ROCK ON or Turn It Down?

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Which is louder…a rock concert or a symphony performance? You might be surprised to learn that live music concerts (of any genre) are generally presented at 110 decibels! Prolonged exposure to any sound over 85 decibels can cause irreversible "noise-induced hearing loss" (NIHL). This type of hearing loss is a reality for approximately 26 million American adults. NIHL increasingly affects children, as well as adults. The American Academy of Audiologists estimates approximately 12% of American children ages 6-19 have suffered permanent damage to their hearing from exposure to loud sounds!

How do loud sounds damage hearing?

Sound travels through the air as sound waves. These waves enter the ear and hit the eardrum, causing it to vibrate. The sound then travels via vibration through the tiny bones in the middle ear and into the inner ear area of the cochlea. The cochlea contains millions of tiny hair cells bathed in fluid. Sounds trigger these hair cells to move. The signal is then transmitted to the brain through the auditory nerve. The brain receives the signal and attaches meaning to the sound (ex., speech, a dog barking, or music). Loud sounds travel with greater force, hitting the inner ear area hard. Scientists have long believed this force causes damage to the hair cells inside the cochlea. Recent studies also show that "exposure to harmful noise levels triggers the formation of molecules inside the ear" that can damage or kill the hair cells (National Institutes of Health).

Image courtesy of the National Institutes of Health

Either way, the damage can be caused by an intense one-time event such as an explosion, or from prolonged exposure to loud sounds such as those found in a woodshop. Once these hair cells are damaged, they cannot be repaired or regrown. NIHL is not curable, but it is highly preventable.

Plugged in and causing damage?

iPods and MP3 players sometimes seem to be permanently attached to our students' ears! Listening to music at loud levels through personal stereo devices definitely damages hearing. We need to make sure we are educating our children about hearing conservation.

How loud is too loud?

Sound is measured in units called decibels (dB). From near silence at 0 decibels to fireworks at 140 decibels, we are exposed to varying levels of sound every day. Since NIHL can occur from prolonged exposure to any sound over 85 dB (or a one-time exposure to any sound at 140 dB), it is vital to know the sources and decibel levels of these sounds. Here are some dangerously loud sounds to be aware of:

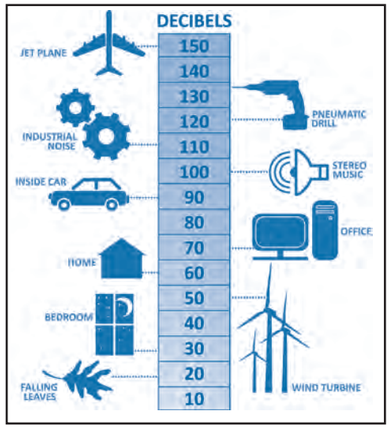
- **85 DECIBELS:** Heavy city traffic or school cafeteria
- **90 DECIBELS:** Lawnmower, motorcycle, or factory environment
- **100 DECIBELS:** Woodshop or snowmobile
- **105 DECIBELS:** Personal stereo at full volume
- **110 DECIBELS:** Concerts, car racing, or sporting events
- **120 DECIBELS:** Jet engine at take-off, auto horn, or a nearby clap of thunder
- **130 DECIBELS:** Ambulance or air raid siren
- **140 DECIBELS:** Gunfire, fireworks, or custom car stereo at full volume

You could also consider noise dangerous if you need to raise your voice to be heard by others, if it is painful to your ears, or if it makes your ears "ring" after exposure (American Academy of Audiology). Prolonged exposure to any noise at or above 85 decibels or exposure to any sound over 100 decibels for more than one minute can cause permanent hearing loss.

How can I protect myself and my child?

The best way to conserve hearing is to know which sounds are dangerously loud and avoid them. Several comprehensive educational resources geared for use with students are available and free online:

- The American Academy of Audiologists' awareness campaign is called *"Turn it to the Left"* and targets children and adolescents. You can find free resources at their website, **www.turnittotheleft.org** including fact sheets, a quiz, and downloadable posters.
- The National Institute on Deafness and Other Communication Disorders campaign, "Wise Ears" was recently expanded. The enhanced program is *"It's a Noisy Planet-Protect Their Hearing."* The website, **www.noisyplanet.nidcd.nih.gov** provides teachers and parents with facts, games, videos, and social media connections. Many of the Noisy Planet resources are also available in Spanish.
- The American Speech-Language-Hearing Association offers information, videos, and printed resources as part of their "Listen to your Buds" program. The program's focus is teaching students how to safely listen to music on their personal audio devices. Resources and links are available at **www.asha.org/buds**.
- Oregon Health and Science University offers the curriculum and training program *Dangerous Decibels*. This program includes an option to attend a two-day workshop open to all professionals and educators "interested in teaching the valuable lesson of hearing loss prevention." Those who complete the workshop requirements are certified as "Dangerous Decibels Educators." Their website, **www.dangerousdecibels.org**, includes many links and free downloadable resources including their 70-page *Educator Resource Guide* which provides lesson plans with hands-on activities appropriate for grades K-12. Another aspect of the Dangerous Decibels program is "Jolene," a mannequin equipped with a sound level meter wired to a silicon ear. "Jolene" can make appearances at schools, scientific meetings, health fairs, and other events to promote hearing loss prevention.



This past spring, students at the Muskegon Area Career Tech Center's Electrical/Computer Technologies program built their own "Jolene" for use in presentations. Students are eager to present to many more students and staff throughout Muskegon County. ***Contact Health Science Academy Instructor Kathy Andrews at 231-767-3675 or kandrews@muskegonisd.org to schedule a presentation at your school.***

Of course, you can always build your own "Jolene" with the free downloadable instructions on the *Dangerous Decibels* website. *"The Jolene Cookbook"* has been downloaded in all 50 states and in 35 countries. The "Jolene Family Album" shows variations of "Jolene" from all over the world.

Noise-induced hearing loss worsens with time and is not curable, but it is almost 100% preventable. Let's give children the information they need to make choices that will positively affect their quality of life for years to come.