

# OHIO HEARING CONSERVATION PROGRAM



Ohio Department of Health

*— to educate children on the dangers of high noise levels*

---

A RESOURCE GUIDE FOR HEARING HEALTH PREVENTION

## OVERVIEW .....

We live in a noisy society where blaring music, the increased use of personal listening devices, loud vehicles and noisy recreation are acceptable and sometimes unavoidable parts of life. Therefore, there is a greater need to educate children on the dangers of high noise levels. School hearing conservation programs should be comprehensive in scope, including educational programming aimed at preventing and reducing hearing loss and indentifying and managing hearing loss. The goal of the Ohio Hearing Conservation Program is to increase awareness of preventable hearing loss among school-aged children and to provide information on hearing conservation programs for school personnel who are developing local programs.

**According to Audiology Online** (<http://www.audiologyonline.com>):

- 5.5 percent of students involved in noisy activities utilize hearing protection
- 1 percent of school-aged children have some degree of noise-induced hearing loss
- 12.5 percent of children in the United States aged 6-19 years have noise-induced hearing threshold shifts in one or both ears, which indicates a significant change in hearing ability

The incidence of noise-induced hearing loss may be reduced through hearing loss prevention programs that educate on the appropriate use of ear protection and ways to reduce noise exposure. Hearing conservation can be divided into two areas: education and prevention. The education aspect addresses hearing loss related to excessive noise. The prevention aspect addresses ways to protect hearing from potentially damaging noise levels.

**As a result of using this resource, school personnel will:**

- Understand anatomy and related disorders of hearing
- Define frequency and intensity
- Explain how noise is harmful to the ears/hearing
- Describe hearing protection and how to use it
- Access sample lesson plans for teachers/school nurses to use to implement hearing conservation training in the classroom
- Utilize Web resources for additional information

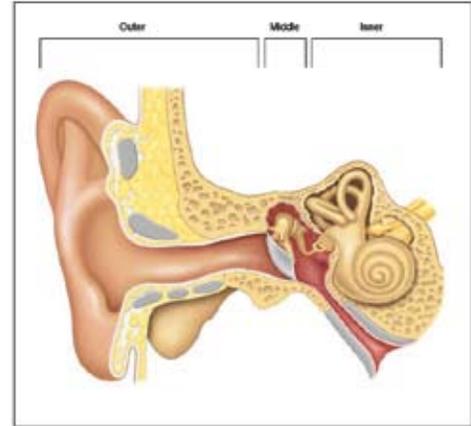


## ANATOMY AND RELATED DISORDERS OF THE EAR

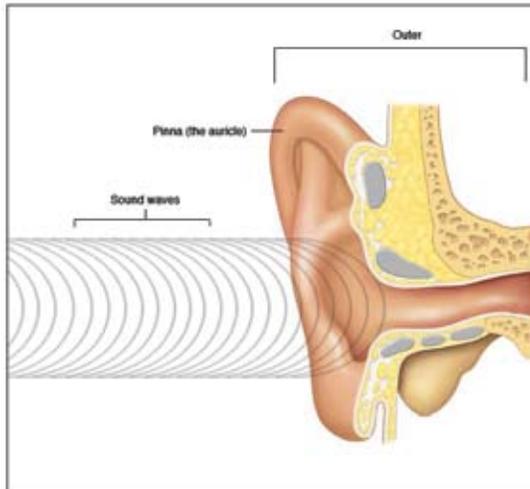
**The ear is divided into three parts:** the outer, middle and inner ear. Diseases and deformities of the outer and middle ear may result in conductive (temporary) hearing loss; damage to or deterioration of the inner ear may result in sensorineural (permanent) hearing loss.

### Outer ear:

The only visible part of the ear is the pinna (the auricle). The pinna has a special helical shape and is the first part of the ear that reacts to sound. The pinna acts as a kind of funnel that assists in directing the sound further into the ear. The position of the pinna also aids in the localization of sound sources. The inability to locate sound easily is one of the chief complaints of a person with a hearing impairment in one or both ears.



The external auditory canal (ear canal) is a tunnel that begins at the pinna and ends at the eardrum. The ear canal, which is a little over one inch long, is lined with hair follicles. Cerumen (wax) protects the delicate skin of the ear canal and the combination of hairs and cerumen helps deter insects from entering the ear canal. In order to protect the eardrum, the auditory canal is slightly curved, making it more difficult for insects, for example, to reach the eardrum. In addition to protecting the eardrum, the auditory canal also functions as a natural hearing aid that automatically amplifies the low and less-penetrating sounds of the human voice. In this way, the ear compensates for some of the weaknesses of the human voice and makes it easier to hear and understand ordinary conversation.



