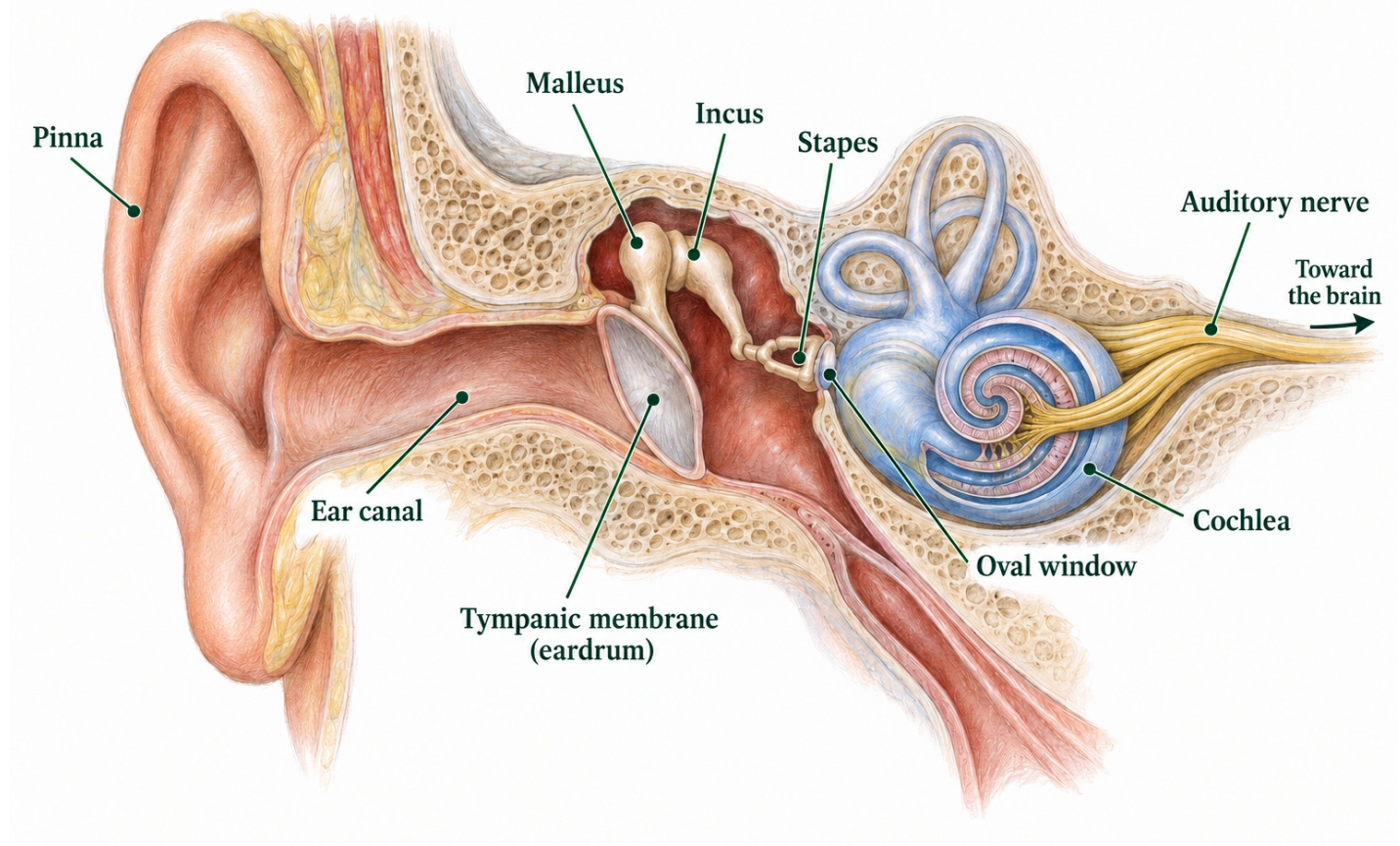


Follow the sound to the signal

Locate the problem along the sound-to-signal pathway before selecting a next test or support. Optional reference for existing lessons. No extra assignment or submission. Follow the current Schoology lesson for required work and deadlines. Current lesson links are on page 6.

