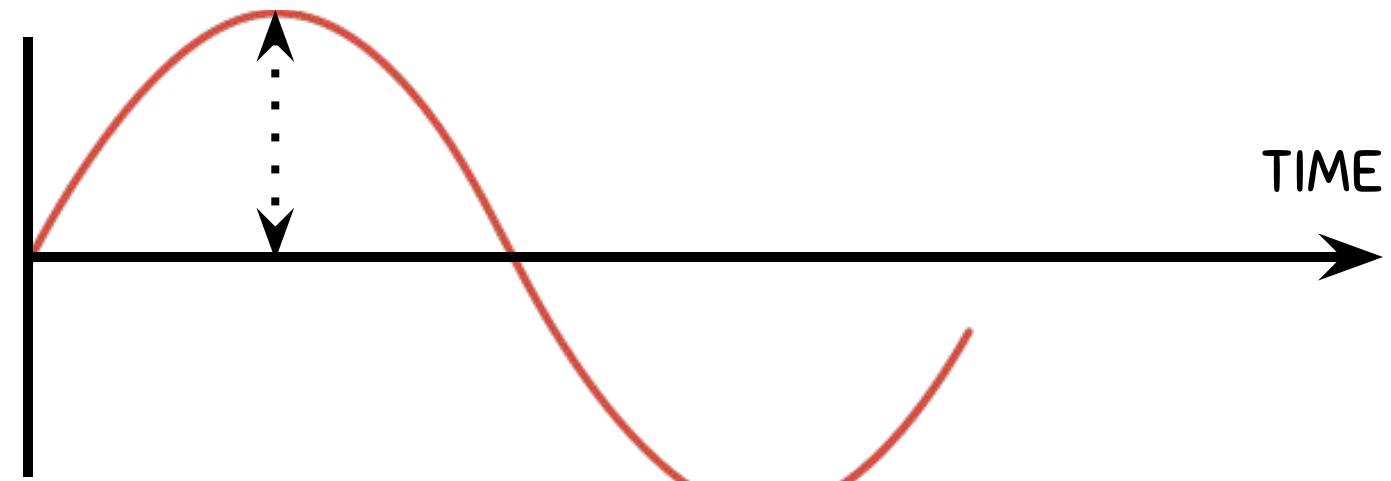


Lower pitch

Fewer waves passing through the same point per second creates a lower-pitched sound (like a drum beat).

