

The Sounds of Literacy!

Charting the C's Presentation 2025

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The science of reading is critical for all students. Still, for those with hearing loss, it takes on an even more essential role in supporting the framework for their literacy foundation and development. Full access to sound is essential in how students with hearing loss develop language skills, including reading and writing. Understanding how sound travels through the ear and how hearing loss can impact this process helps to guide effective teaching strategies tailored to their unique needs. By addressing both the science of reading and the unique challenges of hearing loss, educators can better support these students in developing strong literacy skills. The Reading Rope emphasizes the intertwining of phonological awareness, decoding, vocabulary, and comprehension—skills are all impacted by access to sound. This holistic approach provides students with the tools to access language. Promotes understanding of how auditory information is processed, helping bridge gaps and ensure more equitable learning opportunities for all students with hearing loss. Educators can create a more inclusive and effective literacy environment integrating knowledge of the science of reading with an understanding of how hearing loss affects auditory processing. This approach helps students with hearing loss build the essential skills needed to become proficient readers, ensuring that access to sound and structured language instruction supports their academic success.

How Hearing Loss Affects Sound Processing:

Conductive Hearing Loss: Sound waves may not travel efficiently through the outer or middle ear due to blockages, infections, or structural issues.

Sensorineural Hearing Loss: There may be damage to the hair cells in the cochlea or the auditory nerve, reducing the brain's ability to process sound signals accurately.

Mixed Hearing Loss: A combination of conductive and sensorineural issues.

Supporting Literacy for Students with Hearing Loss and Auditory Processing:

Amplification devices: Hearing aids, cochlear implants, and FM systems can enhance sound perception.

Visual aids: Sign language, captions, and visual storytelling can support comprehension.

Multisensory learning: Combining visual, tactile, and auditory approaches can strengthen literacy skills.

Connection to Literacy:

Hearing loss can impact a student's ability to process phonemic sounds, which are critical for developing reading and writing skills.

Students may require additional support, such as visual aids, sign language, speech-to-text technology, or specialized instruction, to enhance their literacy skills.

The Process of Hearing:

Hearing plays a significant role in literacy development, and for students with hearing loss, understanding how sound travels through the ear can be a crucial part of supporting their needs. Here's a simplified explanation of how sound travels through the ear:

Outer Ear (Sound Collection)

Middle Ear (Amplification)

Inner Ear (Sound Conversion)

Auditory Nerve (Signal Transmission)

Brain (Sound Interpretation)

Breaking down the Process of Hearing:

1. Outer Ear (Sound Collection):

- Sound waves are collected by the **pinna (pretzel)**(the visible part of the ear) and travel through the **ear canal (licorice)** to reach the **eardrum (peppermint candy)** causing it to vibrate. At times there is wax build up that blocks the opening of the ear canal or plugs up the ear mold of a hearing aid. (**gushers**)

2. Middle Ear (Amplification):

- Vibrations from the eardrum move to the **ossicles (jelly beans)**—three tiny bones called the hammer (malleus), anvil (incus), and stirrup (stapes). These bones amplify the vibrations.
- The stapes transmit the vibrations to the **oval window (pringles)**, a membrane leading to the inner ear.

3. Inner Ear (Sound Conversion):

- Vibrations enter the **cochlea (swiss roll)**, a spiral-shaped, fluid-filled structure. Inside tiny hair cells (sensory receptors) respond to different sound frequencies.
- Inside the cochlea, tiny hair cells move in response to the vibrations and convert mechanical vibrations into electrical signals. (**Sprinkles**)

4. Auditory Nerve (Signal Transmission):

- Electrical signals travel from the cochlea through the **auditory nerve (thin licorice)** to the brain.
- The brain interprets these signals as recognizable sounds.

5. Brain (Sound Interpretation):

- The **brain (popcorn)** processes these signals, allowing us to recognize and understand sounds, including speech.

Remember to take a picture