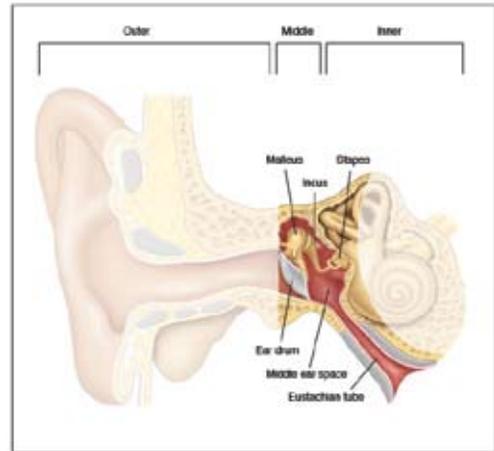
Obstructions such as accumulated cerumen or foreign objects may interfere with the transmission of sound to the middle ear. Hearing may not be affected unless the canal is completely obstructed. Generally, cerumen (wax) need not be removed mechanically because the ear naturally rids itself of a normal accumulation of wax. Removal of wax or foreign objects should be performed only by a professional.

Infection of the ear canal is called external otitis, which is usually quite painful. It may be caused by injury or irritation to the canal that sets up a condition making a person more subject to bacterial invasion. Examples are swimmer's ear and irritation following improper removal of wax or foreign objects. Medical help should be sought in the treatment of external otitis.

## Middle Ear:

The eardrum (tympanic membrane) is located at the end of the ear canal and also serves as a protective seal for the middle ear space. The eardrum is a tough, thin, fibrous structure of pearl-gray appearance. It is set into motion when sound waves strike it and can be perforated by injury and infection. The amount of hearing loss resulting from damage depends on the location and size of the hole or thickness of the eardrum. In addition to hearing loss, perforations allow exposure of the delicate middle ear mucous membrane to water and bacteria. A perforated eardrum that fails to heal may require surgical intervention.

Directly behind the eardrum is an air-filled cavity called the middle-ear space. Air enters the middle ear through the Eustachian tube from the back of the throat. With a normal-functioning Eustachian tube, air pressure in the middle ear nearly equals outside air pressure. The normally closed tube opens during swallowing and yawning, allowing air to enter the middle ear space.



The three smallest bones (ossicles) in the body occupy the middle-ear space. These middle-ear ossicles are called the malleus, incus and stapes and they work as mechanical levers when the eardrum is stimulated. Sound waves that strike the eardrum are converted to mechanical energy by the ossicles, which in turn exert varying pressure changes on the fluid of the cochlea in the inner ear.

A common problem with children is an improperly functioning Eustachian tube. If the tube fails to open during swallowing, air cannot get into the middle-ear space and the air previously trapped in the middle-ear space is partially absorbed by the mucous lining of the middle ear, creating a vacuum and causing a retracted eardrum. The vacuum may fill with fluid drawn from the surrounding tissues; this condition is called serous otitis media (SOM) and may interfere with the movement of the eardrum and ossicles, causing a mild hearing loss.

If the problem persists and the fluid cannot escape, an infection called acute otitis media (AOM) may develop and is often a complication of the common cold or allergies. AOM is the most common bacterial illness in children for which antibacterial agents are prescribed in the United States. This infection may cause a bulging of the eardrum and possible drum perforation, and usually requires medical attention. If the child suffers from recurrent tonsillitis, sinusitis, allergies and especially hypertrophied adenoids, the likelihood of AOM may be increased.

Chronic otitis media (COM) is the term used to describe a variety of signs, symptoms and physical findings that result from long-term damage to the middle ear by chronic infection and inflammation.

### This includes:

- Severe retraction or perforation of the eardrum
- Scarring or erosion of the ossicles
- Chronic or recurring drainage from the ear
- Inflammation causing erosion of the bony cover of the facial nerve, vestibular/balance canals or cochlea
- Erosion of the bony borders of the middle ear or mastoid, resulting in infection spreading to the meninges or brain
- Presence of cholesteatoma (cyst-like growth)
- Persistence of fluid behind an intact eardrum

COM is characterized by persistent otorrhea (ear inflammation with pus discharge) for more than six weeks. Otorrhea is most common in children who have ear tubes or otherwise punctured eardrums. COM can destroy the ossicles and the mastoid bone. Inflammation of the mastoid bone is called mastoiditis. Hearing loss may be as great as 50 to 60dB HL with untreated or unresolved otitis media which means a child would hear normal conversational levels as whispers.

