

And on This Farm He Had a ... What is THAT???

Assistive Technology Solutions to Support Vision and Hearing Loss

Who are we?



In 1988, Margaret and Chuck Doumitt realized the need for disability resources after two of their children were diagnosed with Batten's Disease. The STAR Center is headquartered in Jackson, Tennessee, though we have an office in Nashville and our Assistive Technology team serves individuals in all 95 counties across the state. In 2021, we became the nonprofit partner associated with the Tennessee AgrAbility Project. In addition, we are associated with Tennessee Vocational Rehabilitation and the Tennessee Technology Access Program. We serve any person with any type of disability diagnosis in order to support their educational, employment, or daily living goals.

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Financial Statement: I receive a salary from the STAR Center, and I have no financial ties to any of the products discussed in this presentation.

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Financial Statement: I receive a salary from the STAR Center, and I have no financial ties to any of the products discussed in this presentation.

Jason Barber

Self-Employed Farmer

Creator of “Farming, Blind with Duck” on YouTube

Daily Assistive Technology User



Financial Statement: I have no financial ties to any of the products discussed in this presentation.

Objectives

- ▶ Recognize two (2) barriers faced by a farmer with vision loss that can be overcome with the use of assistive technology.
- ▶ Name two (2) assistive technology solutions to support farmers who are hard of hearing.
- ▶ Identify three (3) ways to incorporate a smart device to assist a farmer with sensory loss.

Does Sensory Loss Really Impact Farmers?

- ▶ In a 2016 study of 300 agricultural workers, approximately 30 participants had a moderate to severe visual impairment.
 - ▶ Environmental Risks
 - ▶ Chemicals
 - ▶ Machinery
 - ▶ UV Light
 - ▶ Airborne Soil or Objects
- ▶ Hearing loss from noise exposure is the #1 sensory disability among farmers.
 - ▶ Permanent and irreversible
 - ▶ Environmental Risks
 - ▶ Tractors/combines
 - ▶ Livestock
 - ▶ Chainsaws
 - ▶ Firearms

Farm Activities Requiring Sight and Hearing?

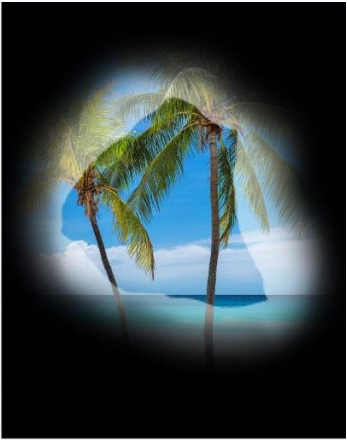
- ▶ Monitor livestock health
- ▶ Administer medications
- ▶ Observe crop growth
- ▶ Repair equipment
- ▶ Repair fencing
- ▶ Choosing tools
- ▶ Locating lost items (e.g., nuts, bolts, screws, nails, etc.)
- ▶ Locating animals
- ▶ Listening to animals
- ▶ Hearing the functional sounds of equipment
- ▶ Recognizing when someone has approached

Vision Technology

Defining Visual Impairment

- ▶ NOT the same as “needing glasses” or adding bifocals to existing prescription.
- ▶ Defined by visual acuity
 - ▶ Technical definitions have varied with best-corrected visual acuity (BCVA) of either 20/40 or 20/60.
 - ▶ In general terms, visual impairment cannot be corrected with typical intervention and interferes with daily functioning.

