

Development of a Computer-based Hearing Loss Prevention Education Program for Veterans and Military Personnel

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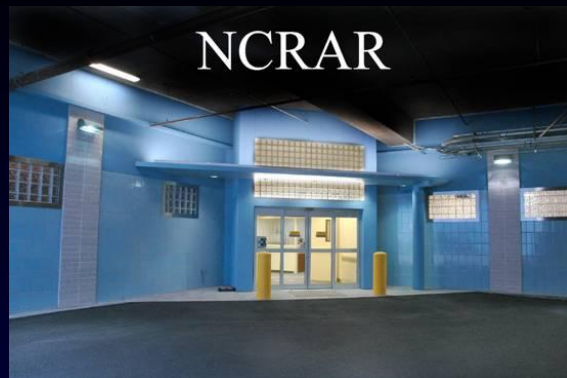
**National Center for Rehabilitative Auditory
Research**

**Portland VA Medical Center
Portland, Oregon**

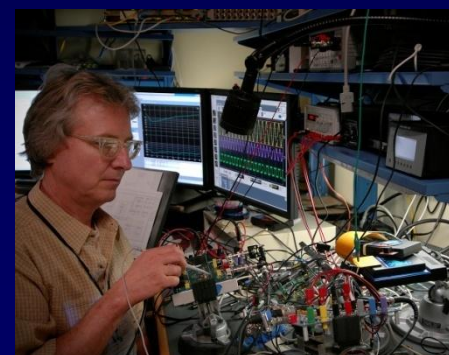




VA Medical Center, Portland, Oregon



National Center for Rehabilitative Auditory Research (NCRAR)



VA RR&D Centers of Excellence



Limb Loss & Prosthetics
(Seattle, WA)



Functional Electrical
Stimulation
(Cleveland, OH)



Wheelchair Technology
(Pittsburgh, PA)



Innovative Visual
Rehabilitation
(Boston, MA)



Restorative &
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(Providence, RI)



Auditory Rehabilitation
(Portland, OR)



Bone & Joint Rehabilitation
(Palo Alto, CA)



Platform Technology
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Aging & Vision Loss
(Decatur, GA)



Brain Rehabilitation
(Gainesville, FL)



Spinal Cord Injury
(Miami, FL)



Spinal Cord Injury & MS
(West Haven, CT)



Spinal Cord Injury
(Bronx, NY)



Exercise & Robotics
(Baltimore, MD)



Mission of the NCRAR

“To benefit Veterans by alleviating the economic, social and communicative problems resulting from auditory system dysfunction.”

Hearing Loss Prevention Program

DoD / VA Joint Incentive Fund (JIF)

JIF is a collaborative program between the Department of Defense and the Department of Veterans Affairs. The program's goals are to enhance cost-effectiveness of, quality of, and access to health care for military personnel and Veterans.



The hearing loss prevention education program described here is a JIF project.

The goal of this project is to create a self-administered, computer-based, interactive, multimedia Hearing Loss Prevention Program (HLPP) that can be delivered at military bases, primary care and other medical settings.

Initial Installations

- Portland VA Medical Center
- Madigan Army Medical Center, Fort Lewis, Washington
- Womack Army Medical Center, Fort Bragg, North Carolina

Program Elements

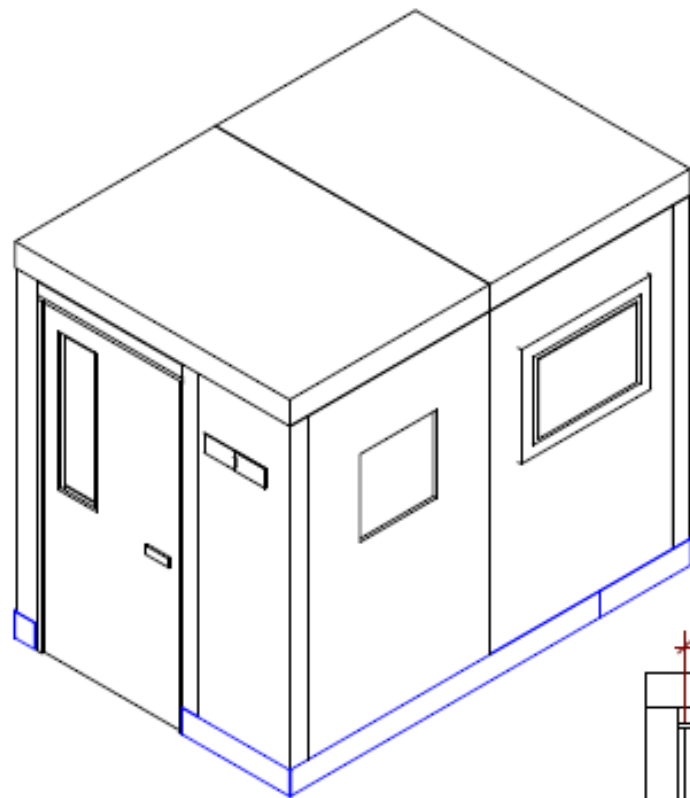
- Sound-attenuated enclosure in which one participant at a time uses the program