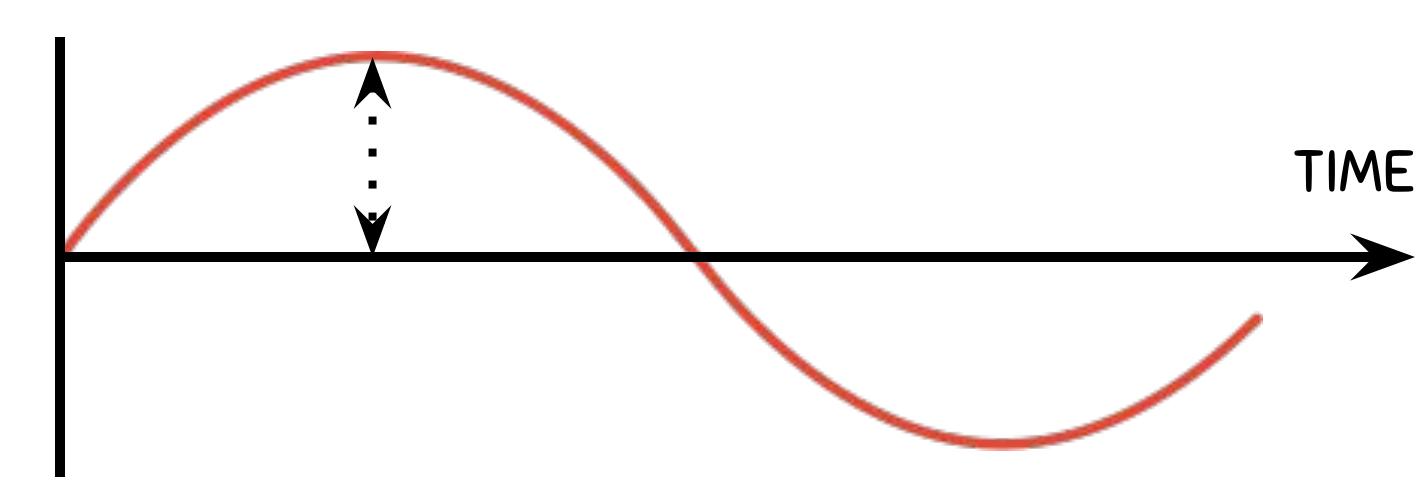
THE PHYSICAL PROPERTIES OF WAVES

Amplitude and Loudness



Louder

Larger amplitude makes the sound louder as the waves carry more energy.



