

Music

Sound & The Hearing Process

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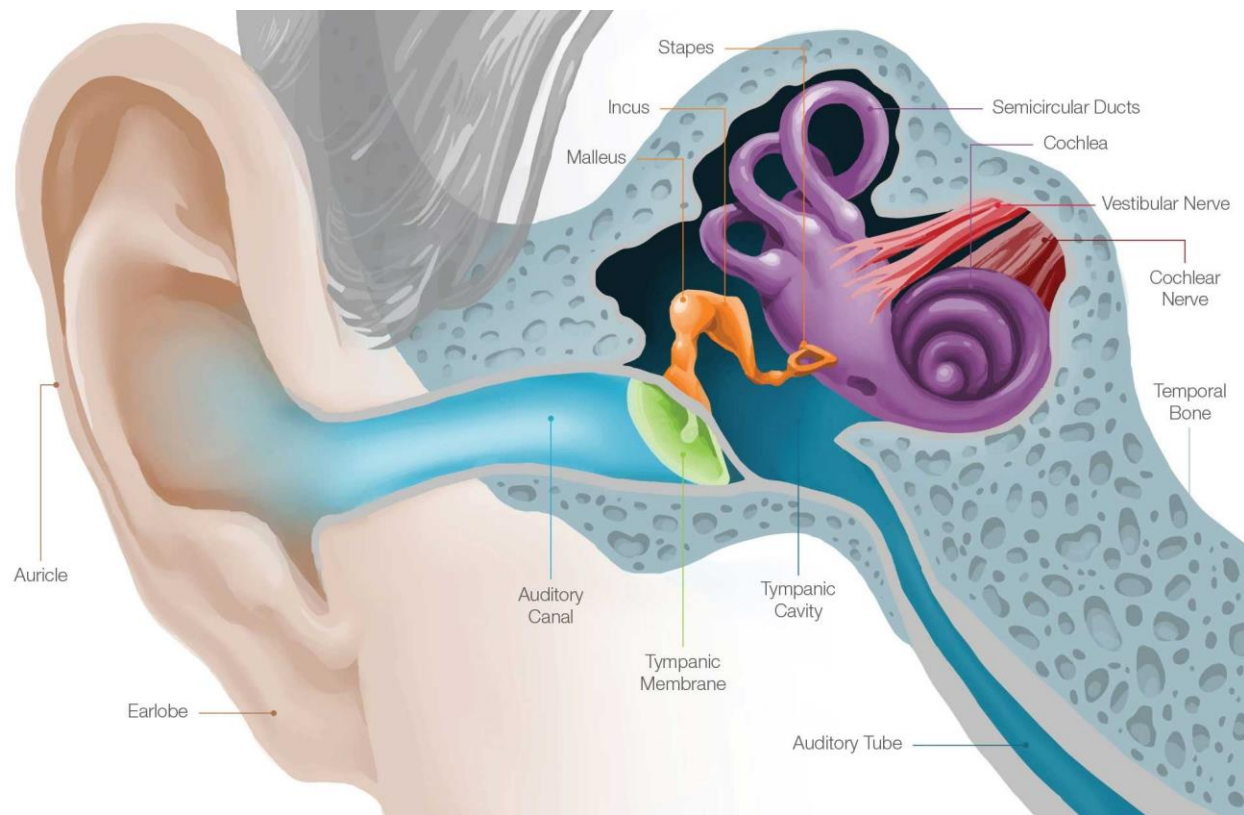
Whenever we hear a sound, there is something vibrating. In other words, an object is moving back and forth rapidly- so quickly, in fact, that we often cannot even see the motion. When the object vibrates, it initiates movement in the particles around it, and those particles, in turn, smack into their neighbors. The vibrations and particles create and transfer energy forming invisible waves. These waves, emanating out from the vibrating object, will continue onward until they run out of energy.

Frequently when we hear sounds, they are travelling through air. However, sound passes through other mediums, as well. Moreover, it is transmitted through water and solids, such as glass, metal, and stone, at an even faster rate than through air. This is because the particles are more tightly packed and need not travel far before they knock into each other.

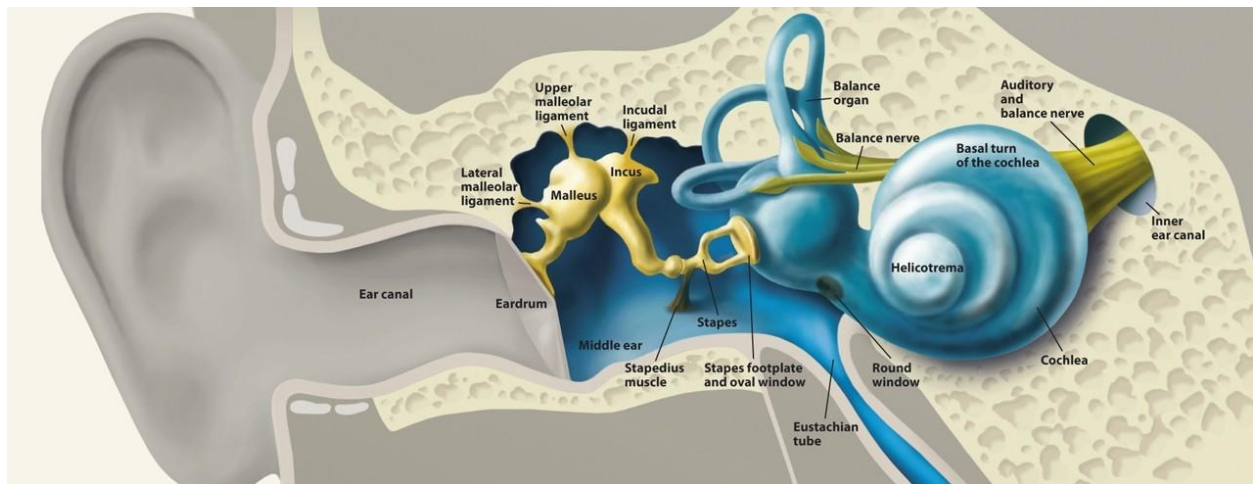
From a human standpoint, a second component to the concept of sound is when we are within a close enough distance from the source of vibrations for our ears to pick up the sound.