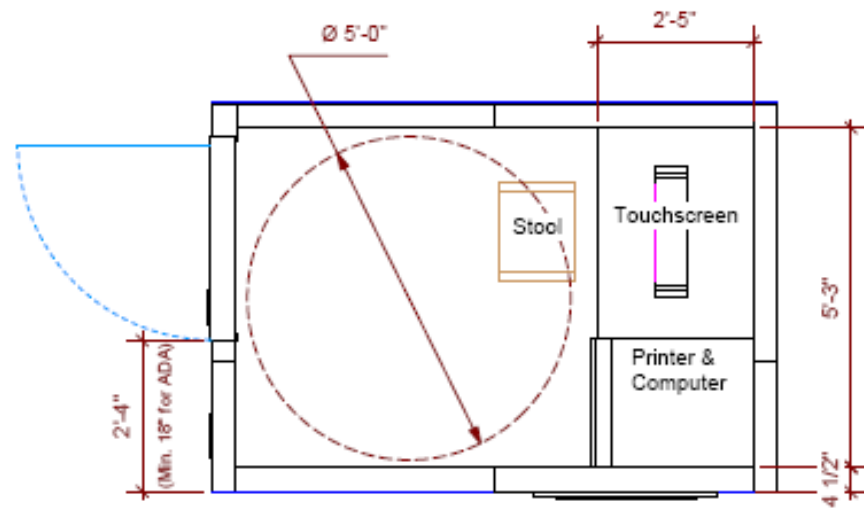
FLAT SCREEN
WILL PROJECT
VIDEO IMAGES



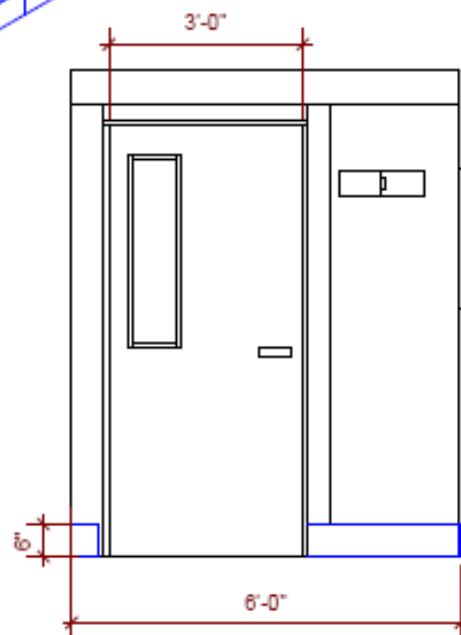




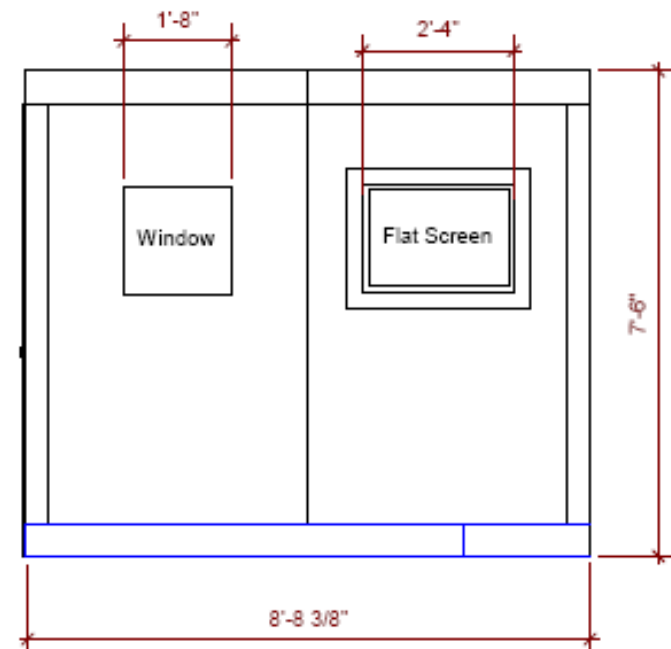
1 Isometric View
2 Scale: 1/2" = 1'-0"