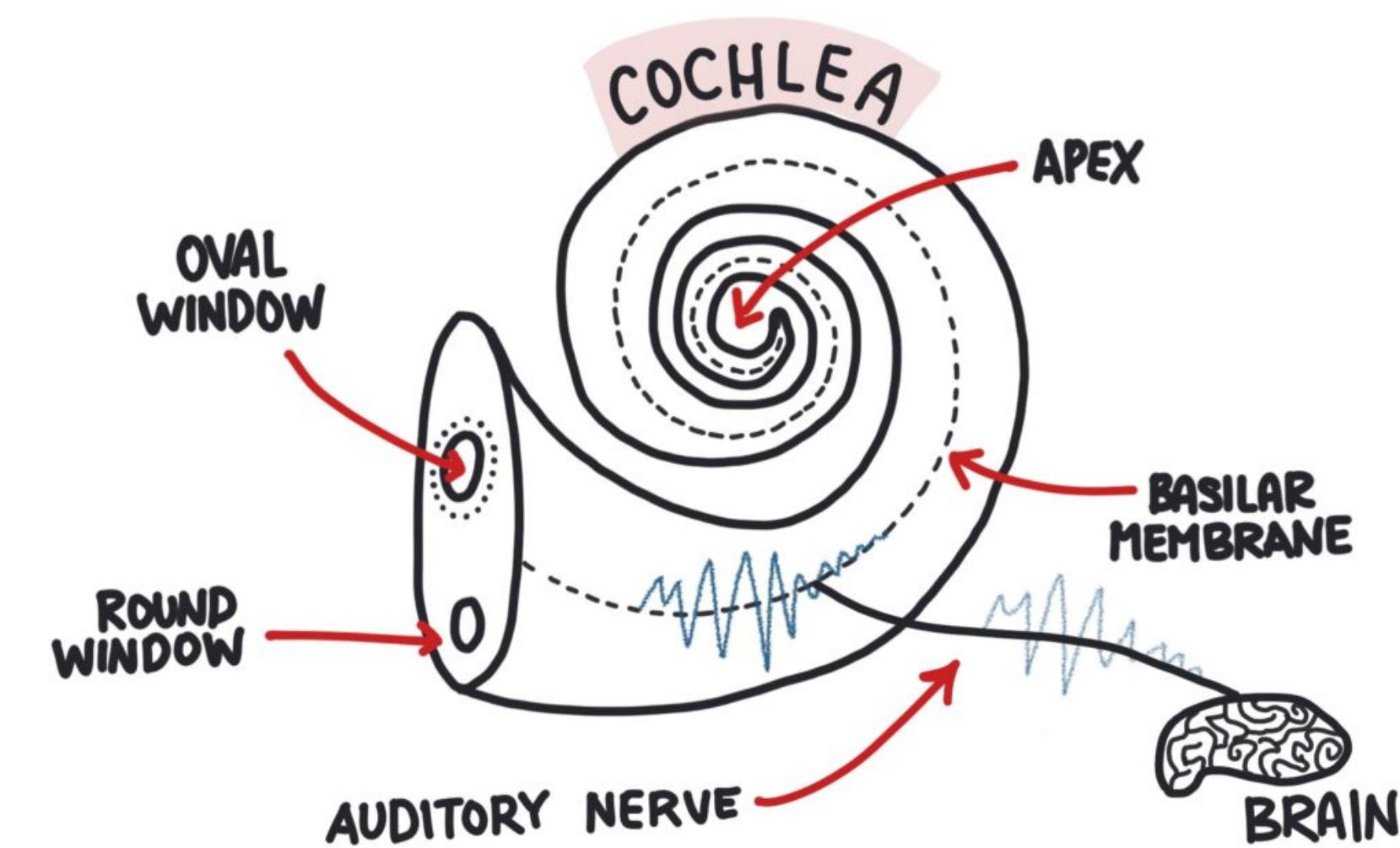
Softer

Smaller amplitude results in a softer sound.

THEORIES OF SOUND & PITCH PERCEPTION

Place Theory

We hear different pitches because different sound waves trigger activity at different places along the cochlea's basilar membrane.