How sound reaches the inner ear



Original colored-pencil teaching illustration. Simplified cutaway; no patient side is assigned. Follow the labeled route from pinna to auditory nerve. [1]

The pinna collects airborne sound. Sound travels down the ear canal and vibrates the tympanic membrane, or eardrum. The malleus, incus and stapes are three connected middle-ear bones called ossicles. The stapes moves at the oval window, transferring vibration to cochlear fluid. [1]

Within the cochlea, movement of the basilar membrane bends tiny hair-cell bundles called stereocilia. This mechanical motion starts an electrical response. Auditory nerve fibers carry signals toward the brain. The cochlear base responds best to higher frequencies; the apex, farther along the coil, responds best to lower frequencies. [1]

The illustration shows large structures. Hair cells are microscopic and are described in the text.

What does each observation test?

Air conduction (AC)	Sound through earphones uses outer ear, middle ear, cochlea and auditory neural pathways. A poorer AC result alone does not locate the problem.
Bone conduction (BC)	A skull vibrator bypasses outer/middle-ear sound transmission. Detection still depends on cochlear transduction and auditory neural signaling. BC does not prove every neural or central function is intact.
Masking	Noise delivered to the nontest ear limits cross-hearing. Unmasked BC may reflect the more sensitive cochlea, regardless of vibrator side. Masked, reliable results may be needed for an ear-specific comparison.

A threshold is the lowest level detected under a standardized repeated-response procedure. Formal thresholds need calibrated equipment and controlled background noise. A computer volume percentage, an online tone and a classroom response are not dB HL measurements. [11]

Typical AC testing spans 250-8000 Hz; conventional BC generally covers a narrower range, approximately 250-4000 Hz. Our constructed cases supply no 8000 Hz BC result. A missing value stays missing. [11]

ASHA manual guidance calls for BC masking when an unmasked BC threshold is 10 dB better than AC. That indication helps establish a valid measurement; it is not a universal disease cutoff. [11]

Looking at the canal and eardrum

Otoscopy is a clinician's visual inspection of the canal and tympanic membrane. Clinicians may inspect the pinna and surrounding skin and assess reported tenderness before viewing the canal. In class, study the model or supplied image; this description is not permission to insert an instrument. [3, 5]

To straighten the canal, clinicians generally draw the pinna up and back in adults/older children, and down and back in infants/young children, commonly under age three. This is background knowledge for understanding a clinical description. [5]

A normal-looking membrane is intact, translucent or pearly gray, and neutral to slightly concave. In an otoscope view facing the membrane, the classic anteroinferior light reflex is near 5 o'clock in the patient's right ear and 7 o'clock in the patient's left ear. These are patient sides, not the viewer's body sides. A reflection alone cannot establish disease. [3, 4, 22]

Canal swelling or tenderness	Can support external-ear inflammation; history and qualified assessment are needed.
Fluid or bubbles behind the membrane	Suggest middle-ear effusion, meaning fluid. Fluid alone does not establish acute infection.
Bulging membrane with effusion	Can support acute otitis media in the appropriate clinical context. Redness alone is insufficient.
Visible hole or obstructing wax	May indicate perforation or cerumen impaction. Do not remove wax, irrigate or choose treatment in class.

A finding is evidence to investigate. It is not a standalone diagnosis or a treatment order. [3, 6, 7]

Rinne and Weber need context

A 512 Hz tuning fork can support bedside localization. These are clinical comparison descriptions, not numerical audiograms. Follow only the teacher's voluntary, comfortable-level classroom demonstration. No result diagnoses a classmate. [8, 9, 23]

Observation	What it can and cannot support
Rinne: AC heard longer/better than BC	Called positive. Can occur in normal hearing AND sensorineural hearing loss. A positive result does not prove normal hearing.
Rinne: BC heard as long as or longer/better than AC	Called negative. Suggests a conductive component, but profound one-sided sensorineural loss can produce a false negative when the opposite cochlea hears skull vibration.
Weber heard toward one side	For a simple unilateral loss, tends toward the affected ear in conductive loss and the better ear in sensorineural loss. This side rule does not settle mixed or complex asymmetric cases.
Weber heard in the middle	Can occur with normal hearing or symmetric impairment. Midline does not rule out hearing loss.