Candidates for ear surgery include children with otitis media with effusion (OME) lasting four months or longer with persistent hearing loss or other signs and symptoms, recurrent or persistent OME in children at risk regardless of hearing status, and OME and structural damage to the tympanic membrane or middle ear. Some examples of "at risk" are children with speech delay, family history of hearing loss, syndromes associated with hearing loss, poor school performance and diagnosis of learning disability. Ultimately, the recommendation for surgery must be individualized based on consensus between the primary care physician, otolaryngologist and parent or caregiver that a particular child would benefit from intervention.

Cyst-like growths called cholesteatoma may form behind intact tympanic membranes and tympanic perforations. Cholesteatoma formation is a result of numerous middle-ear infections. It does not happen in an otherwise healthy ear. These slowly developing cysts can be destructive not only to hearing, but to the middle-ear bones and may spread into the air spaces of the mastoid and into the brain space where a brain infection (meningitis or encephalitis) can develop. If they are removed early, little damage results.

Another disease affecting the ossicles is otosclerosis, in which movement of the stapes is inhibited by a spongy, bony growth. This disease develops as early as the late teens and may become worse until hearing is impaired as much as 60 dBHL. The disease is usually hereditary, affects more women than men and is accelerated during or following pregnancy. A surgical procedure to correct this condition is called stapedectomy.

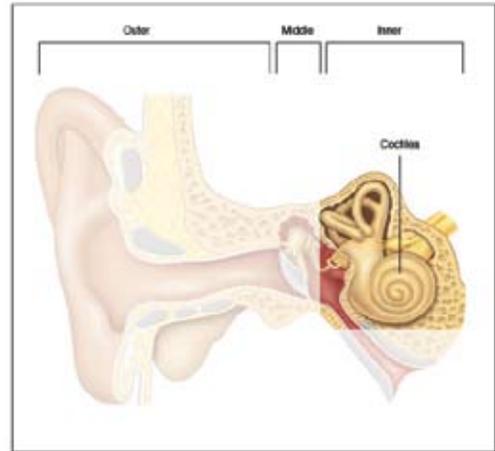


## Inner Ear

The inner ear is composed of two principal parts: the vestibular system and the hearing system. The vestibular system of the inner ear is responsible for the sensations of balance and motion. The cochlea is the sense organ of hearing. The cochlea is responsible for converting sounds that enter the ear canal from mechanical vibrations into electrical signals. This process, known as transduction, is performed by specialized sensory cells in the cochlea. The electrical signals, which code the sound's characteristics, are carried to the brain by the auditory nerve. Certain diseases that affect hearing may also involve the semicircular canals, causing dizziness, nausea and loss of balance.

The cochlea, a snail-shaped structure of two and one-half turns, is filled with fluid. The fluid is set in motion through its connection with the stapes. This causes a wavelike motion that in turn activates the hair cells of the cochlea causing electrical impulses to be sent via the to the brain via the auditory nerve. These fragile, sensitive hair cells or nerve endings may be destroyed by noise, high fever, ototoxic drugs, several infectious diseases, kidney disease and certain inherited disorders.

Damage or disease may also affect the auditory nerve (Cranial Nerve VIII), which carries the hearing signal to the brain. Hearing loss associated with the auditory nerve or inner ear is permanent. This is called a sensorineural hearing loss and ranges from mild to profound.



### **Some symptoms of this hearing loss that could also mimic attention deficit disorders are:**

- Sudden school failure after illness
- Frequent requests to repeat what has been said
- Irrelevant answers to questions
- Turning one ear toward the speaker
- Talking too loudly or too softly
- Indistinct speech (slurring of sounds)
- Sounds heard are quieter, distorted and less clear

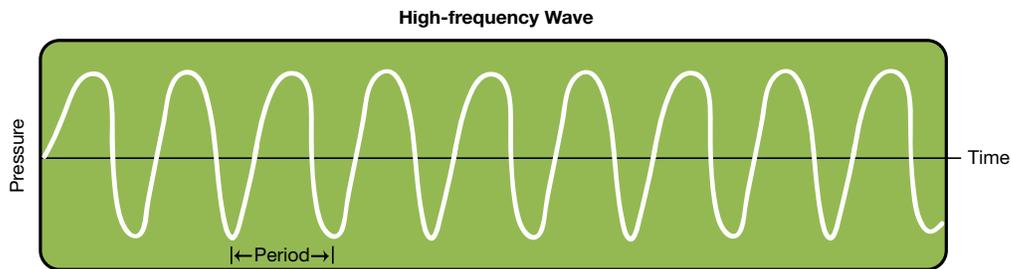
The majority of people with sensorineural hearing loss benefit from hearing aids, auditory training and, for profound hearing loss in children, a cochlear implant.