Visual Impairment Examples



Glaucoma



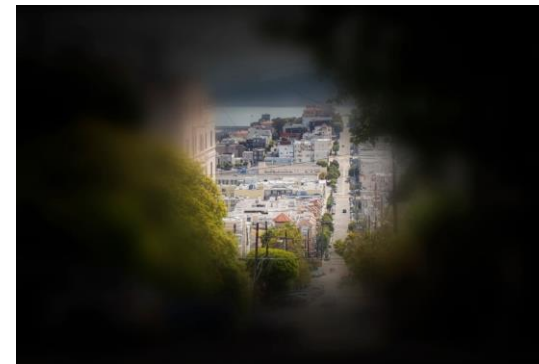
Age-Related Macular Degeneration



Cataract



Diabetic Retinopathy



Retinitis Pigmentosa

Handheld Solutions

Support in the palm of your hand

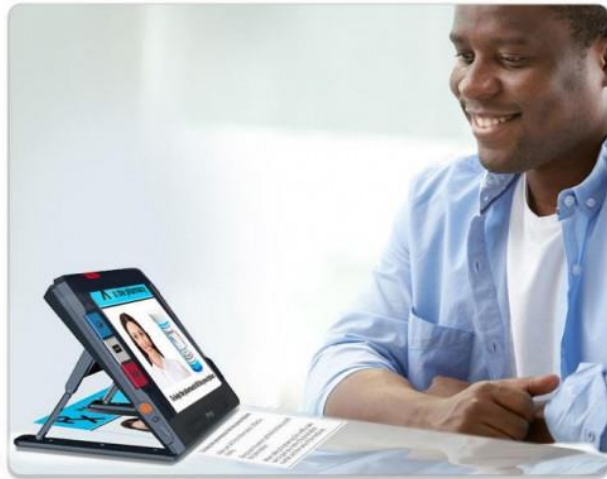
Low-Tech Options

- ▶ Handheld Magnifier
- ▶ PenFriend 2
- ▶ Solar Shields
- ▶ Bump dots
- ▶ Talking watch
- ▶ Magnetic pickup tool
- ▶ Magnetic parts dish



