Charting the Cs Conference 2025:

To Literacy and Beyond

Cooperation
Communication
Collaboration

The Sounds of Literacy!

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The Science of Reading & Hearing Loss

Critical for all students—especially essential for those with hearing loss

Full access to sound supports language, reading, and writing development

Hearing loss impacts how sound travels and is processed in the brain

Tailored teaching strategies help address these unique auditory challenges

Reading Rope

The Reading Rope highlights skills reliant on sound:

- Phonological awareness
- Decoding
- Vocabulary
- Comprehension

Equitable Literacy

Promotes equitable literacy by bridging auditory gaps

Integrating reading science with hearing loss knowledge fosters:

- Inclusive instruction
- Strong literacy foundation
- 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:

- **Outer Ear (Sound Collection):**
  - Sound waves are collected by the **pinna (pretzel)**(the visible part of the ear) and travel through the **ear canal (pretzel stick)** 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**)
- **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.

Breaking down the Process of Hearing: part 2

- **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**)
- **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.

Breaking down the Process of Hearing: part 3

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

Charting the Cs

Thank you!