## FREQUENCY

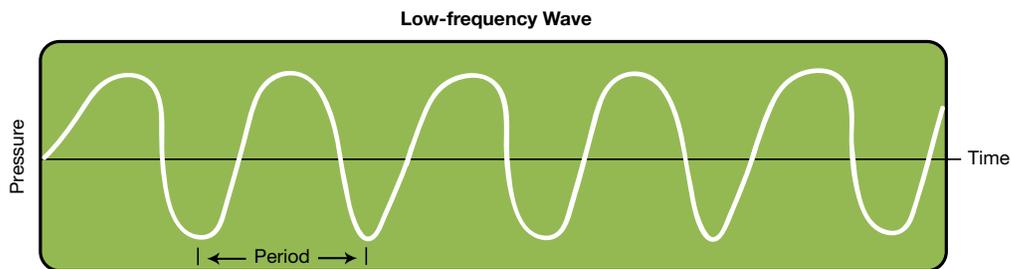
Sound from a vibrating source travels through a medium such as air in waves to the human ear. Characteristics of the wave determine how the sound will be heard. Two of these characteristics are frequency and intensity.

Frequency is measured by the number of times the wave is repeated each second and is perceived by the listener as pitch. It is expressed in Hertz (Hz) or cycles per second (cps). For example, a 500 Hz tone will cycle 500 times a second; whereas, a 4,000 Hz tone will cycle 4,000 times a second. These are pure tones. Generally, what we hear are complex sounds, which are combinations of pure tones. Although humans may hear from 20 to 20,000 Hz, perceiving 300 to 8,000 Hz is most important for understanding speech. The sensation or perception of the frequency is referred to as the pitch of the sound. A high-pitched sound will correspond to a high-frequency sound wave and a low-pitched sound will correspond to a low-frequency sound wave.

**A graph showing two different pure tones with different frequencies and the same intensity which would be perceived as different pitches.**



The first wave is a high-pitch pure tone that will be perceived as a high-pitched sound.  
For example, the sound produced by a whistle.



The second wave is a low-frequency pure tone that will be perceived as a low-pitched sound.  
For example, the sound produced by a drum.

### **For more information on pitch and frequency:**

<http://www.glenbrook.k12.il.us/gbssci/phys/Class/sound/u11l2a.html> — this Web site will describe: Sound Properties and Their Perception: Pitch and Frequency

<http://www.umanitoba.ca/faculties/arts/linguistics/russell/138/sec4/acoust1.htm> — this Web site will provide the opportunity for listening to the different pure tones and complex tones.

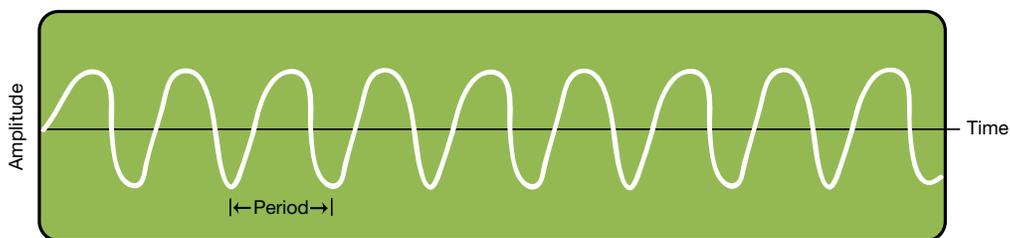
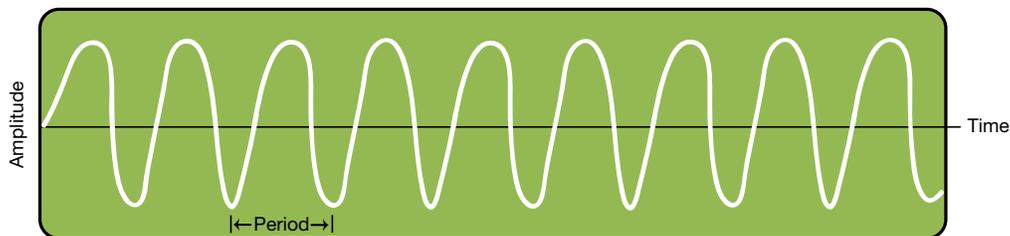
## INTENSITY

Intensity is the external measure level of a sound; the amount of amplitude movement determines the intensity of sound, which is perceived by the listener as loudness. Loudness is the internal subjective experience of the intensity of sound.