2 Plan View
2 Scale: 1/2" = 1'-0"



3 Front Elevation
2 Scale: 1/2" = 1'-0"



4 Side Elevation
2 Scale: 1/2" = 1'-0"

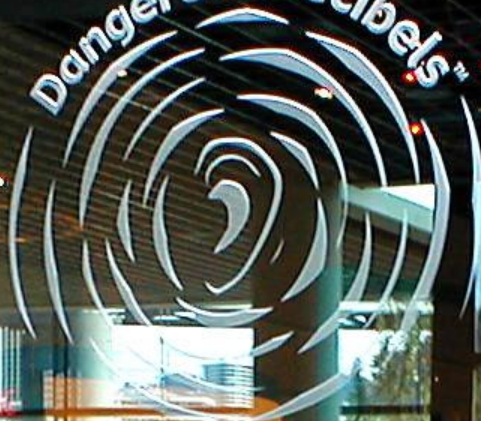


Oregon Museum of Science and Industry (OMSI)





Dangerous Decibels™



Presented by our partners in public health:

OHSU
Oregon Health Division
Oregon Department of Health and Services

OMHSU at OHSU

Oregon Health Division Center for Environmental Health & Safety

In affiliation with the American Tinnitus Association and
Veterans Affairs Medical Center for Rehabilitative Audiology Research

14th Science Education

Founders:

Dr. Robert R. Stein
Dr. Robert R. Stein
Dr. Robert R. Stein
Harold and Arlene Schindler Trust
Schindler Foundation

Noise-Induced Hearing Loss Can Be Prevented

Dangerous Decibels™ is a program to prevent noise-induced hearing loss (hearing loss from loud sounds and tinnitus (ringing in the ears). Tinnitus and hearing loss from loud sounds affect all ages and can be caused by loud homes, and recreational activities. Researchers, educators, civic leaders, and volunteers are working together to create a hearing education and research program in Oregon that will be a model for local and national hearing protection programs.

Dangerous Decibels™ consists of:
• a science exhibition at OHSU
• an educational outreach program for schools
• research data collection to help reduce noise-induced hearing loss





TESTING
In Progress





Welcome to the
Dangerous Decibels project!

This exhibit is part of a research project by Oregon
Health & Science University and OHSU. The purpose
of the project is to find out how many people have
hearing loss caused by loud sounds. You can help by
playing a game that will test your hearing.





booth walls
are modular, so
the door and
window can be
put in 3 different
configurations