In Rinne, a clinician compares perception from a vibrating fork at the mastoid bone behind the ear with perception beside the ear canal. The AC > BC shorthand describes perceived duration/loudness, not the relationship between two numerical dB HL thresholds. [8]

In Weber, the fork is placed at the midline of the head. Lateralization means the sound seems stronger on one side. Interpret that response with Rinne, otoscopy, history and formal audiometry as needed. There is no single diagnostic "positive Weber" result. [9]

When the pattern is bilateral, mixed, subtle, inconsistent or uncertain, record the uncertainty. Formal audiometry and masking may resolve it. Never turn a faint or unclear classroom response into an invented clinical finding. [8, 9, 23]

Your classroom boundary

Use models, images and supplied audiograms. Do not insert anything into a classmate's ear, irrigate an ear, create deliberately loud exposure or diagnose a classmate. Any teacher-approved partner activity is voluntary and uses comfortable sound levels.

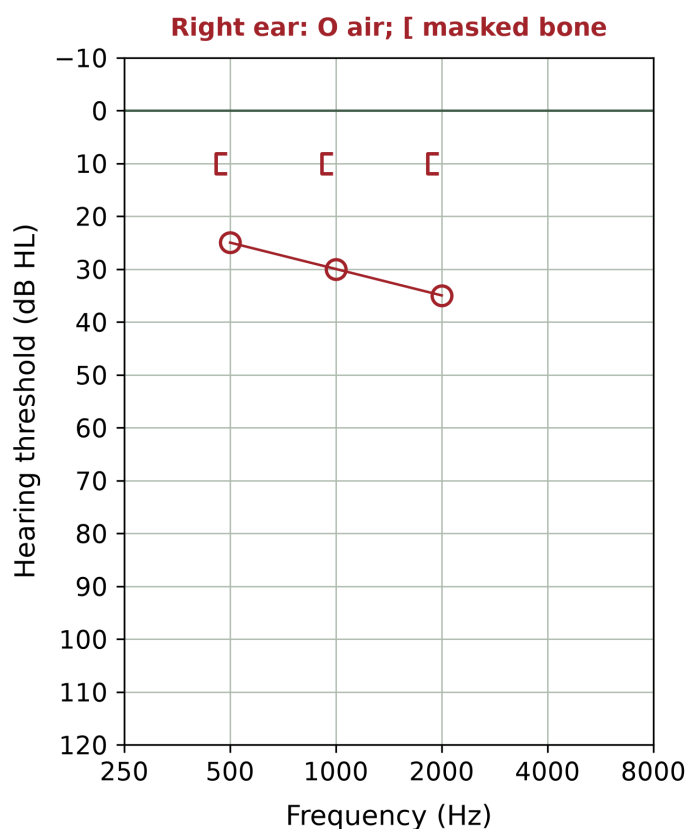
Pause and explain: Why could both a positive Rinne and a midline Weber occur even when a person has hearing impairment? Use the limits above to build the explanation.

Read the axes before the pattern

Frequency is pitch-related repetition rate, measured in hertz (Hz). Its horizontal scale is logarithmic: 250 to 500 Hz and 4000 to 8000 Hz are equal octave steps, each a doubling. Place values by frequency, not by equal spacing of every number in a list. [10]

The vertical axis is hearing level in dB HL and increases downward. A lower mark means a higher threshold and poorer sensitivity. Zero dB HL is a reference level, not silence. On these grids one octave horizontally has the physical length of 20 dB vertically. [10]

A no-response arrow attached to the test symbol means no response at the equipment limit. It is not an exact threshold; do not connect it as though it were measured. Check the chart's actual legend and test conditions. [10]



The conventional symbol legend

Air, unmasked: right O (red); left X (blue).

Air, masked: right Triangle (red); left Square (blue).

Bone, unmasked, mastoid: right < (red); left > (blue).

Bone, masked, mastoid: right [(red); left] (blue).

