CENTER
FOR
Sight
& Hearing

Presenter

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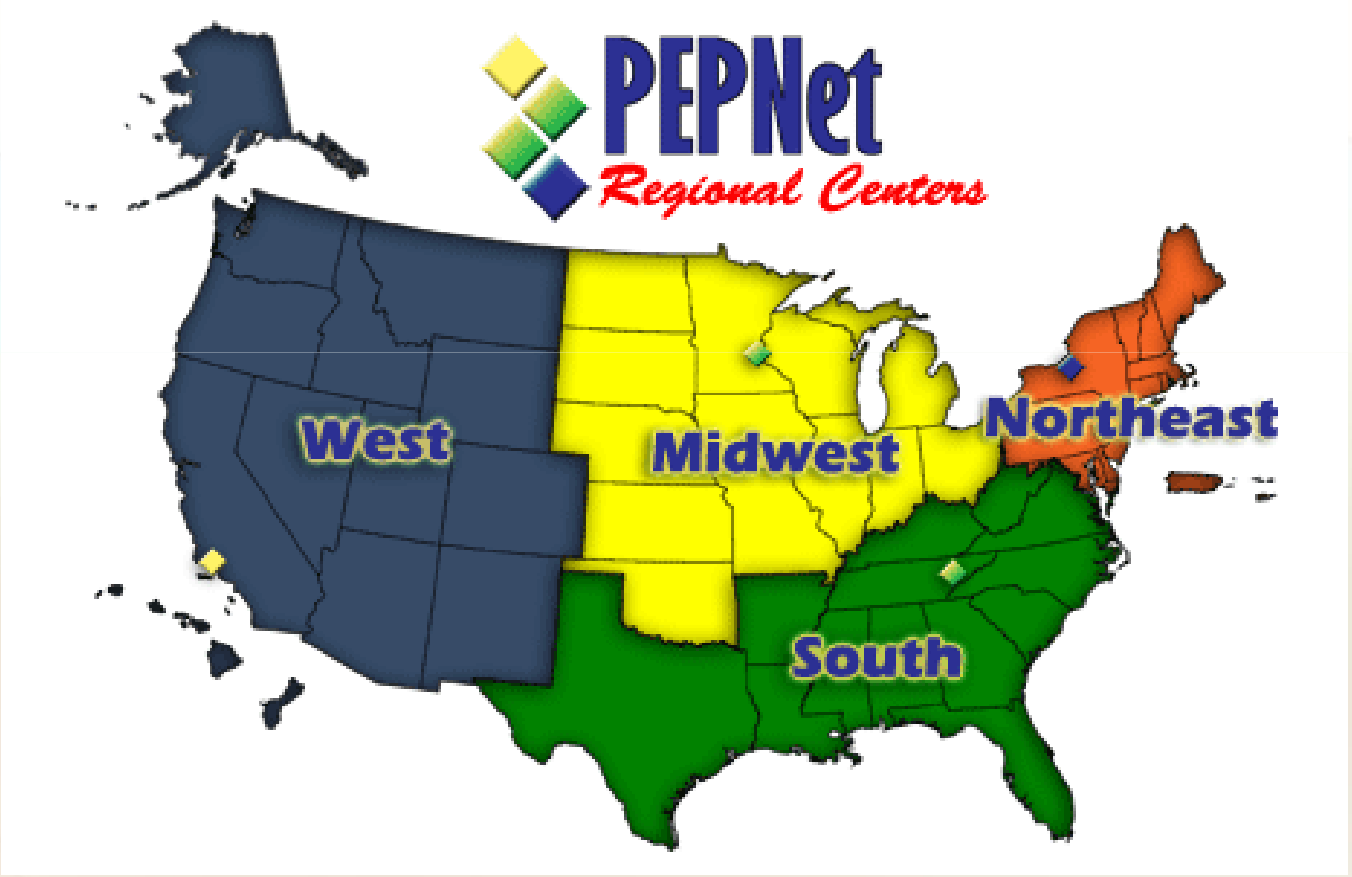
Demystifying Assistive Listening Devices

Based on work by
Cheryl D. Davis, Ph.D.
WROCC Outreach Site at
Western Oregon University
http://www.wou.edu/nwoc/demyst.htm

PEPNet Regional Centers



Things to investigate

- **Why an ALD?**
- **Components**
- **Wireless systems**
- **Troubleshooting**
- **Keys to success**

This is your session

WHAT WOULD YOU LIKE TO DISCOVER?