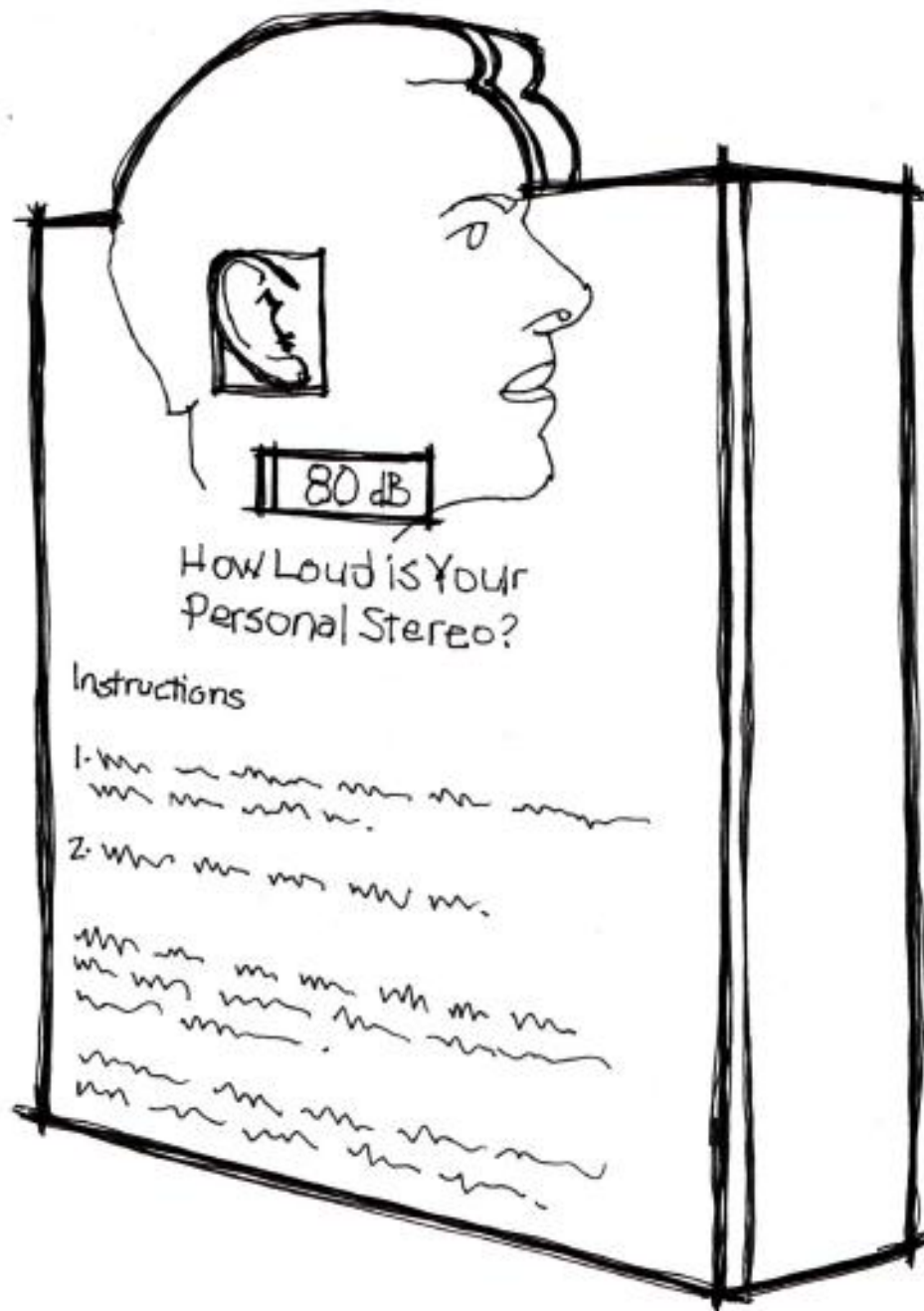
← foam insulation
between
double walls



FLAT
VIDEO
SCREEN
WILL GO
HERE

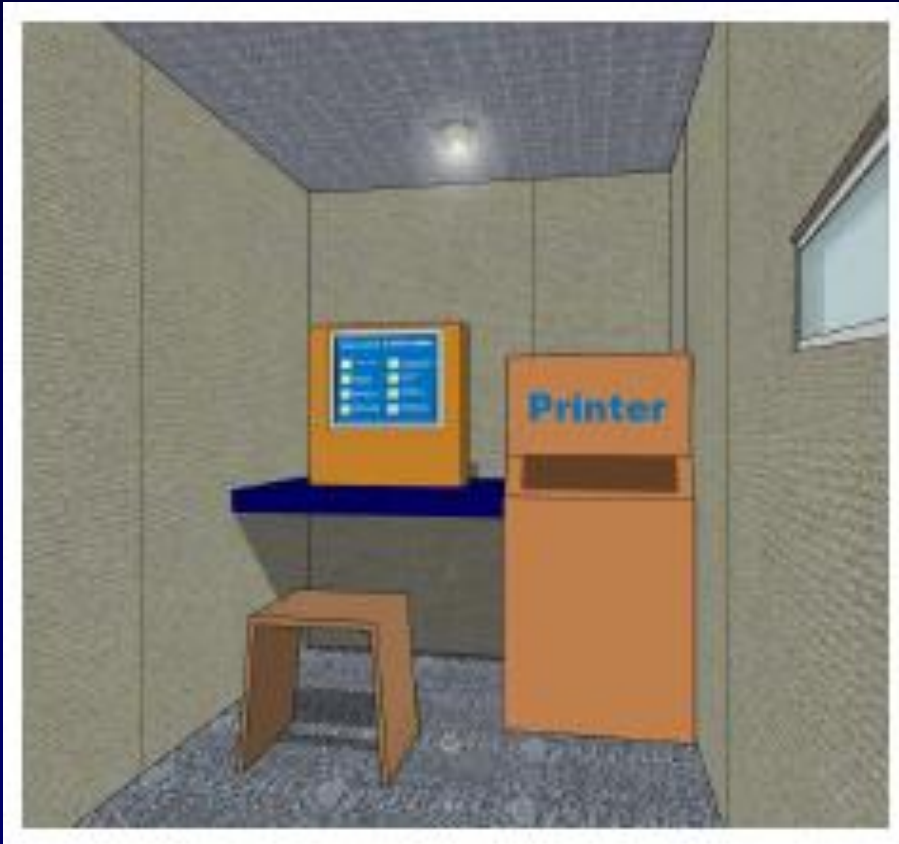
iPod
TEST
EAR
WILL
GO
HERE





Program Elements

- Computer touch screen allows participants to select activities
- Printer allows participants to receive copies of hearing test results and to print other info sheets



All booth interior
surfaces are carpeted

Welcome to the Hearing Education Center

Touch the screen to begin

A Joint Incentive Fund (JIF) Program

Sponsored by



Developed by **NCRAR**

National Center for Rehabilitative Auditory Research
VA Rehabilitation Research & Development Service

LEFT



RIGHT

YOU NEED TO WEAR HEADPHONES TO HEAR THE
PRESENTATION AND TO TAKE THE HEARING TEST.

PUT THE **BLUE** HEADPHONE ON YOUR **LEFT** EAR,
AND THE **RED** HEADPHONE ON YOUR **RIGHT** EAR.



SKIP HEADPHONE PRESENTATION

NOW WE WILL SET THE VOLUME.

PLEASE TOUCH THE BUTTON MARKED
PLAY ON THE SCREEN.

YOU WILL HEAR MUSIC.



SKIP HEADPHONE PRESENTATION

DO YOU HEAR MUSIC?

IF YOU DID NOT, OR IF THE MUSIC WAS QUIETER THAN
YOU'D LIKE, PRESS THE UP ARROW.



IF YOU HEAR MUSIC THAT WAS LOUDER THAN YOU'D LIKE
PRESS THE DOWN ARROW.