Shapes identify sides and conditions when printed without color. Unmasked BC symbols describe vibrator placement, not necessarily the responding cochlea. Masking must be interpreted from the clinical record. [10, 21]

Separate constructed microexample: right AC = 25, 30, 35 dB HL at 500, 1000, 2000 Hz; masked right BC = 10 dB HL at each. These are teaching inputs, not a person's results or one of the four practice cases.

A gap is not the degree of loss

ABG at a frequency = AC threshold minus BC threshold at that same frequency. This practice uses an ABG of 15 dB or more as a classroom flag for a conductive component, with the supplied reliable, ear-specific results. It is a teaching convention, not a universal diagnostic cutoff. ASHA's 10 dB BC-masking indication is a separate measurement rule. [2, 11]

Conductive pattern	Normal-range BC with poorer AC and a meaningful ABG supports an outer/middle-ear transmission component.
Sensorineural pattern	AC and BC are elevated together without a significant ABG. The numbers need not be exactly equal.
Mixed pattern	BC is elevated and AC is poorer still, leaving an additional ABG. More than one part of the route may be involved.

Type asks which part of the pathway may contribute. Degree asks how elevated the thresholds are. Configuration describes their shape across frequencies. An ABG is not the overall degree of hearing loss. [2, 12]

Use the ASHA/Clark categories below and identify whether you are describing a single frequency or the stated average. This is a named educational convention; a professional report may use another method. [12]

ASHA/Clark degree [12]	Threshold or stated average, dB HL
Normal	-10 to 15
Slight	16 to 25
Mild	26 to 40
Moderate	41 to 55
Moderately severe	56 to 70
Severe	71 to 90
Profound	91 or higher

For this practice, PTA means the air-conduction average at 500, 1000 and 2000 Hz, calculated separately for each ear. Display one decimal. To apply the integer Clark bands, round the unrounded average to the nearest whole dB; an exact .5 rounds upward. Always report important individual-frequency thresholds too.

Worked microexample from page 4: ABG at 1000 Hz = 30 - 10 = 20 dB. AC PTA = (25 + 30 + 35) / 3 = 30.0 dB HL, mild under the named convention. The 20 dB gap flags a transmission component in this constructed example; it does not determine the overall degree.

A 3000-6000 Hz notch can be compatible with noise exposure. A gradual bilateral high-frequency slope can be compatible with age-related change. Neither shape, age nor occupation proves a cause, a specific disease or a genetic explanation. [13, 14]

Older course resources may use 20 or 25 dB HL as a normal-limit convention. This reference and its constructed practice cases use the explicitly named ASHA/Clark bands. For assigned work, use the classification chart supplied by that lesson if it differs; never mix cutoffs. This reference does not change the paper quiz or its grading.

Choose support with the person

Hearing aids	Amplify acoustic signals. Surviving hair cells and neural pathways still process them. They can support several types of loss; they do not restore normal hearing. [15]
Bone-conduction devices	Route skull vibration around outer/middle-ear transmission obstacles to a functioning cochlea. They do not replace missing cochlear or neural function. [2, 15]
Cochlear implants	Use cochlear electrodes to stimulate auditory nerve fibers, bypassing damaged hair cells. They do not bypass the auditory nerve, guarantee an outcome or restore normal hearing. [16, 17]
Communication and access supports	Captions, suitable seating, clear face-to-face communication, remote microphones and visual/vibration alerts can be useful with or without a device. [19]

Device choice cannot be read directly from one degree label. Qualified teams consider the medical cause, anatomy, aided speech performance, likely benefit, follow-up learning, access and the person's own communication goals and preferences. [17, 18]

Respect Deaf identity and individual communication choices. Ask which spoken, signed, captioned or combined approaches the person wants; do not assume one device or one language goal fits everyone.

A sudden hearing change needs immediate medical attention. Do not assume wax, self-treat or wait for a classroom test to settle it. Students should involve a trusted adult and a qualified clinician. [20]

Return to the current required lesson

Optional reference for existing lessons. No extra assignment or submission. Follow the current Schoology lesson for required work and deadlines.