Properties of Hearing Aids vs ALDs

Hearing Aids

- **Tailored to your specific hearing loss**

Your hearing loss

Your hearing aid

- **Pick up back ground noise**

Sound

ALDs

- **Amplify all sounds equally**

sounds

SOUNDS

- **Focus on single speaker**

Sound

Components

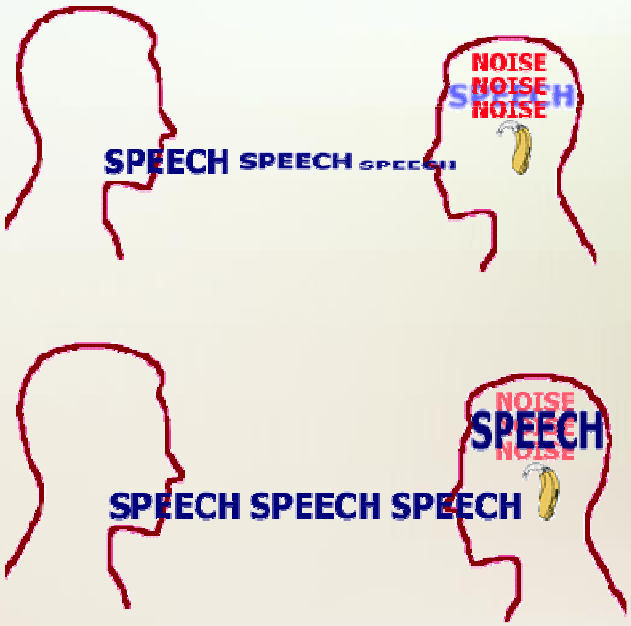
- **Individual**
- **Sound**
- **Environment**
- **Sound Source**
- **Microphones**
- **Transmitter and Receiver Systems**
- **Coupling Devices**
- **Telecoils**