WHEN THE VOLUME IS JUST RIGHT PRESS "OK".



Please answer the following questions.

Yes

No

Have you used this program in this booth before?

☐☐

During the past year, I *(check all that apply)*

have been around loud sounds that made my ears hurt or “ring”

☐☐

used power tools or other loud machinery

☐☐

fired a gun

☐☐

listened to loud music

☐☐

SKIP

NEXT

I am ☐ MALE ☐ FEMALE

My age:

- | | |
|--------------------------------------|--------------------------------------|
| ☐ 1-17 years | ☐ 50-59 years |
| ☐ 18-29 years | ☐ 60-69 years |
| ☐ 30-39 years | ☐ 70-79 years |
| ☐ 40-49 years | ☐ 80+ years |

I wear ear plugs or ear muffs when I am around loud sounds:

☐ ALWAYS ☐ SOMETIMES ☐ NEVER

Intro Video

What would you like to do?



Learn why, when and how to protect my hearing



Learn how hearing works and how loud sounds damage hearing



Learn how sound intensity is measured and which sounds are too loud



Take a screening test of my hearing



Learn about the consequences of hearing loss and listen to demonstrations of simulated hearing loss



Learn how to select and use hearing protective devices



Evaluate the fit of my ear plugs



Learn about tinnitus (ringing of the ears)