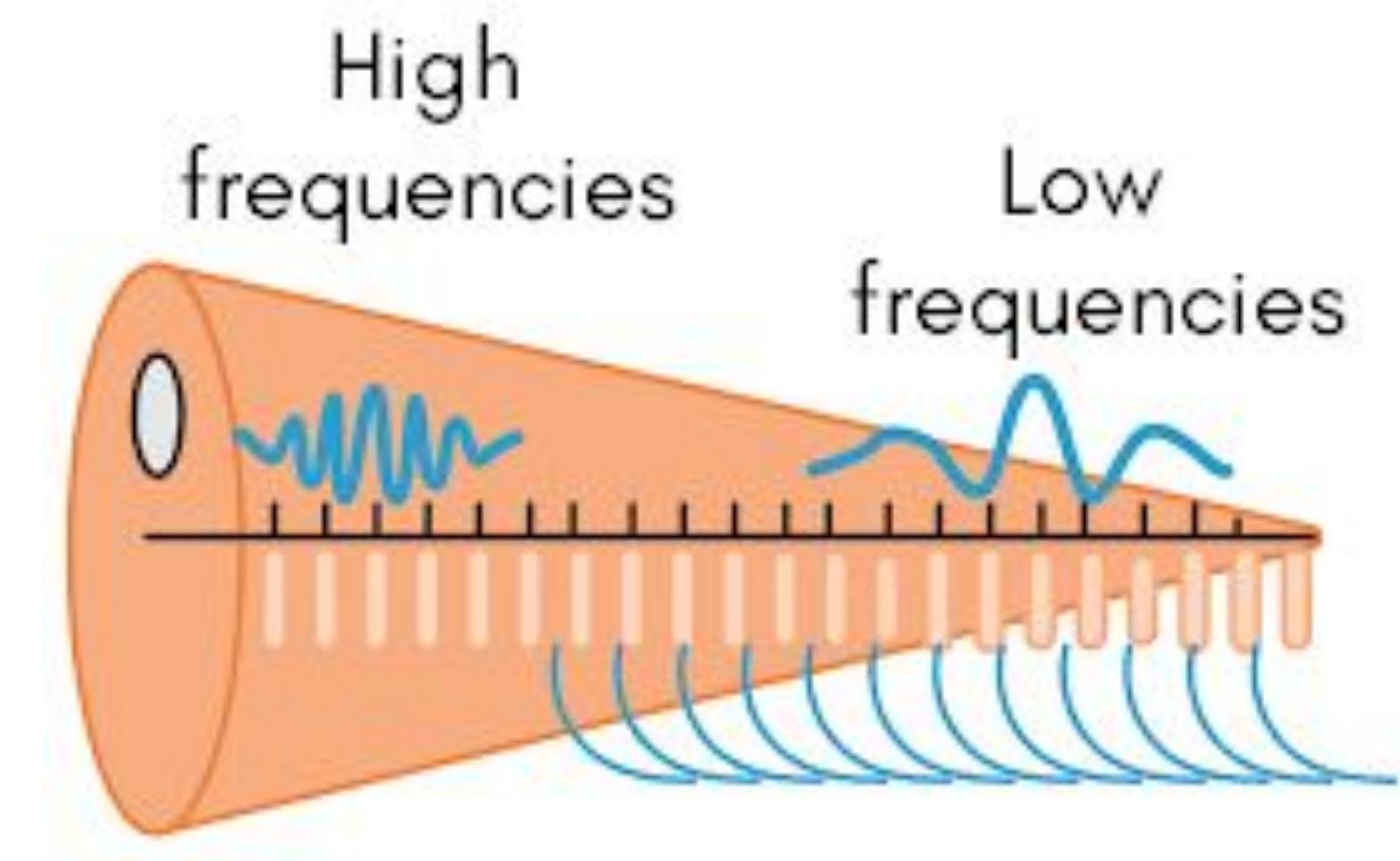




THEORIES OF SOUND & PITCH PERCEPTION

Frequency Theory

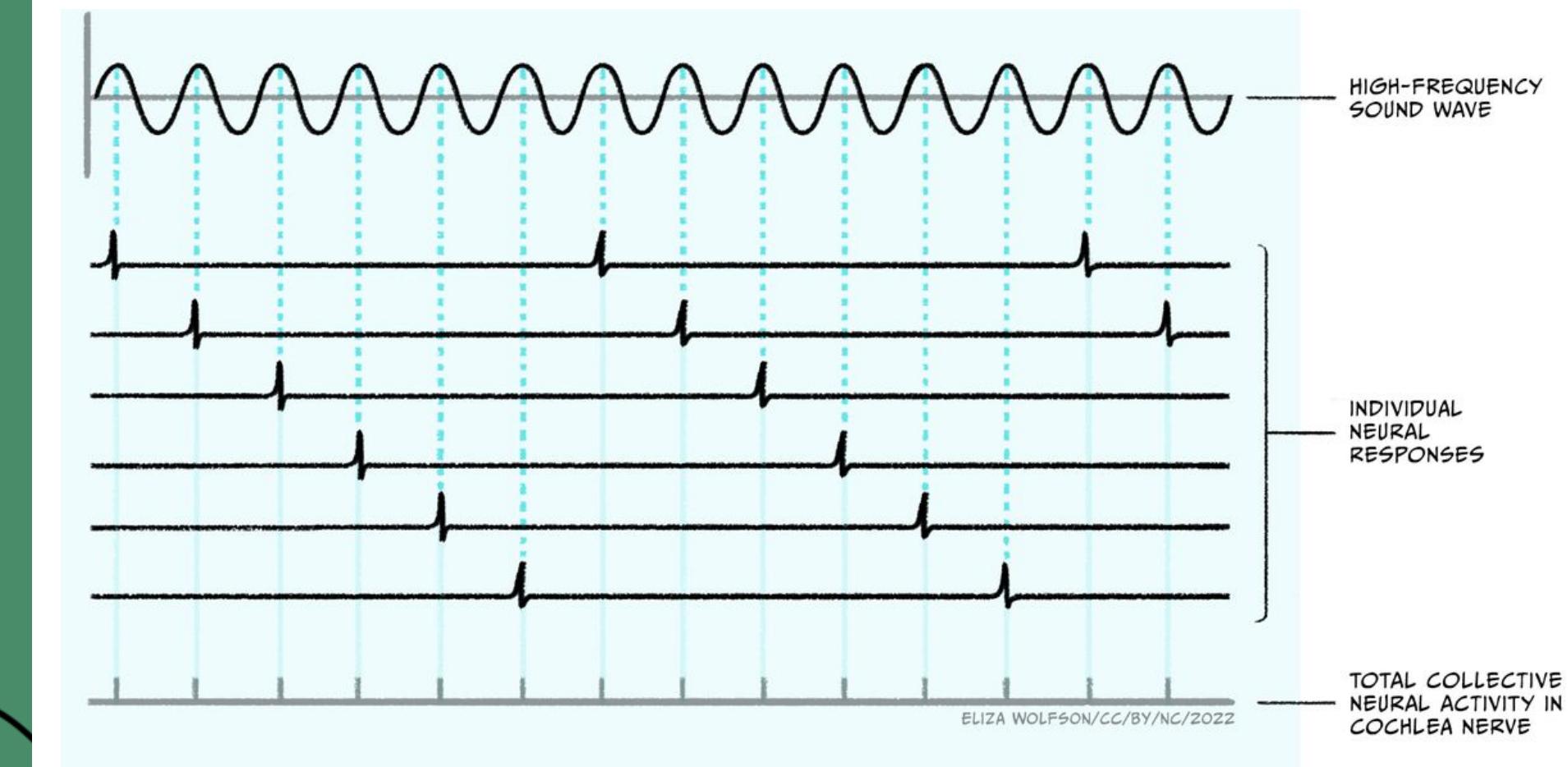
We hear different pitches because different sound waves trigger neural impulses to the brain at the same rate as the sound wave. If the sound wave has a frequency of 100 waves per second, then 100 pulses per second travel up the auditory nerve.