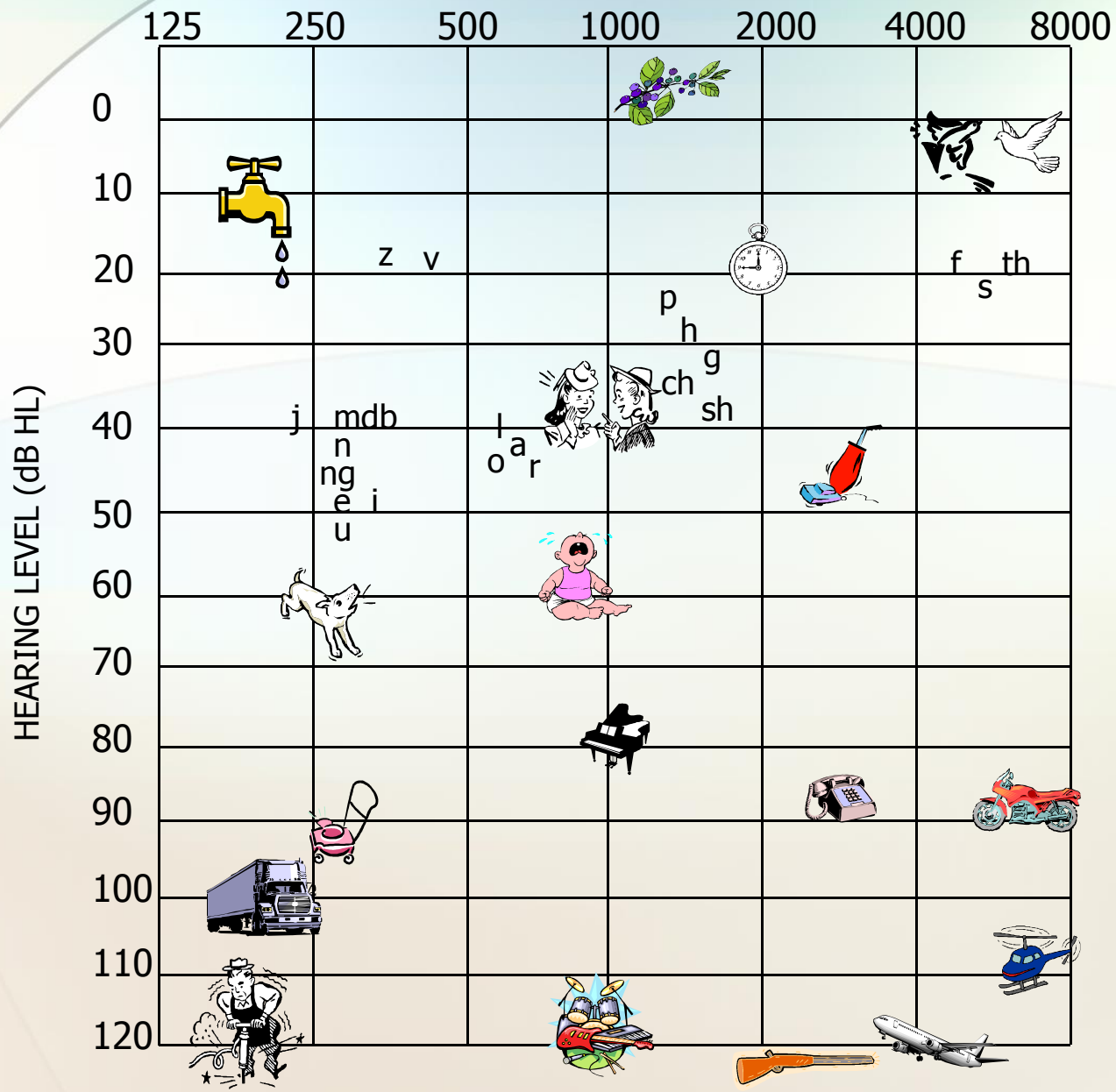
Components: Individual

- **Hearing loss**
  - **binaural or monaural**
  - **severity (dB) and frequency (Hz)**
  - **conductive or sensorineural**
  - **may fluctuate or be progressive**
- **Age at onset of loss**
- **Acceptance of loss**
- **Speech reading ability**
- **Hearing aid/CI T-coil use**
- **Knowledge of and comfort with ALDs**

Components: Sound

- **Dimensions**
  - **Frequency**
  - **Loudness**
- **Impact on Speech Intelligibility**
  - **Distance**
  - **Signal-to-Noise Ratio**
  - **Reverberation**

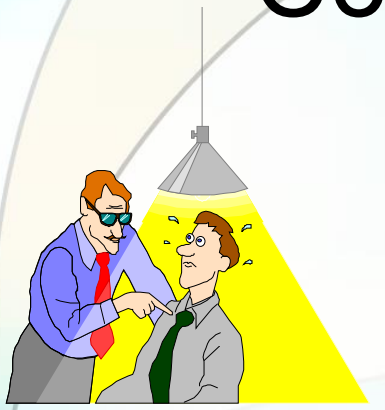


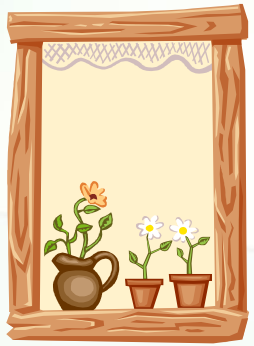


AUDIOGRAM OF FAMILIAR SOUNDS

FREQUENCY IN CYCLES PER SECOND (HZ)

Components: Environment

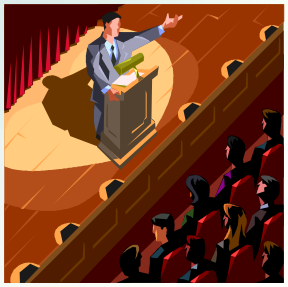




- **Light or dark**
- **Uncovered windows**
- **Distance from speaker**
- **Room acoustics and noise**