Learn about hearing health care services at

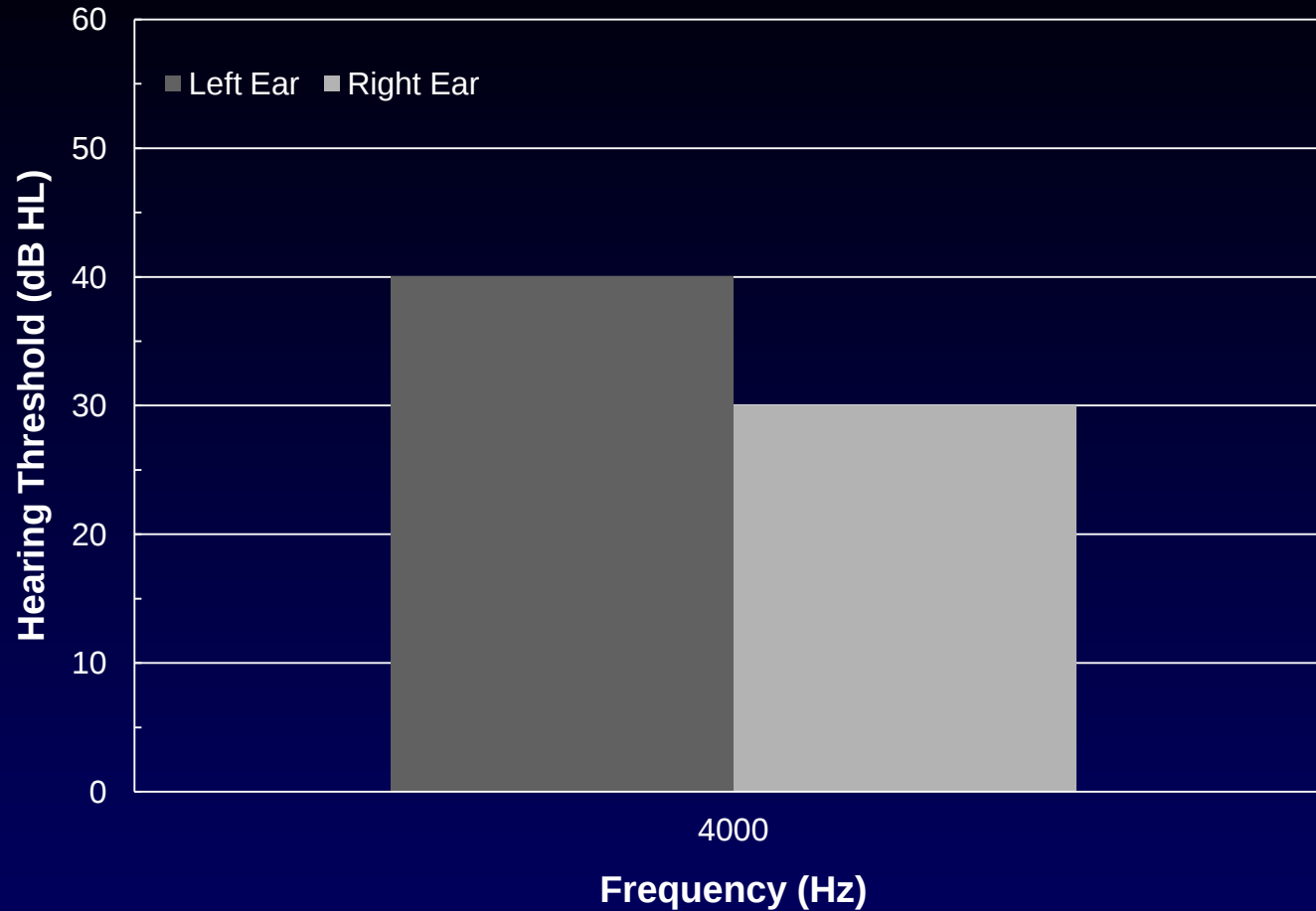
DONE

Hearing Screening Test

- Self-administered
- “Quick Test” screens 4000 Hz to 20 dB HL
 - takes about 2 minutes for both ears
- More Complete Test screens 3, 4 and 6 kHz to 20 dB HL – takes about 6 minutes
- Pulsed tones are used
- Participants have the option of printing a graph of results + an info sheet

TEST IN PROGRESS . . .

**PRESS HERE WHEN
YOU HEAR A TONE**



Your results suggest that you may have hearing loss. However, this program tested only one frequency of your hearing, and noise outside of the booth may have caused problems with the test. To know your hearing results for sure, it is best to get a complete hearing test from an audiologist or physician.

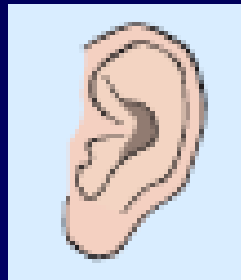
***Learn Why, When and How
to Protect Your Hearing***

TEST YOUR KNOWLEDGE

How can you protect your hearing?

- a) Wear hearing protection
- b) Move away from the noise source
- c) Turn down the volume of loud music
- d) All of the above

***Learn How Hearing Works
and How Loud Sounds
Damage Hearing***



TEST YOUR KNOWLEDGE

Hair cells are located in the

- a) outer ear
- b) middle ear
- c) inner ear (cochlea)
- d) brain

***Learn How Sound Intensity
Is Measured and Which
Sounds are Too Loud***



TEST YOUR KNOWLEDGE

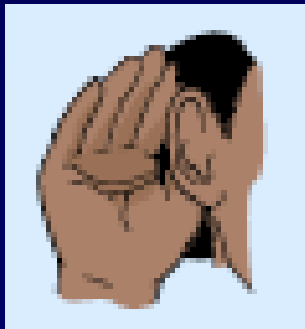
The louder a sound is, the

☐ MORE

☐ LESS

time it takes to damage your hearing.