Intensity is expressed in decibels (dB). The decibel has no absolute value; rather, it compares one sound to another. The sounds used for comparison can be different. The measurement of noise utilizes a standard called sound pressure level (SPL). Hearing testing utilizes a different standard, the hearing level (HL). There are several other standards, but these two are the most commonly used in describing hearing.



Following are two examples of different amplitudes at the same frequency. The sound source at top is greater, which would be perceived as louder than the sound source below, which would be perceived as softer.



### For more information on intensity and decibels:

Sound Properties and Their Perception: Intensity and the Decibel Scale

<http://www.glenbrook.k12.il.us/gbssci/phys/Class/sound/u1112b.html>

## NOISE-INDUCED HEARING LOSS

---

Noise-induced hearing loss (NIHL) is a high-frequency sensorineural hearing loss caused by chronic exposure to loud sounds. It can also be caused by a one-time, very loud, impulse noise such as a gunshot blast near the ear.

Every day, we experience sounds in our environment such as the television, radio, washing machine and automobiles, buses and trucks. But when an individual is exposed to harmful sounds — sounds that are too loud or loud sounds over a long time — sensitive structures of the inner ear can be damaged, causing NIHL. More than 30 million Americans are exposed to hazardous sound levels on a regular basis. Individuals of all ages, including children, adolescents, young adults and older people, can develop NIHL. Exposure occurs in the workplace, school, recreational settings and at home.

### Noisy recreational activities that could damage the hearing of school-aged children include:

- MP3 player or CD player use
- Hunting and target shooting
- Woodworking
- Concerts
- Farm equipment
- Auto races
- Involvement in a band (recreational or school)
- Job (depending on environment of job)
- Fireworks/firecrackers

Harmful noises at home include some children toys, garbage disposals, hair dryers, blenders, gas-powered lawn mowers, leaf blowers and shop tools. It makes no difference where a person lives - both urban and rural settings offer noisy environments on a daily basis. Of the 28 million Americans who have some degree of hearing loss, about one-third can attribute their hearing loss, at least in part, to noise.



## Prevention

NIHL is preventable. All individuals should understand the hazards of noise and how to practice good health in everyday life.

- Be aware that noises above 90 decibels can cause damage.

### For example:

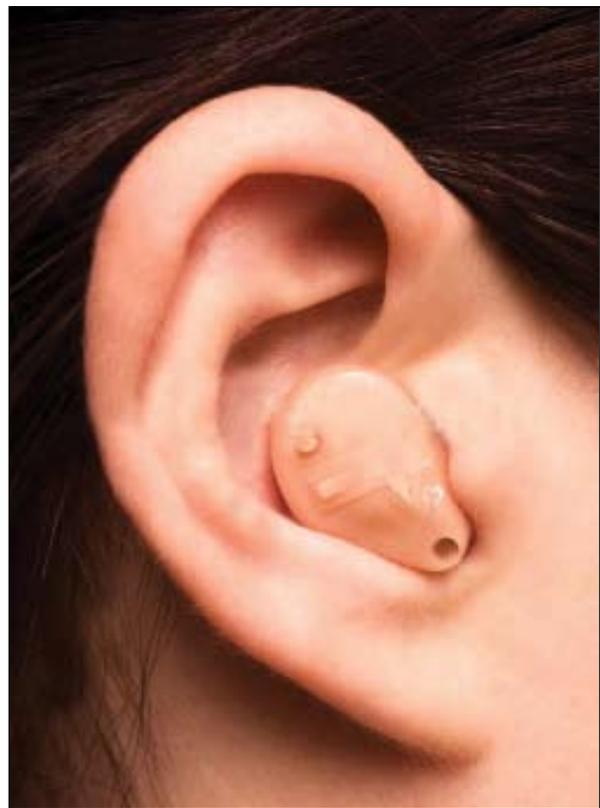
- o Wear well-fitting earplugs or other hearing-protection devices when involved in a loud activity (special earplugs and earmuffs are available at hardware stores and sporting goods stores)
- o Be alert to hazardous noise in the environment
- o Protect children who are too young to protect themselves
- o Make family, friends and colleagues aware of the hazards of noise
- o If you suspect a NIHL, have an exam by an otolaryngologist, a physician who specializes in diseases of the ears, nose, throat, head and neck. An audiologist, a health professional trained to identify and measure hearing loss and to rehabilitate persons with hearing impairments, could provide a full audiological evaluation.