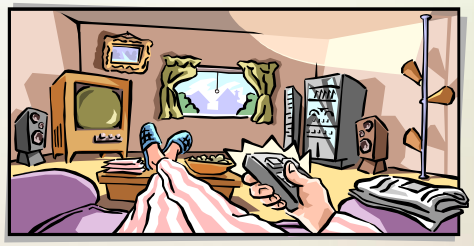
Components: Sound Source

- **Instructor giving a lecture**

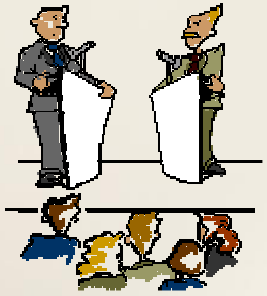


- **Panel of speakers**

- **Video or audio recording**

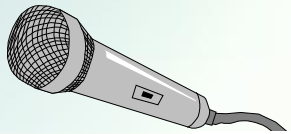


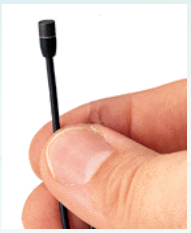
- **Q&A from the audience**
  - **Hard of hearing student**
  - **Neighboring student**

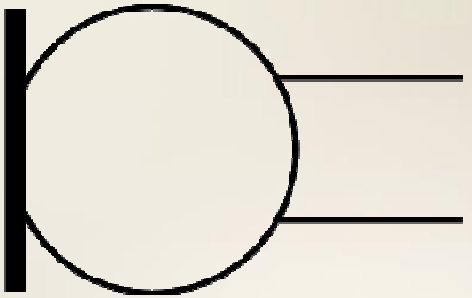


Components: Microphones

- **Omnidirectional**
- **Unidirectional**
- **Lavaliere or Lapel**
- **Table top or conference**
- **Environmental mic**
- **Placement is vital!**
  - **Remember effect of distance on sound**