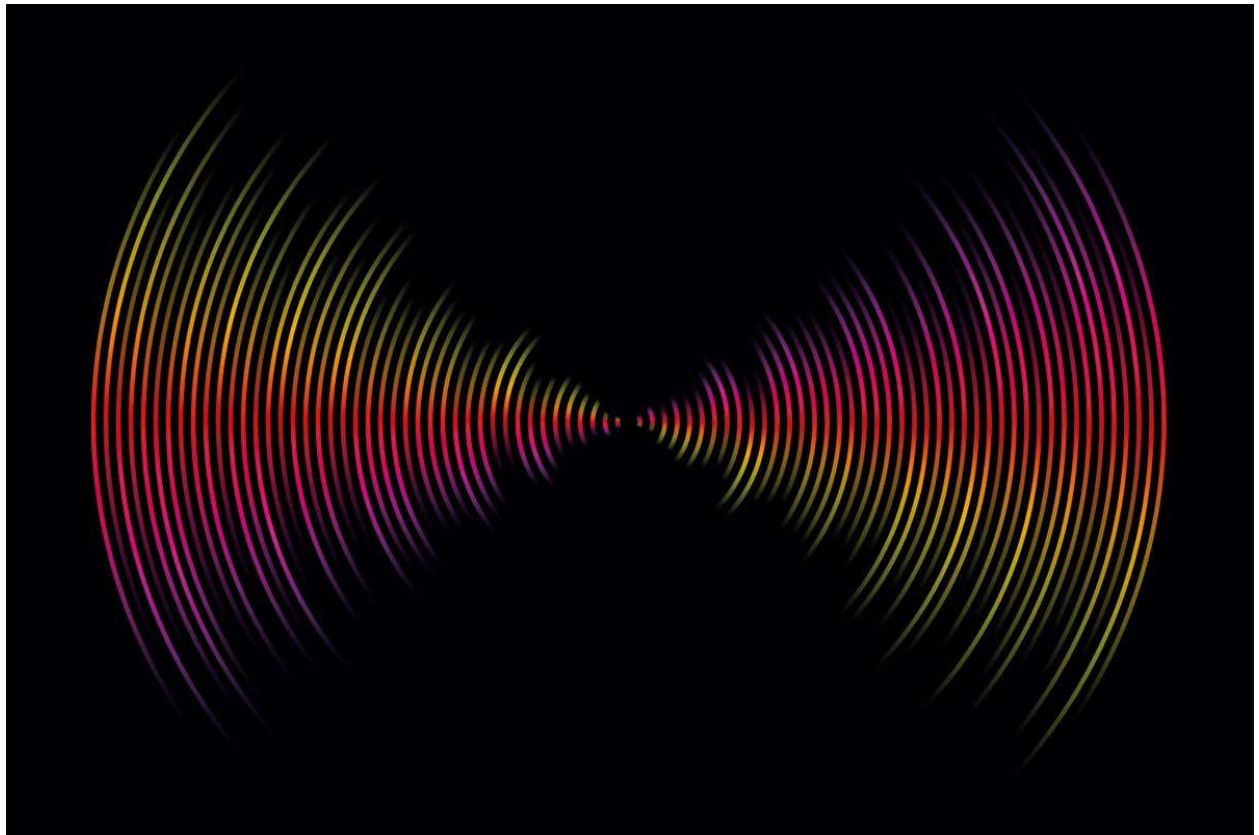
The Hearing Process



- ① Sound waves pass into the ear canal
- ② Reach the eardrum, making it vibrate
- ③ Stirring bones in the Middle Ear which strike the Inner Ear
- ④ Which carries the vibrations as waves through fluid in the Cochlea
- ⑤ Where Hair cells within the fluid convert the waves into electrical signals (nerve impulses)
- ⑥ Which are transmitted via the auditory nerve to the brain
- ⑦ Which converts and interprets them



“The better to hear you with, my dear:” A second diagram of the ear, with terminology corresponding to my explanation above



An admittedly pointless, yet cool picture of what sound waves could look like if they could be seen

Some sources: University of Toronto Computer Science, Scientific American magazine, Bill Nye, Uhac site, NIH: National Institute on Deafness, Science Kids at Home site, Explain That Stuff site