**Remember this...**



**Loud Stereo Speaker**

**Could make you this...**



**Permanent Hearing Loss**

## Using MP3 (personal use) players

Personal listening devices contribute two factors to NIHL- volume and duration. Listening to MP3 music players too loudly or for too long could permanently damage hearing, according to the American Academy of Audiology and iPod manufacturer Apple Computer, Inc. Being at close range to a single, extremely loud sound such as a shotgun blast about 145-165 decibels (dB) can cause permanent damage to your hearing, but so can constant exposure to the more moderate noise levels produced by personal music players. At peak volume, some MP3 players reach 110 to 120 dB, which approach the level of a live rock concert.

According to the National Institute for Occupational Safety and Health, the safe exposure limit is 85 dB for eight hours a day. (Normal conversational levels are around 50 to 60 dB and a typical vacuum cleaner emits 75 decibels.) Every time the volume level increases by three decibels, the safe exposure time drops by half.



### For example:

88 dB	— 4 hours
91 dB	— 2 hours
94 dB	— 1 hour
97 dB	— 30 minutes
100 dB	— 15 minutes
103 dB	— 7.5 minutes
106 dB	— less than 4 minutes
109 dB	— less than 2 minutes
112 dB	— less than 1 minute
115 dB	— less than 30 seconds

Researchers have determined the limit for safe listening with the MP3 player is one hour a day with the volume no higher than 60 percent. If you listen for more than an hour, you should turn the volume below 60 percent. Another informal rule: If you have to remove the headphones to hear people talking to you, it is too loud. For today's ear buds, a safe daily dose of listening at moderate levels may only be around 30 minutes. For more information about hearing loss as it relates to listening and learning needs, refer to the following:

**[Relationship of Hearing Loss to Listening and Learning Needs. \(Relationship of Hearing Loss.pdf\)](#)**

Audiologists suggest the best way to protect one's hearing is to limit both the decibel level and the duration of exposure. It is important to remember that the effects of noise exposure are cumulative. People need to realize that if they listen to their personal listening players all day, they have to keep them at the level of normal conversation about 55 to 65 decibels. At that level, a person could listen indefinitely without worrying about contributing to hearing loss. If you want to listen to it louder, you will need to limit the time.

**[Refer to the article by Gregory Mott from The Washington Post, iPod today, hearing aid tomorrow? \(iPod today.pdf\)](#)**

**Five steps to protect yourself from hearing loss when using a personal listening device:**

1. Limit the volume of the personal listening device to around 60 decibels (dB), about two-thirds of the maximum volume.
2. Try to limit listening no more than 60 minutes a day.
3. Wear sound-isolating or noise-canceling headphones that fit over the ear, instead of ear buds that are inserted directly in the ear. When using ear buds, external noise can still be heard. The volume will be turned up to drown out the noise, boosting the sound signals by as much as six to nine decibels over the noise. The music would be heard from the player, but the person maybe unaware of the excessive volume.
4. Take advantage of the free download Apple is now offering for the iPod models with video-playback capabilities. The download contains a setting to limit the volume.
5. If tinnitus (noise that originates within the ear — it is described as ringing or buzzing sound in the ears) is occurring, conversations sound muffled after listening to the player, or having difficulty hearing conversations, visit an audiologist for a hearing test.



## HEARING PROTECTION

---

Hearing protectors are devices that fit over or in the ears. Typical examples are earplugs and earmuffs. There are, however, many different types of hearing protectors available on the market. Hearing protectors break the path of sound reaching your ears. By breaking the sound path and providing a reduction or attenuation in the sound level, hearing protectors may assist in reducing the risk of excessive exposure to loud noise.