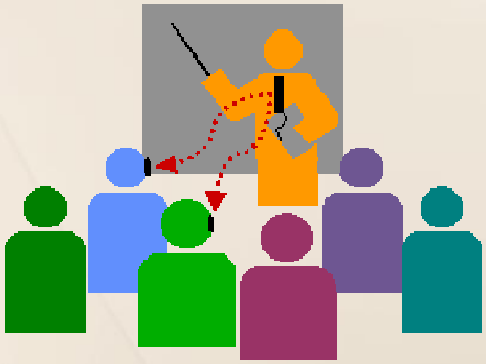


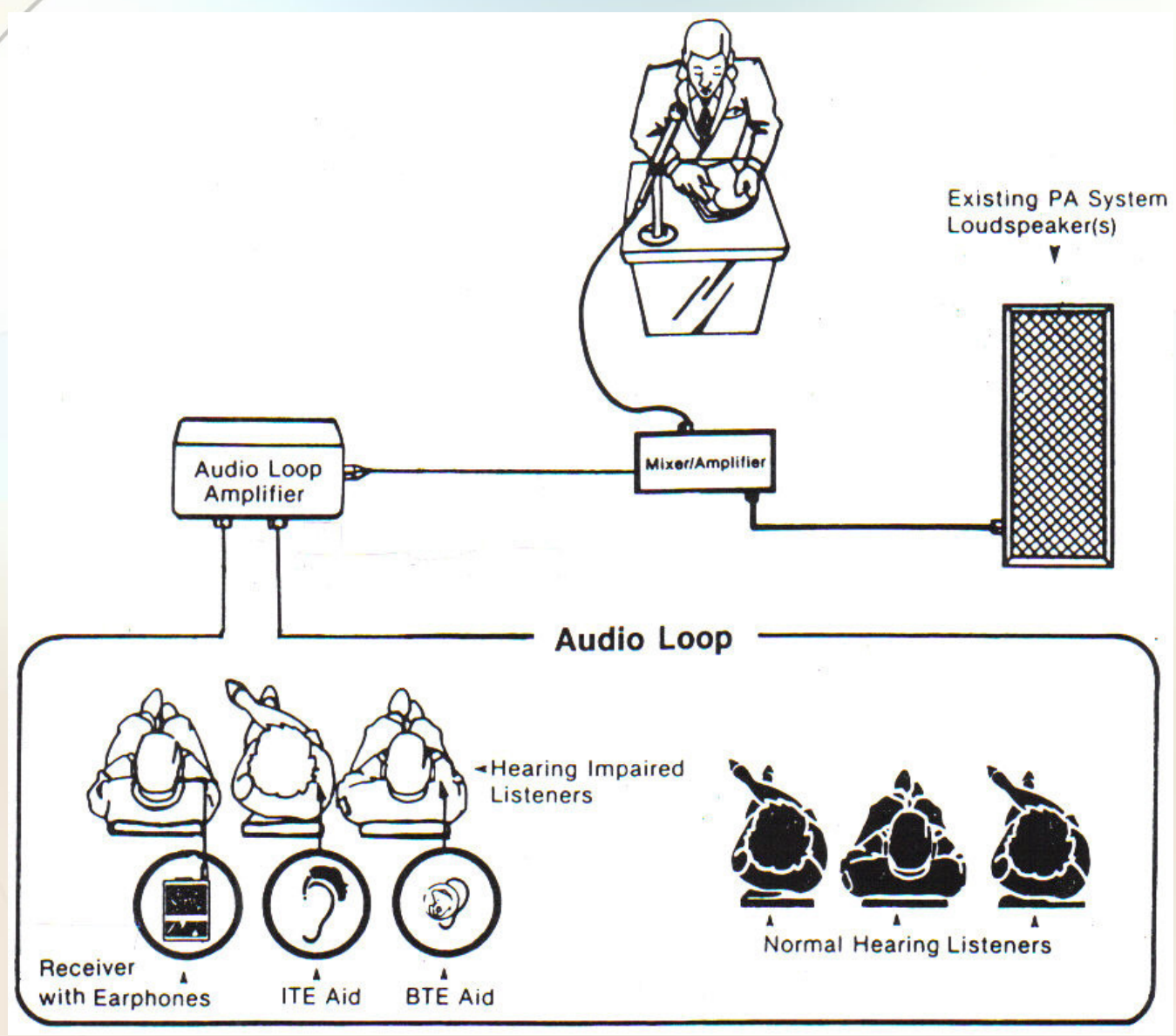




Components: Transmitter and Receiver Systems

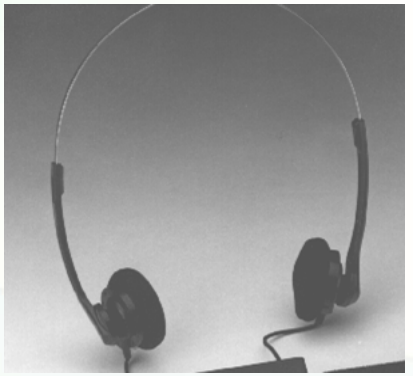
- **FM**
- **Infrared**
- **Electromagnetic induction loop**
- **Hardwired systems**

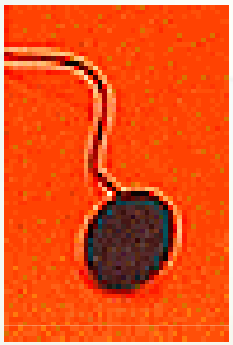


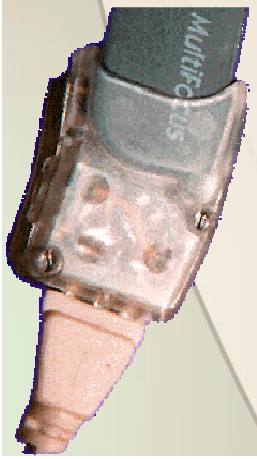

Existing PA System
Loudspeaker(s)
Audio Loop
Amplifier
Mixer/Amplifier
Audio Loop
Hearing Impaired
Listeners
Receiver
with Earphones
ITE Aid
BTE Aid
Normal Hearing Listeners

Components: Coupling Devices

- **No hearing aid OR no T-coil**
  - **headphones**
  - **earbuds**
- **Hearing aid with T-coil**
  - **neckloop**
  - **silhouette or ear hooks**
  - **headphones**
- **Other methods**
  - **Direct Audio Input**
  - **FM Boot**