Portable Digital Magnifiers

Ruby 10 with Speech



Nara 5



Phone Applications and Accessibility

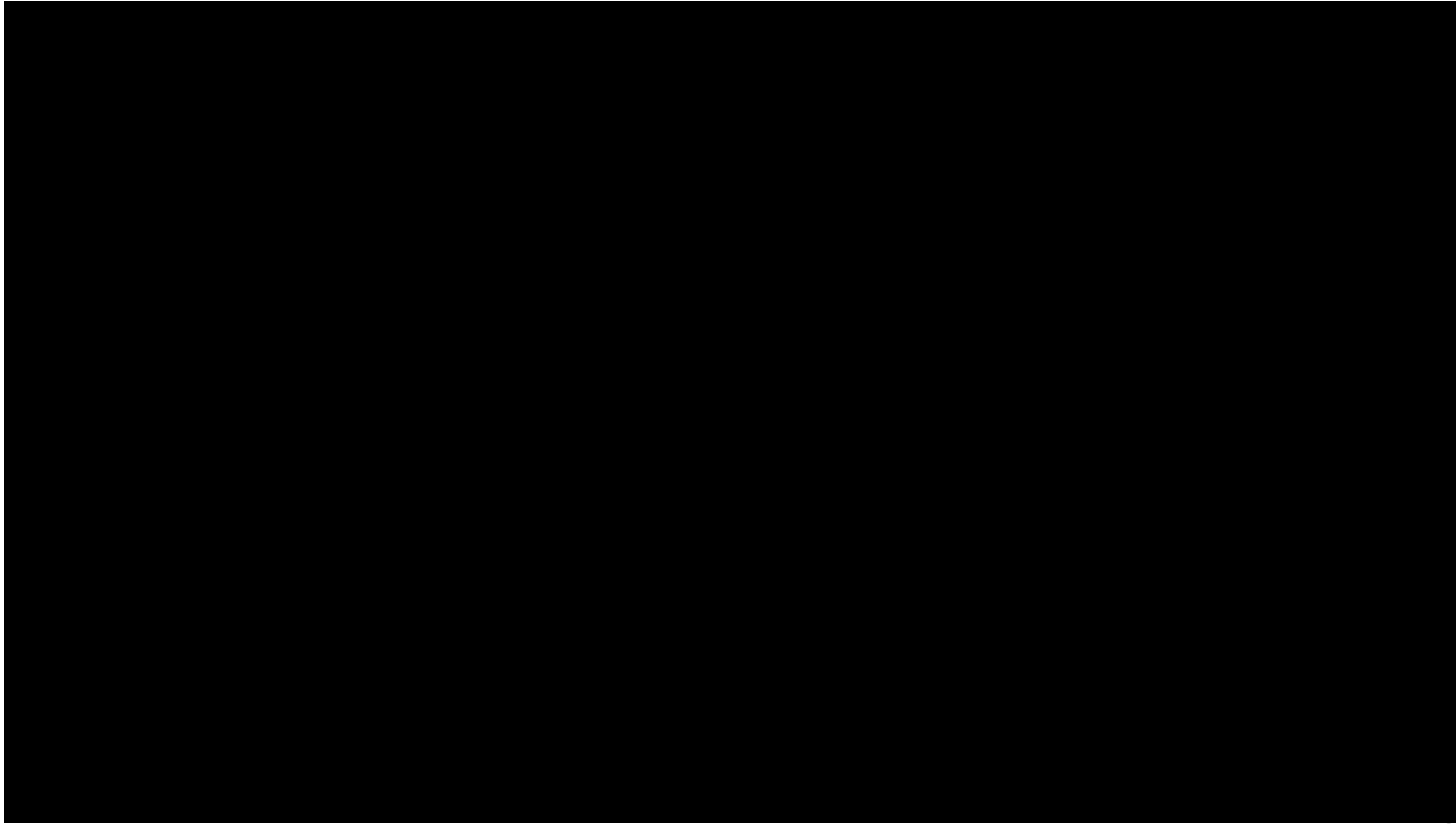


Seeing AI



WayAround

WayAround Demonstration



Phone Applications and Accessibility



Seeing AI



WayAround



17 Be My Eyes

Phone Applications and Accessibility

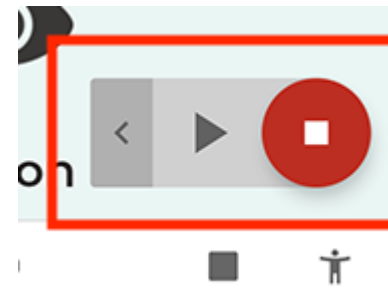
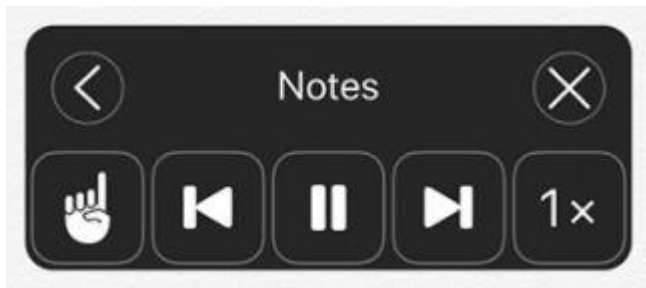
Options including in the Operating System - Part 1

- ▶ VoiceOver (iOS)/TalkBack (Android)
 - ▶ Gesture based screen reader
 - ▶ Verbal descriptions of everything on the screen
 - ▶ Battery level
 - ▶ Applications
 - ▶ Text
 - ▶ Who is calling
 - ▶ Customizable with voice, speaking rate, pitch

Phone Applications and Accessibility

Options including in the Operating System - Part 2

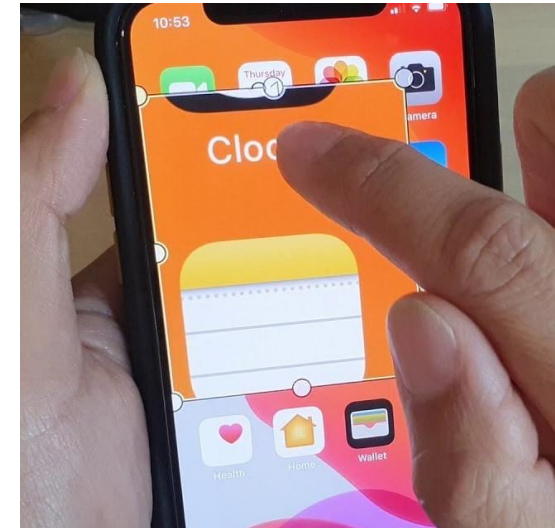
- ▶ Spoken Content (iOS)/Select-to-Speak (Android)
 - ▶ Verbalize specific text on the screen.
 - ▶ By gesture, selections, or speaking the entire screen.
 - ▶ Customizable with voice, speaking rate, pitch.