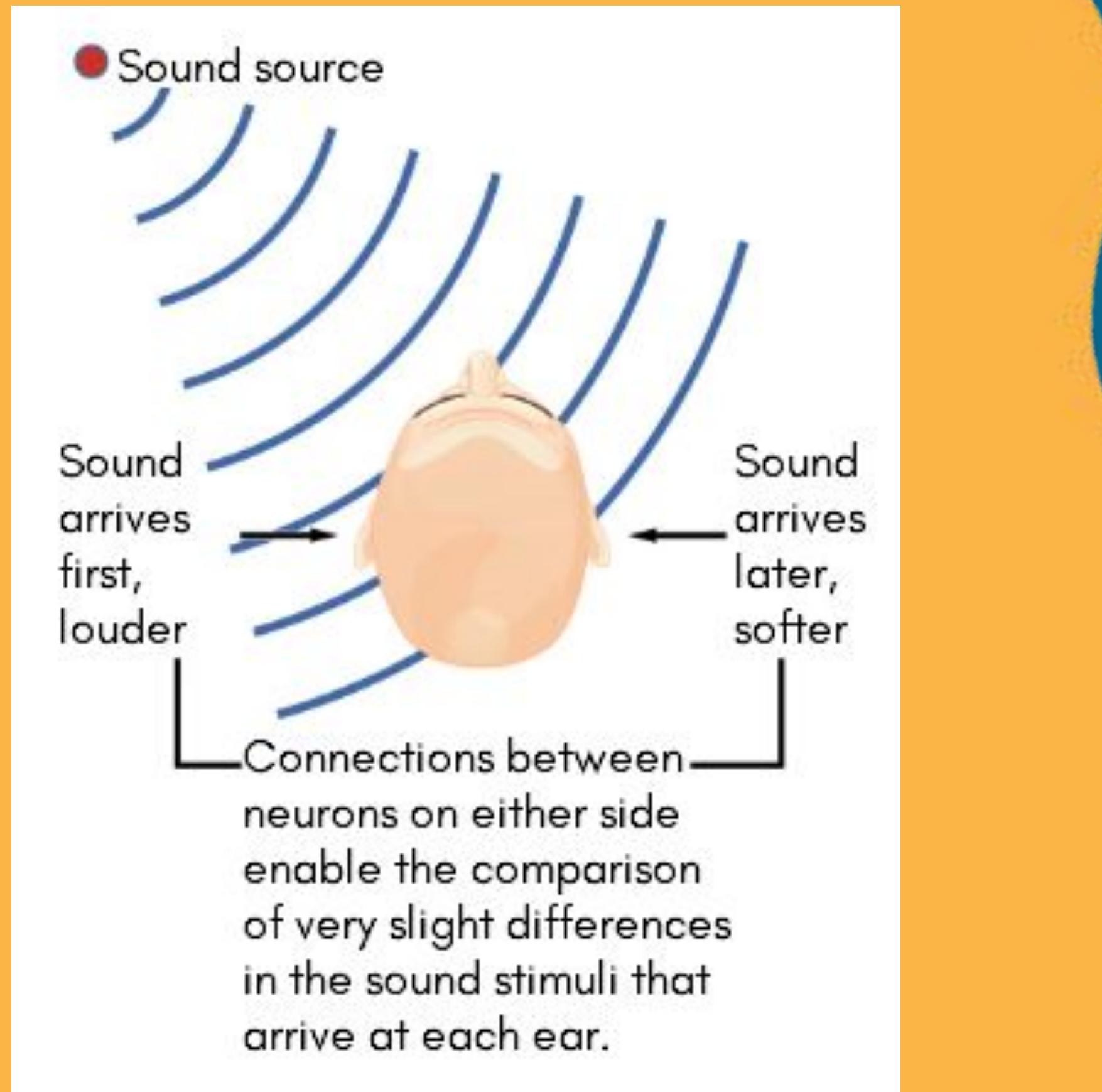


THEORIES OF SOUND & PITCH PERCEPTION

Volley Theory

Neural cells work together, alternating when they fire. Operating in rapid succession, they can achieve a combined frequency above 1000 waves per second.





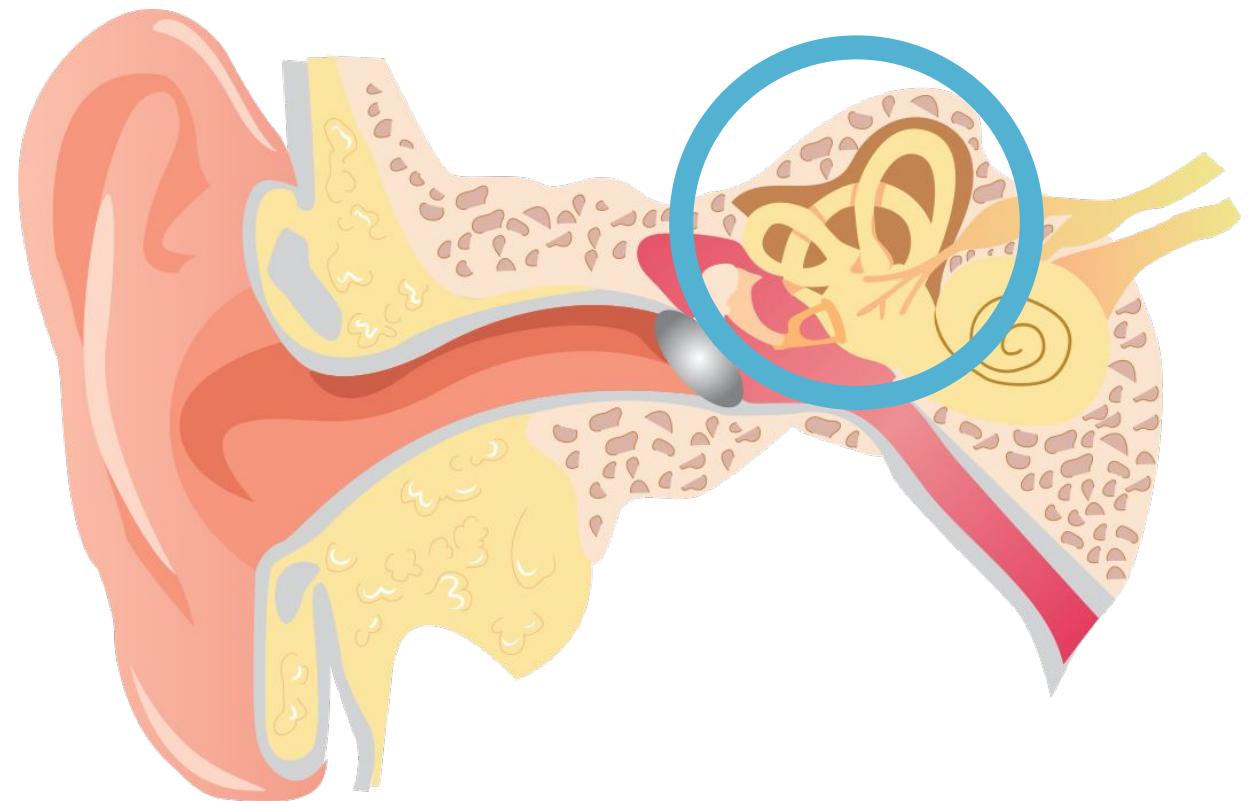
Sound Localization

The ability to identify the position and changes in position of sound sources based on acoustic information.