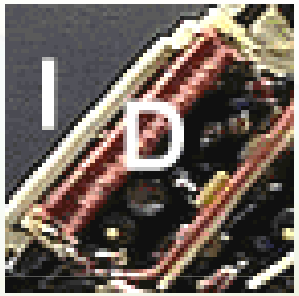


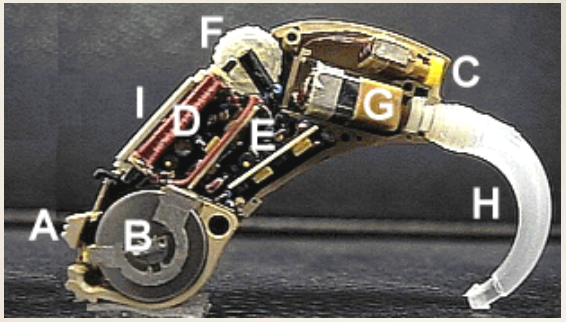




Components: Telecoils

- **Hearing Aids: Microphone vs T-coil**
- **Not all hearing aids have T-coils**
- **T-coils are not as sensitive as hearing aids**
- **Proximity is important**
- **Found in telephones & speakers**
- **Susceptible to electromagnetic interference**





How to choose the right technology

WHICH SYSTEM IS BEST?

FM

- **Uses radio waves**
- **Transmitter = radio station**
- **Receiver = radio**
- **Ex. Crib Monitor**

FM Advantages

- **Very portable**
- **Very easy to set up and use**
- **Offers great flexibility of movement**
- **Used indoors or outdoors**
- **Appropriate for mild to profound losses**
- **Receiver can be covered or put in pocket**
- **No fluctuation in strength of signal**

FM Disadvantages

- **Potential for outside interference**
- **Receivers and transmitters must be on the same channel**
- **Must be 1 free channel between systems used in close proximity**

True or False?

- **You can leave the room and still hear the presentation.**

  True

- **This system can be used indoors or outdoors.**

  True

- **You must have a receiver to use this system.**

  True

- **You must have a hearing aid to use this system.**

  False

- **You can use FM in multiple rooms in a building.**

  Only if there is a free channel

- **I can use my FM receiver with your FM transmitter.**

  Only if they are on the same frequency

Infrared

- **Uses infrared light**
- **Transmitter/emitter panel**
  - **Like a remote control**
  - **Signal is 60° cone shape**
- **Receiver**
  - **Like receiver on TV**

Infrared Advantages

- **Compatibility: Home receivers can be used with public transmitters**
- **No spillover means security**
- **Can be used in adjacent rooms**
- **Widest bandwidth and best sound reproduction**
- **Appropriate for mild to moderate/ severe loss**
- **Not affected by radio transmission**

Infrared Disadvantages

- **Must have direct line of sight**
- **Can’t cover the receiver or put in pocket**
- **Indoor or evening use only**
- **High intensity or fluorescent lights can cause interference**
- **Large areas require multiple emitter panels**

True or False?

- **You can leave the room and still hear the presentation.**

  False

- **This system can be used indoors or outdoors.**

  False

- **You must have a receiver to use this system.**

  True

- **You must have a hearing aid to use this system.**

  False

- **You can use infrared in multiple rooms in a building.**

  True

- **I can use my IR receiver with your IR transmitter.**

  True

Electromagnetic Induction Loop

- **Uses electromagnetic fields of energy, e.g., power lines**
- **Transmitter - Loop of several wires**
- **Receiver**
  - **T-coil in hearing aid**
  - **Personal or desktop receiver**
- **Telephone and other devices**
- **As small as a neckloop or as large as an auditorium**

Induction Loop Advantages

- **Low equipment costs after installation**
- **Easy operation**
- **Lasts forever**
- **Induction receivers compatible with ALL loop systems**
- **Unobtrusive with T-coil hearing aid**

Induction Loop Disadvantages

- **Installation costs may be high**
- **Installation may not be possible in historic buildings**
- **Can't assume everyone will have a T-coil**
- **Susceptible to electrical interference & spill over**
- **Must sit around looped area**
- **May be dead areas within loop**

True or False?

- **You can leave the room and still hear the presentation.**

  False
- **This system can be used indoors or outdoors.**

  True
- **You must have a receiver to use this system.**

  True, but could be t-coils
- **You must have a hearing aid to use this system.**

  False
- **You can use induction loops in multiple rooms in a building.**

  True, only if room between looped areas
- **I can use my loop receiver with your loop transmitter.**

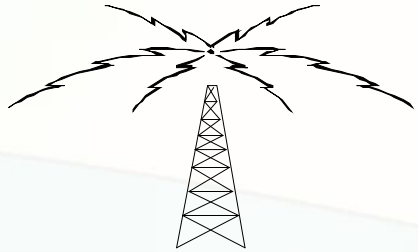
  True

Troubleshooting: General

- **Batteries charged?**
- **Deductive reasoning**
  - **T-coil working? Try a phone call**
  - **Try different couplers**
- **Ultrasonic sensors**
- **Check with local HLAA group**
- **Cultivate an expert**
- **Call the company!**