Phone Applications and Accessibility

Options including in the Operating System - Part 3

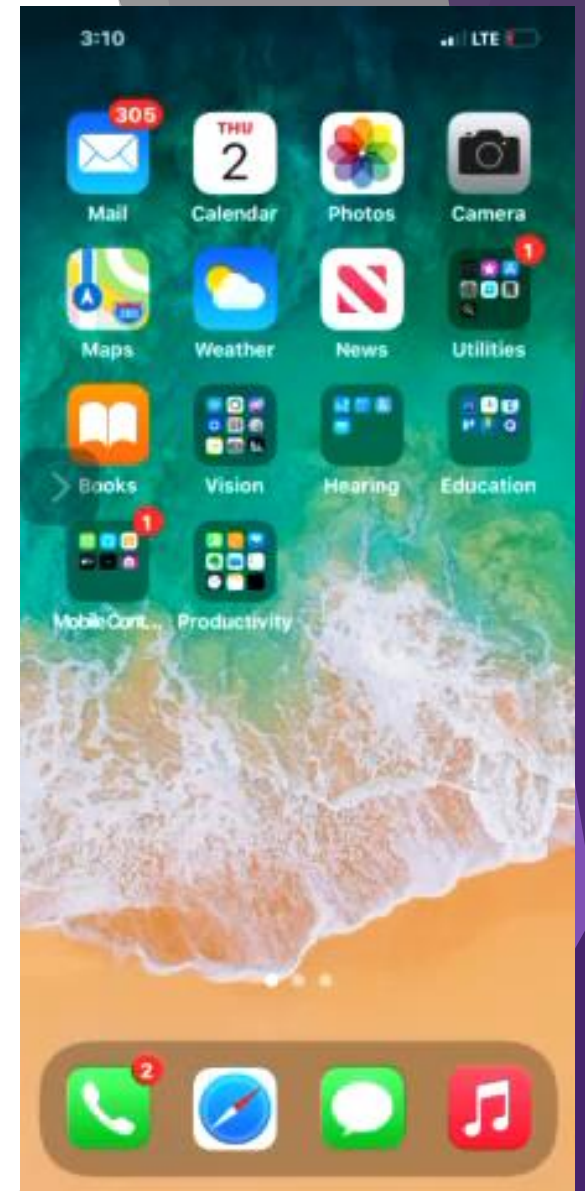
- ▶ Zoom (iOS)/Screen Magnification (Android)
 - ▶ Provides magnification of the device screen
 - ▶ Can be used in different modes
 - ▶ Full Screen
 - ▶ Resizable Lens
 - ▶ Ability to apply filters to the screen
 - ▶ Ability for smart typing (iOS) or Magnified Typing (Android)
 - ▶ Switch to window zoom when on-screen keyboard appears



Phone Applications and Accessibility

Options including in the Operating System - Part 4

- ▶ **Magnifier**
 - ▶ Allows the device camera to be used like a magnifying glass
 - ▶ Image can be frozen
 - ▶ Contrast and color enhancement features available



Wearable Devices

Handsfree Support

Wearable Magnifiers



IrisVision Inspire



Patriot ViewPoint



eSight Go

Computer Access

Recordkeeping Needs

Window Accessibility

- ▶ Features built into any Windows-based device that allow a user with visual impairment to customize use.
 - ▶ Display
 - ▶ Adjust size of icons by adjusting the scale
 - ▶ Adjust the size of text
 - ▶ Customize the size and color of the mouse pointer/text cursor
 - ▶ Color control
 - ▶ Adjust contrast and color settings of applications
 - ▶ Reduce screen brightness
 - ▶ “Night light” to reduce bright whites
 - ▶ Color Filters
 - ▶ Used to accommodate color blindness and assist with screen details that may be missed.

Windows Accessibility - Part 2

- ▶ Windows Magnifier
 - ▶ Magnify screen
 - ▶ Can be used in different modes
 - ▶ Full screen
 - ▶ Lens
 - ▶ Docked magnified area on partial screen
 - ▶ Includes a select-to-speak reader option
 - ▶ Read specified text aloud
 - ▶ Windows Narrator
 - ▶ Windows native screen-reader
 - ▶ Use the computer with minimal or no vision
 - ▶ Works best with Microsoft based programs

ZoomText/JAWS/Fusion

- ▶ Third party computer software to support vision needs
 - ▶ ZoomText Magnifier/Reader
 - ▶ Fully integrated.
 - ▶ Provides enlargements and enhancements to the screen.
 - ▶ Audio feedback is customizable for as much, or as little, the user desires.
 - ▶ JAWS
 - ▶ Job Access With Speech
 - ▶ Provides speech and Braille output for most all PC applications.
 - ▶ Speaks everything that is viewed visually
 - ▶ And somethings that the visual viewer does see
 - ▶ Alternative text
 - ▶ Scripted links and landmarks



ZoomText/JAWS/Fusion - Part 2

- ▶ Fusion

- ▶ The marriage of ZoomText and JAWS

- ▶ Allows the user to modify the screen for visual support.
 - ▶ Uses the more detailed audio feedback of JAWS.
 - ▶ Supports Braille feedback.