- Ear plugs are placed in the ear canal to totally block the canal. They come in various pre-made shapes and sizes, or they can be custom made by taking an impression of the ear. Ear plugs can reduce noise 15-30 dB depending on how they are made and fit.
- Ear muffs fit completely over both ears. Again, they must fit tightly so sound is blocked from entering the ears. Like ear plugs, muffs can reduce noise 15-30 dB depending on how they are made and fit.
- Ear plugs and ear muffs can be used together to achieve even greater sound reduction. Use of ear plugs and ear muffs is recommended when noise exposure is particularly high.
- Cotton in the ears is not considered appropriate ear protection. It cannot effectively block the ear canal. It has been found to reduce sound by only 5-7 dB.



The underlying assumption when an individual is supplied with and wears hearing protectors is they are actually reducing the total amount of noise reaching the ear. However, this assumption is not always correct. For hearing protectors to work effectively, they must be worn for the duration of the exposure to the noise. This means they must be positioned before you enter the noisy area, and not removed for any length of time, no matter how short, while you are exposed to the noise.



The noise reduction rating (NRR) is a rating of the effectiveness of earplugs at decreasing the amount of sound entering the ear. Typical values range from 12 to 33 dB. NRR tells you how many decibels you can expect the products to reduce (when wearing the product properly). For example, someone attends a concert where the sound is 100 decibels and wears hearing protection as shown with a NRR of 29 dB, the sound level entering the ear is 71dB (100-29=71).

Fit is very important for all types of hearing protectors. It's up to the user to ensure the protectors fit, are comfortable and are effective.

**Foam plugs** should be soft and springy. They must be tightly compressed, so they can expand after insertion. Pulling on the outer ear straightens the canal during insertion.

**Pre-molded plugs** should not be hard or sticky. Hold the stem and gently push the plug into the ear canal. Pulling on the ear may help also.

**Ear muffs** require a good seal around the ear. Pads should be flexible, soft and adjust to a comfortable tension. Be sure hair, glasses and jewelry don't prevent them from sealing.

**Custom-molded plugs** are made especially for the individual and are already shaped for the ear (rather than conforming to the ear). Pulling on the outer ear during insertion may help.

#### **Hearing Protection Resources**

- <http://www.e-a-r.com/hearingconservation>
- <http://www.3m.com/product/index.jhtml>
- <http://www.bilsom.com>
- <http://www.aearo.com>
- <http://www.etymotic.com>
- <http://www.hearos.com>



## SAMPLE LESSONS PLANS .....

The following are sample lesson plans found on the Internet. Some of the Web sites and information are copyrighted, and the Ohio Department of Health (ODH) was granted permission for educational use only. Web sites sometimes become obsolete or change and information may become unobtainable, so ODH has provided pdf files. If you identify any other Web sites that would be useful, please contact ODH so we are able to include those sites in future revisions of this resource.

Field Services Section Administrator  
Bureau of Child & Family Health Services  
Ohio Department of Health  
246 North High Street, 6th floor  
Columbus OH 43215  
Phone: (614) 466-5332  
Fax: (614) 728-6793  
E-mail: [bcfhs@odh.ohio.gov](mailto:bcfhs@odh.ohio.gov)

### Kindergarten – 4th grade

**How loud is it?** – Web site by NASA explores provides free, weekly K-12 educational articles and lesson plans on current NASA projects.

- o <http://www.odh.ohio.gov/ASSETS/5D4E12E51E0A476CBF3405D5967F3926/1%20How%20Loud%20is%20it.pdf>

### Grades 3-6

**I Love What I Hear** – Web site by The National Institute on Deafness and Other Communication Disorders (NIDCD) is one of the institutes that comprise the National Institutes of Health (NIH).

- o <http://www.nidcd.nih.gov/health/education/teachers/DefaultPage.htm>

### Grades 5-8

- **What is noise?** – Web site describes environmental noise for young children.
  - o [http://www.epd.gov.hk/epd/noise\\_education/young/eng\\_young\\_html/m1/m1.html](http://www.epd.gov.hk/epd/noise_education/young/eng_young_html/m1/m1.html)
- **What is sound?** Web site that has a compilation of quizzes for teachers.
  - o <http://www.thatquiz.com/tq/mc?PQVQ8894>
- **Noise Off** – Teacher’s guide Web site for the Citizens Coalition Against Noise Pollution.
  - o <http://www.odh.ohio.gov/ASSETS/0704630612D6452D88901706065F7E0F/5%20NoiseOFF%20teachers.guide.pdf>
- **Weekly Reader Fun Quiz** – Web site from the League of the Hard of Hearing. A short quiz on noise and what schools can do to heighten student awareness about noise.
  - o <http://www.odh.ohio.gov/ASSETS/B2203179616B4980A9351A1473E560C6/6%20Noise%20Awareness%20Weekly%20Reader%20Fun%20Quiz.pdf>
- Military Auditory Association Web site by military audiologists. It is designed to be a three-day hearing loss prevention campaign for fifth graders.
  - o <http://www.militaryaudiology.org/bang/index.html>