Troubleshooting: FM

- **Are receiver & transmitter on the same station (frequency)?**
  - **Color code or number them**
- **Sources of interference?**
  - **Station drift - your system OR someone else's**
  - **Police band, construction walkie talkies, pagers**
- **Must have one free channel difference if 2 different stations are being used in rooms next to each other.**



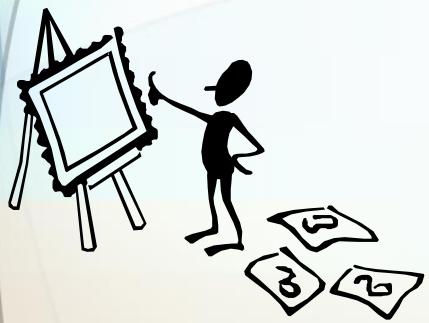
Troubleshooting: Infrared

- **Is anything blocking the line of sight?**
- **Are high intensity fluorescent lights present?**
- **Is the room bright, or is there direct sunlight?**

Troubleshooting: Induction Loop

- **Are there sources of electrical interference and spillover nearby?**
- **Portable systems can be a mobility hazard. Are wires protected?**

Keys to Success for the Speaker



- **Put mic close to your mouth**
- **Repeat questions from the audience**
- **Rephrase instead of repeat**
- **Don’t stand in front of windows or bright lights**
- **Face your audience when speaking**

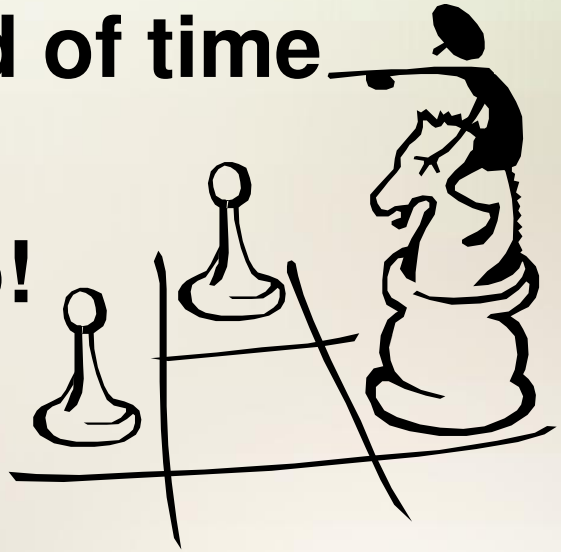
Keys to Your Success

- **Batteries charged & T-coil working**
- **Proximity to T-coil**
- **Proximity to interference**
  - **just changing seats may help**
- **Continue to sit within 20 ft. of the speaker if you will use speech reading**
- **Interact with others about coping techniques- ALDA, HLAA, Beyond-Hearing**

Keys to Your Success

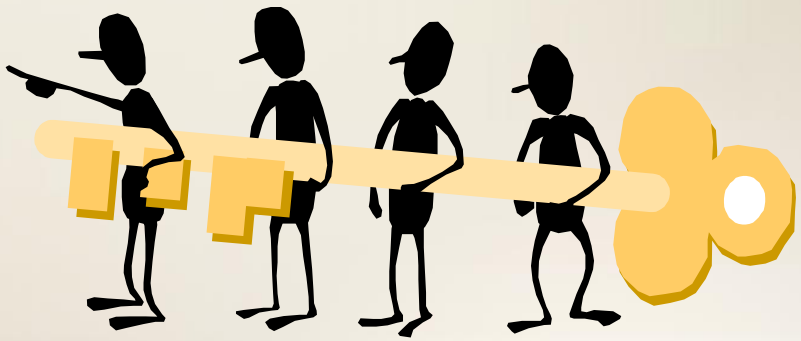
- **Make sure the volume is down when you first put the coupler on**
- **Experiment with different couplers, locations, and environments**
- **Get an environmental mic or hearing aid with mic/t/both position**
- **Check out equipment ahead of time**
- **While you are at it,**