- ▶ Why use third party software when accessibility options are built into the Windows operating system?

- ▶ Preference
 - ▶ Compatibility with software
 - ▶ Customizable hotkeys
 - ▶ Braille Support

Read Aloud for Microsoft

► Microsoft Read Aloud

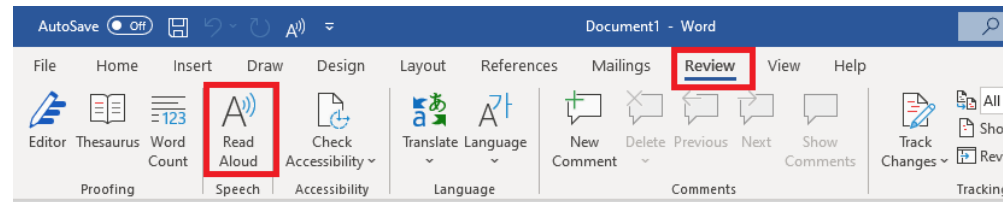
► What is it?

- Text-to-speech technology that will read all or part of your document.

► Where is it located?

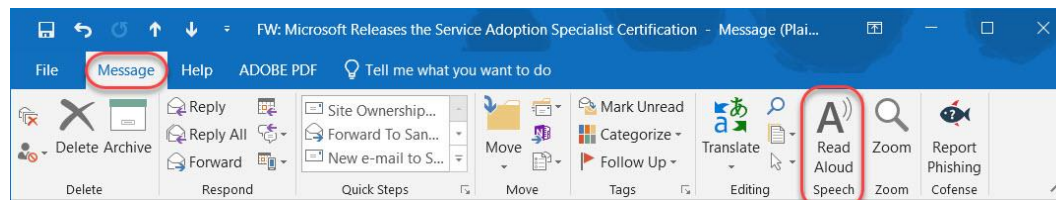
► Word App

- Review Tab in the Ribbon
- Alt + ctrl + space shortcut



► Outlook App

- Messages Tab once email is opened in a new window
- Alt + ctrl + space shortcut in preview panel