## Grade 7

Hearing Protection Web site for 7th grade students on noise-induced hearing loss provides education and motivation for students to protect their hearing throughout their lives.

- o <http://www.odh.ohio.gov/ASSETS/0E5949A3DAC44125BC1809F6F5FC1402/8%20Grade%207%20Hearing%20Protection.pdf>

## Grades 7 & 8

How your brain understands what our ear hears Web site from the National Institute on Deafness and Other Communication Disorders to help students understand hearing.

- o <http://science.education.nih.gov/supplements/nih3/hearing/default.htm>

## Grades 10-12

Hearing Protection Web site for 10<sup>th</sup> to 12<sup>th</sup> grade students on noise-induced hearing loss provides education and motivation for students to protect their hearing throughout their lives.

- o [http://www2.worksafebc.com/PDFs/YoungWorker/StudentSafe/Gr\\_10\\_12\\_Hearing\\_Protection\\_Plan.pdf](http://www2.worksafebc.com/PDFs/YoungWorker/StudentSafe/Gr_10_12_Hearing_Protection_Plan.pdf)

### Other informational Web sites:

- Dangerous Decibels
  - o <http://www.dangerousdecibels.org/virtualexhibit.cfm>
- Hearing Conservation: Raising Awareness about Excessive Noise
  - o <http://www.uthscsa.edu/shp/pa/hearing/brochureEnglish.html>
- The Itinerant Connection
  - o <http://www.odh.ohio.gov/ASSETS/98A68B4595B54BC68AB1E4D1FAB2CA5F/13%20Itinerant%20Connection.pdf>
- Noisy Planet
  - o <http://www.noisyplanet.nidcd.nih.gov>



## RESOURCES

### **Acoustics and Vibration Animations**

Dan Russell, Ph.D., Associate Professor of Applied Physics at Kettering University, Flint, MI  
<http://www.kettering.edu/~drussell/demos.html>

### **American Academy of Audiology (AAA)**

<http://www.audiology.org>

### **Can't Hear You Knocking**

[http://www.hearinet.com/features/feature\\_CHYKindex.shtml](http://www.hearinet.com/features/feature_CHYKindex.shtml)

### **Children Hearing Conservation Programs**

<http://hearingconservation.org>

### **Community Learning Network**

<http://www.cln.org/themes/hearing.html>

### **Dangerous Decibels**

Oregon Hearing Research Center  
Mail Code NRCO4  
3181 SW Sam Jackson Park Road  
Portland, OR 97201  
T: (503) 494-0670  
<http://www.dangerousdecibels.org>

### **I Love What I Hear**

Curriculum  
American Tinnitus Association  
<http://www.nidcd.nih.gov/health/education/teachers>

### **"It's How You Listen That Counts" Campaign**

House Ear Institute  
2100 W. 3rd Street  
Los Angeles, CA 90057  
T: (800) 388-8612  
<http://www.earbud.org>

### **League for the Hard of Hearing International Noise Awareness Day**

League for the Hard of Hearing  
50 Broadway, 6th Floor  
New York, NY 10004  
T: (917) 305-7700 (Voice), (917) 305-7999 (TTY)  
<http://www.lhh.org/noise>

### **Listen To Your Buds**

American Speech Language and Hearing Association  
10801 Rockville Pike  
Rockville, Maryland 20852  
T: (800) 498-2071  
<http://www.listentoyourbuds.org>

### **National Hearing Conversation Association**

E. Prentice Ave., Suite 100  
Greenwood Village, CO 80111-2710  
T: (303) 224-9022 / F: 303-770-1614  
<http://www.hearingconservation.org/>

### **Noise Pollution Clearinghouse**

<http://nonoise.org/?resource/educat/soundhyg/soundhyg.htm>

### **Wise Ears Campaign**

Bookmarks, stickers, publications  
NIDCD plus coalition of business and organizations  
<http://www.nidcd.nih.gov/health/wise>