***Learn About the Consequences
of Hearing Loss and
Listen to Demonstrations of
Simulated Hearing Loss***



TEST YOUR KNOWLEDGE

Hearing loss can contribute to

- a) Communication problems
- b) Frustration and isolation
- c) Tinnitus (ringing in the ears)
- d) All of these

Learn How to Select and Use Hearing Protective Devices



Foam Earplugs



Foam earplugs are made from expandable foam designed to conform to the shape of your ear canal. They provide a good combination of protection and comfort for most people.

Combat Arms Earplug



Combat arms earplugs contain a linear and non-linear setting. This means that they have the ability to protect against continuous noise (such as vehicles or machinery) as well as level-dependent or impulse noise (such as weapons fire).

Standard Earmuffs



The most common type of earmuff, these can be worn over the head, behind the head, or under the chin, depending on the model.

Tactical Communication and Protective Devices (TCAPs)



TCAPs combine hearing protection with electronic systems that enable you to communicate with other members of your unit and still hear ambient sounds to provide situational awareness.

TEST YOUR KNOWLEDGE

What is the best type of hearing protection for you?

- a) The one everybody else is using
- b) The one you will wear consistently
- c) Ear muffs
- d) Ear plugs

Evaluate the Fit of My Ear Plugs



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NIOSH Mining Safety and Health Topic

How Can I Test My Hearing Protection?

Search Mining

Loud noise can permanently damage your hearing. It especially affects the sounds that help you understand speech.

Earmuffs, earplugs, and other hearing protection devices can reduce your risk of hearing loss, but only if you get a good fit and wear them properly.

Follow the instructions for the sound player on the right side of this page to perform a quick test of whether you are getting at least a minimal 15 decibel (dB) level of protection.

How it Works

The test sounds are bands of random noise with a center frequency of 1000 Hz. This is the same type of sound used in standard hearing protector ratings including the "American National Standard Methods for Measuring the Real-Ear Attenuation of Hearing Protectors" (ANSI S12.6). Both tracks are the same, but the second track is 15 decibels (dB) louder than the first. Most hearing protectors will block or "attenuate" sound by more than 15 dB if they are the right size and shape to fit your ears and are worn correctly. A sound that is barely audible at your threshold of hearing without hearing protection should be inaudible though hearing protection even if it's boosted by 15 dB.

Offline Testing

Hearing Protection Quick Test

1. Without hearing protection

2. With hearing protection

Adjust volume

<< previous

--

next >>

Instructions

1. For best results, conduct this test in a quiet room (background noises can interfere with the test sounds). You can listen through speakers or headphones connected to your computer. Speakers will work with either earmuffs or earplugs. Headphones can be used with earplugs and should be the full-sized "circumaural" type that covers the entire ear and does

Module
based on
NIOSH
Quick Fit
Test

www.cdc.gov/niosh/mining/topics/hearingloss/quickfitweb.htm

Learn About Tinnitus ***(ringing in the ears)***



TEST YOUR KNOWLEDGE

Tinnitus can occur

- a) After exposure to loud music
- b) If someone uses power tools without wearing hearing protection
- c) As a consequence of hearing loss
- d) All of these are true

Learn About Hearing Healthcare Services at Portland VA Medical Center



Do you think this program is a good way to provide information to Veterans and their families?

☐ YES ☐ NO

After viewing this program, will you be more likely to protect your hearing from loud sounds?

☐ YES ☐ NO

GOALS OF HEARING LOSS PREVENTION EDUCATION

- raise awareness about
mechanisms of hearing,
how and why hearing loss occurs,
consequences of hearing loss,
how to prevent NIHL -- protect ears
- change knowledge, attitudes, behaviors
- reduce the prevalence of NIHL

Formal Evaluation of the Program and Its Effectiveness for Veterans

• VA RR&D Merit Review 3-Year Study

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Future Applications

Additional refinement and dissemination of the program throughout the VA, DoD and other healthcare systems
(booths are not necessary for the education program)

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Thank You!

Questions and Discussion