Hearing Technology

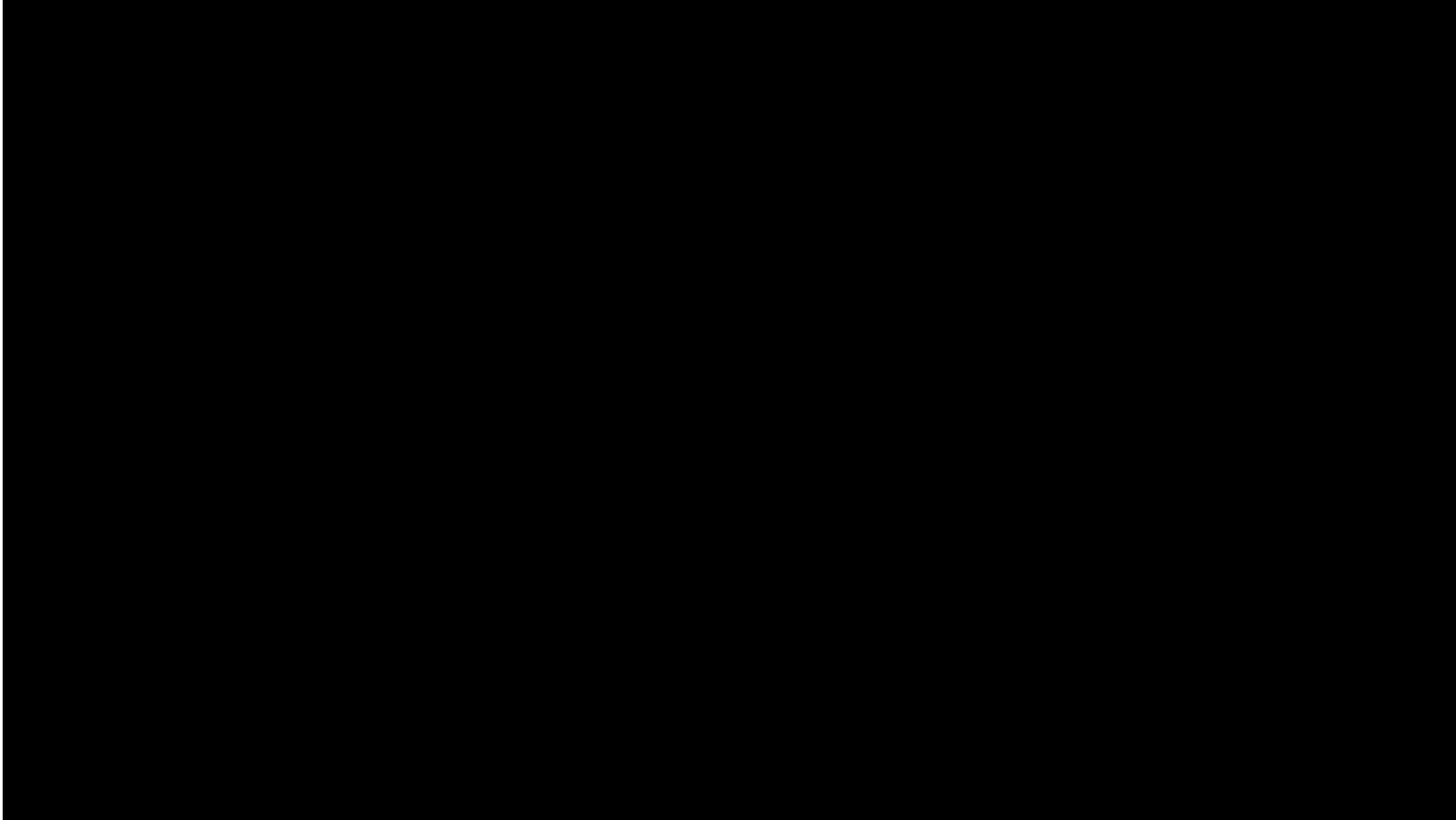
Defining Hearing Loss

- ▶ Inability to hear 20 dB or better in both ears.
- ▶ May be mild, moderate, severe, or profound.
- ▶ May be congenital, age-related, or environmentally related.
- ▶ Hearing aids may be beneficial, BUT not always.

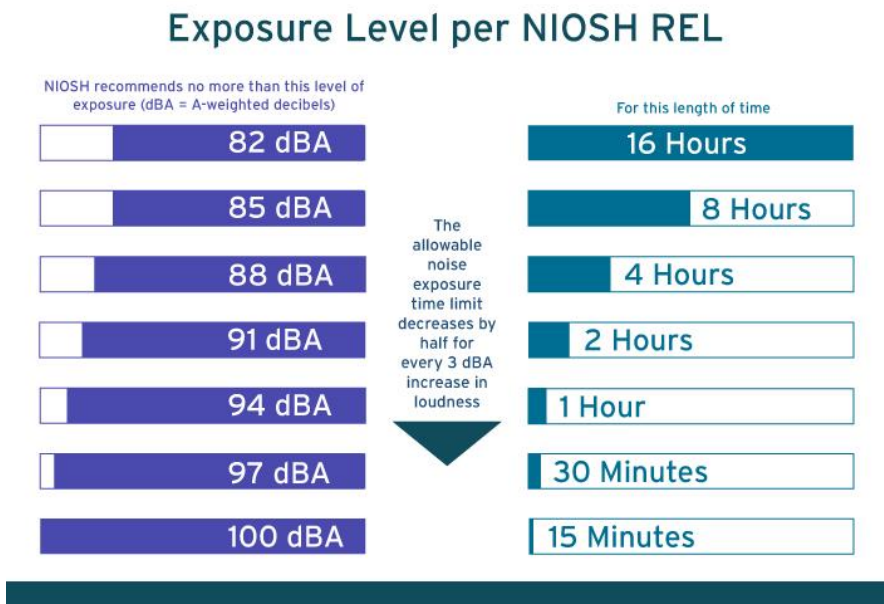
Degree of hearing loss	Hearing loss range (dB HL)
Normal	-10 to 15
Slight	16 to 25
Mild	26 to 40
Moderate	41 to 55
Moderately severe	56 to 70
Severe	71 to 90
Profound	91+

Source: Clark, J. G. (1981). Uses and abuses of hearing loss classification. *Asha*, 23, 493-500.