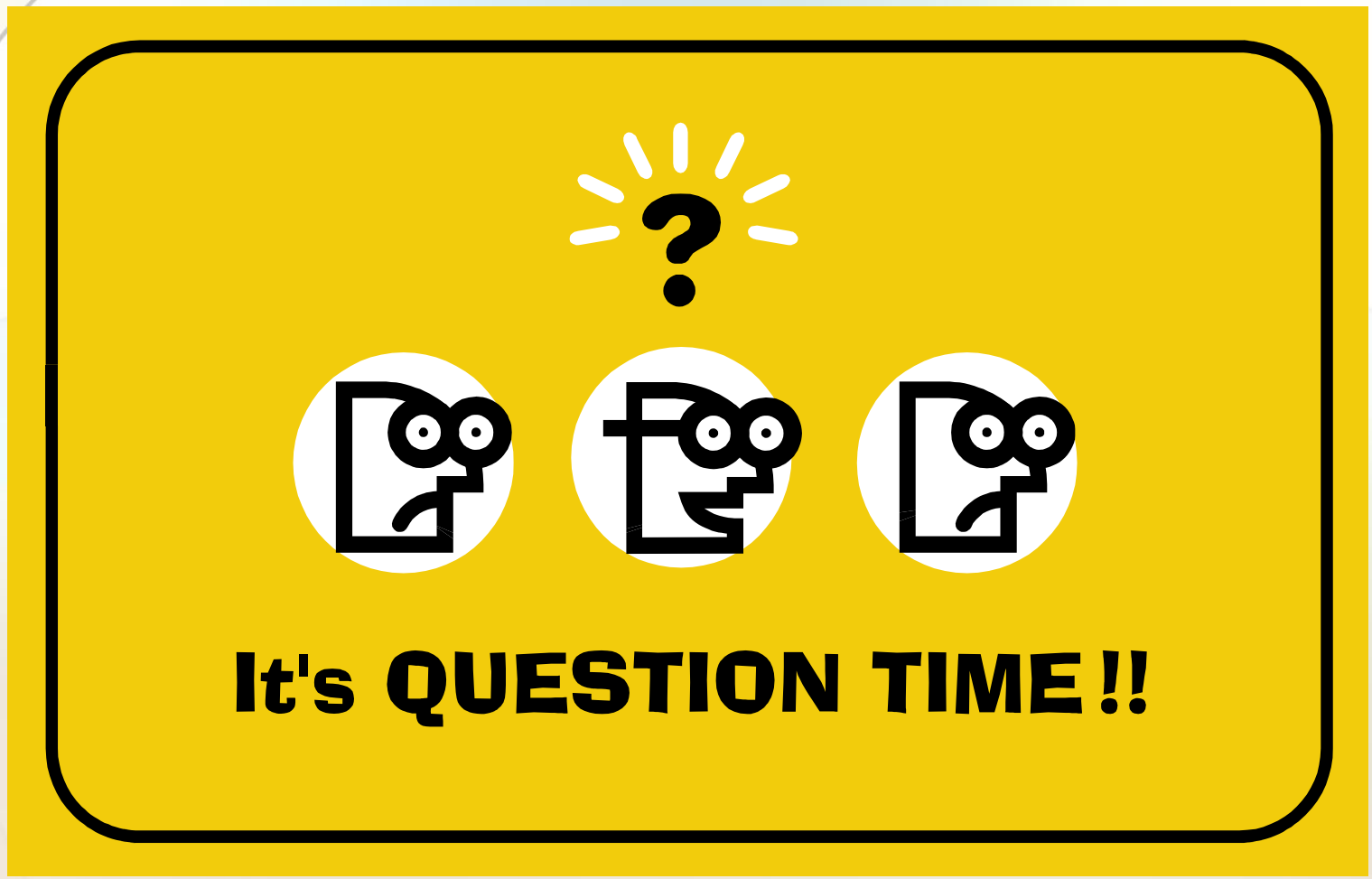
  check out the speaker's too!



Review

- **Evaluate the requirements of the setting and the properties of the equipment.**
- **Buy equipment from companies that will help you troubleshoot.**
- **Don’t forget the non-electronic communication tips!**




It's QUESTION TIME !!

Thank you

You were a great group!

CENTER FOR Sight & Hearing

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