How does age impact our hearing?

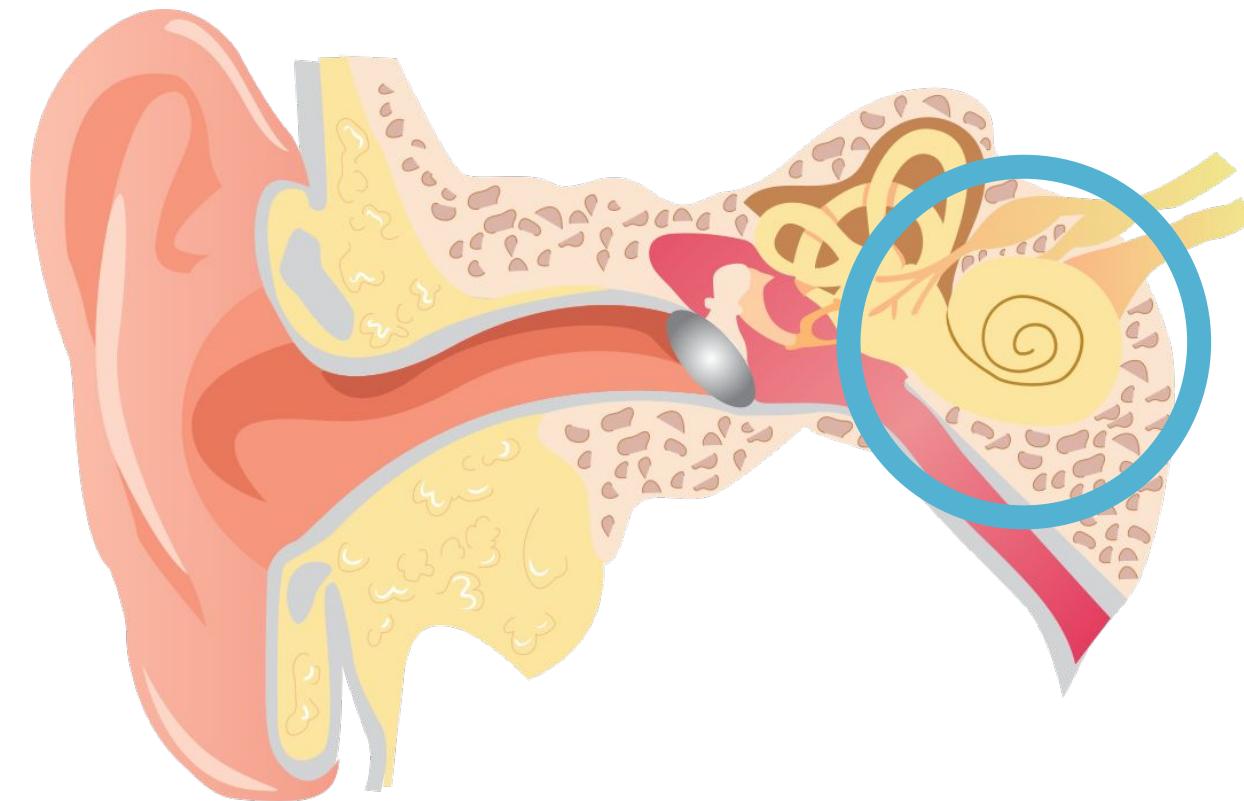
Types of Hearing Loss

Conduction Deafness



Conduction deafness results from damage to the mechanical system that transmits sound waves to the cochlea, most often the bones of the middle ear.

Sensorineural Deafness



Sensorineural hearing loss results from damage to the cochlea's hair cells or the auditory nerve. It results in some sounds being heard more softly or not at all.