Hearing Loss Simulation



How Loud is Too Loud?



Amplifiers and Hearing Aid Mics - Part 1

- ▶ What is the difference between a Hearing Amplifier and a Hearing Aid?
 - ▶ Hearing Amplifier
 - ▶ Wearable
 - ▶ Typically recommended for hearing specific sounds clearer
 - ▶ Does not need a prescription
 - ▶ Not regulated by the FDA
 - ▶ Hearing Aid
 - ▶ Designed for individuals with mild to severe hearing loss
 - ▶ Designed to amplify all sounds in environment
 - ▶ FDA regulated as a medical device
 - ▶ Requires a prescription

Amplifiers and Hearing Aid Mics - Part 2

- ▶ NeoSonic Neckband Listener NW20
- ▶ Bellman & Symfon
 - ▶ MaxiPro
 - ▶ Domino Pro
- ▶ Williams Sound Pocketalker 2.0
- ▶ iOS Live Listening
 - ▶ Only works with Apple Air Pods
 - ▶ Turns iPhone into a personal amplifier



Amplifiers and Hearing Aid Mics - Part 3

- ▶ Hearing Aid Microphones
 - ▶ External accessories used with prescription hearing aids
 - ▶ Connects to hearing aid via Bluetooth
 - ▶ Speaker clips microphone to clothing or speaks directly into the device
 - ▶ Can come in personal or table top versions
 - ▶ Helps to focus on direct conversation
- ▶ How are they different from amplifier systems?
 - ▶ Only work with prescribed hearing aids
 - ▶ Will be prescribed by the audiologist
 - ▶ Brand specific

- ▶ Most popular brands
 - ▶ Phonak Roger
 - ▶ Clip-on
 - ▶ On
 - ▶ TableMic II
 - ▶ Oticon Connect Clip
 - ▶ ReSound Micro/Multi Mic



Bone Conduction Headphones

- ▶ What are they?
 - ▶ Device that sends sound waves directly to the inner ear bones via the bones of the skull.
 - ▶ Bypasses the eardrum.
 - ▶ Does not obstruct the ear canal
- ▶ Can they be used to support hearing loss
 - ▶ Because the technology bypasses the eardrum it may benefit SOME types of hearing loss.
 - ▶ Best results with Conductive Hearing Loss
 - ▶ Damage to the outer/middle ear



- ▶ Shokz
 - ▶ Several different models to meet individual needs
 - ▶ \$80.00 - \$180.00

Captioning

- ▶ What is captioning?
 - ▶ Turning spoken dialogue into written text.
- ▶ Available in the accessibility features of your smart device.
 - ▶ Live Captions (Beta) - iOS
 - ▶ Live Caption - Android
 - ▶ Live Transcription - Android
- ▶ Will work for
 - ▶ phone calls
 - ▶ video calls
 - ▶ in-person conversation
 - ▶ Uncaptioned videos

Prevention/Protection

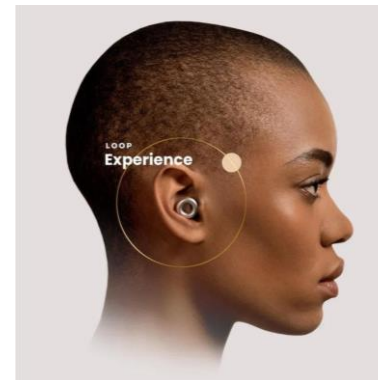
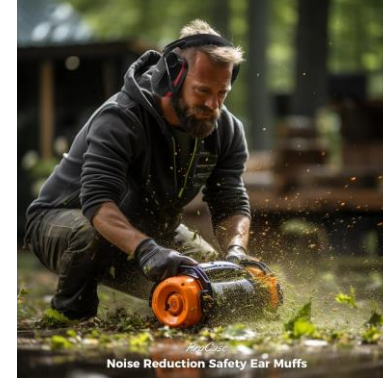
▶ Earmuffs

- ▶ One size fits all
- ▶ Padded ear covers
- ▶ May get hot



▶ Loop Earplugs

- ▶ Multiple levels of noise dampening
 - ▶ Quiet
 - ▶ -25 dB
 - ▶ Experience
 - ▶ -21 dB
 - ▶ Engage
 - ▶ -17 dB



Ta-da! We're Done!



Questions and Farmer Interaction