Today's Lesson · Mon 10/12 · Wk8 · 1.3.1 Days 1 and 2: Build a labeled ear model, then show a hearing loss case on it

Today's Lesson · Tue 10/13 · Wk8 · 1.3.2 Day 1: Run the Rinne test and a speech-in-noise test with a partner

Today's Lesson · Fri 10/16 · Wk8 · 1.3.2 Day 3 and Checkpoint Quiz: Choose the best hearing loss intervention

Use the optional study files when helpful

Use the one-page pocket card to review the rules; use the 16 flashcards for active recall. The separate four-case workbook contains new constructed data and blank plotting grids. Its questions are optional practice, not paper-quiz answers. The two-host study script is text, not an audio recording.

Open the source behind the claim

Numbered links throughout this guide open these sources. Policy dates below are the publications' dates, not a claim of new 2026 guidance. Use the linked guideline or reference when you want to investigate a claim in more detail.

- [1] NIDCD, How Do We Hear? | <https://www.nidcd.nih.gov/health/how-do-we-hear>
- [2] ASHA Practice Portal, Hearing Loss in Adults | <https://www.asha.org/practice-portal/clinical-topics/hearing-loss/>
- [3] MedlinePlus, Ear Examination | <https://medlineplus.gov/ency/article/003340.htm>
- [4] Queensland Health, Ears and Hearing, Child | <https://www.ccm.health.qld.gov.au/child-health-checks/ears-and-hearing-child>
- [5] Alaska, Hearing Screening Guidelines for Preschool/School Population (2016) | https://health.alaska.gov/dph/wcfh/Documents/school/Hearing%20Screening%20Guidelines%20for%20Pre-school_School%20Population.pdf
- [6] CDC, Pediatric Outpatient Clinical Care | <https://www.cdc.gov/antibiotic-use/hcp/clinical-care/pediatric-outpatient.html>
- [7] NIDCD, Ear Infections in Children | <https://www.nidcd.nih.gov/health/ear-infections-children>
- [8] StatPearls, Rinne Test | <https://www.ncbi.nlm.nih.gov/books/NBK431071/>
- [9] StatPearls, Weber Test | <https://www.ncbi.nlm.nih.gov/books/NBK526135/>
- [10] ASHA, Audiometric Symbols (1990 guidelines) | <https://www.asha.org/policy/gl1990-00006/>
- [11] ASHA, Manual Pure-Tone Threshold Audiometry (2005 guidelines) | <https://www.asha.org/policy/gl2005-00014/>
- [12] ASHA, Type, Degree, and Configuration of Hearing Loss (2023) | <https://www.asha.org/siteassets/ais/ais-type-degree-and-configuration-of-hearing-loss.pdf>
- [13] CDC/NIOSH, Understand Noise Exposure | <https://www.cdc.gov/niosh/noise/prevent/understand.html>
- [14] NIDCD, Age-Related Hearing Loss | <https://www.nidcd.nih.gov/health/age-related-hearing-loss>
- [15] NIDCD, Hearing Aids | <https://www.nidcd.nih.gov/health/hearing-aids>
- [16] NIDCD, Cochlear Implants | <https://www.nidcd.nih.gov/health/cochlear-implants>
- [17] ASHA Practice Portal, Cochlear Implants | <https://www.asha.org/practice-portal/professional-issues/cochlear-implants/>
- [18] ASHA Practice Portal, Hearing Aids for Adults | <https://www.asha.org/Practice-Portal/Professional-Issues/Hearing-Aids-For-Adults/>
- [19] NIDCD, Assistive Devices | <https://www.nidcd.nih.gov/health/assistive-devices-people-hearing-voice-speech-or-language-disorders>
- [20] NIDCD, Sudden Deafness | <https://www.nidcd.nih.gov/health/sudden-deafness>
- [21] Johns Hopkins Medicine, Understanding Your Audiogram | <https://www.hopkinsmedicine.org/health/conditions-and-diseases/hearing-loss/understanding-your-audiogram>
- [22] StatPearls, Tympanic Membrane Perforation | <https://www.ncbi.nlm.nih.gov/books/NBK557887/>
- [23] StatPearls, Conductive Hearing Loss | <https://www.ncbi.nlm.nih.gov/books/NBK563267/>