NOTE: Reading this PDF course book is not a substitute for completing the Self-Paced Online training portion of this course. This PDF course book is a resource that accompanies the online training.

English:
If you do not comprehend English, and you require Safety Pass training in a language other than English, please send notification in writing to 2710 Winona Avenue, Burbank, CA 91504. Please provide your name, along with contact information, and specify the language you comprehend. Thank you.

Spanish:
Si usted no comprende inglés y requiere la capacitación Safety Pass en un idioma diferente al inglés, por favor envíe una notificación por escrito a 2710 Winona Avenue, Burbank, CA 91504. Por favor provea su nombre, junto con la información de contacto, y especifique el idioma que usted comprende. Gracias.

Korean:
영어를 이해하지 못하시고 영어가 아닌 다른 언어로 **Safety Pass** 훈련을 받으셔야 한다면, 서면 통지를 **2710 Winona Avenue, Burbank, CA 91504** 로 보내주시기 바랍니다. 귀하의 성함과 연락처를 기재하시고 이해하실 수 있는 언어를 명시해주십시오. 감사합니다.

Armenian:
Եթե դուք անգլերեն չեք հասկանում և ձեզ հարկավոր է **Safety Pass**-ի մարզում անգլերենից տարբեր լեզվով, խնդրում ենք գրավոր ծանուցագիր ուղարկել հետևյալ հասցեով՝ **2710 Winona Avenue, Burbank, CA 91504**: Խնդրում ենք ներկայացնել ձեր անունը, ինչպես նաև կապի տեղեկությունը, հատկապես նշելով ձեր հասկացած լեզուն: Շնորհակալություն:

Contract Services Administration Training Trust Fund
2710 Winona Avenue
Burbank, CA 91504

Safety Pass Training Program

The Entertainment Industry is committed to maintaining a safe and healthful working environment. To that end, all major studios have a safety representative on staff. In addition, all employers have a safety program in force. This Safety Pass Program has been designed to further promote safety and health and to prevent injuries, illnesses, and accidents on all productions, both on-lot and off-lot.

Studios and production companies may have more restrictive safety requirements than those mandated by local, state, or federal laws or regulations. They also may assign different duties or responsibilities to employees. Therefore, in addition to this Safety Pass training course, employees should refer to the safety manual and materials provided by their employers.

Employees must adhere to all safety rules and regulations. Failure of any employee to follow safety rules and regulations can lead to disciplinary action, up to and including discharge. However, no employee shall be discharged or otherwise disciplined for refusing to perform work that the individual reasonably believes is unsafe.

No safety training can comprehensively cover all possible unsafe work practices. Each production and its employees, therefore, should fully promote each employee's personal obligation to work safely in order to prevent accidents involving, and injuries to, the employee and to his/her fellow employees.

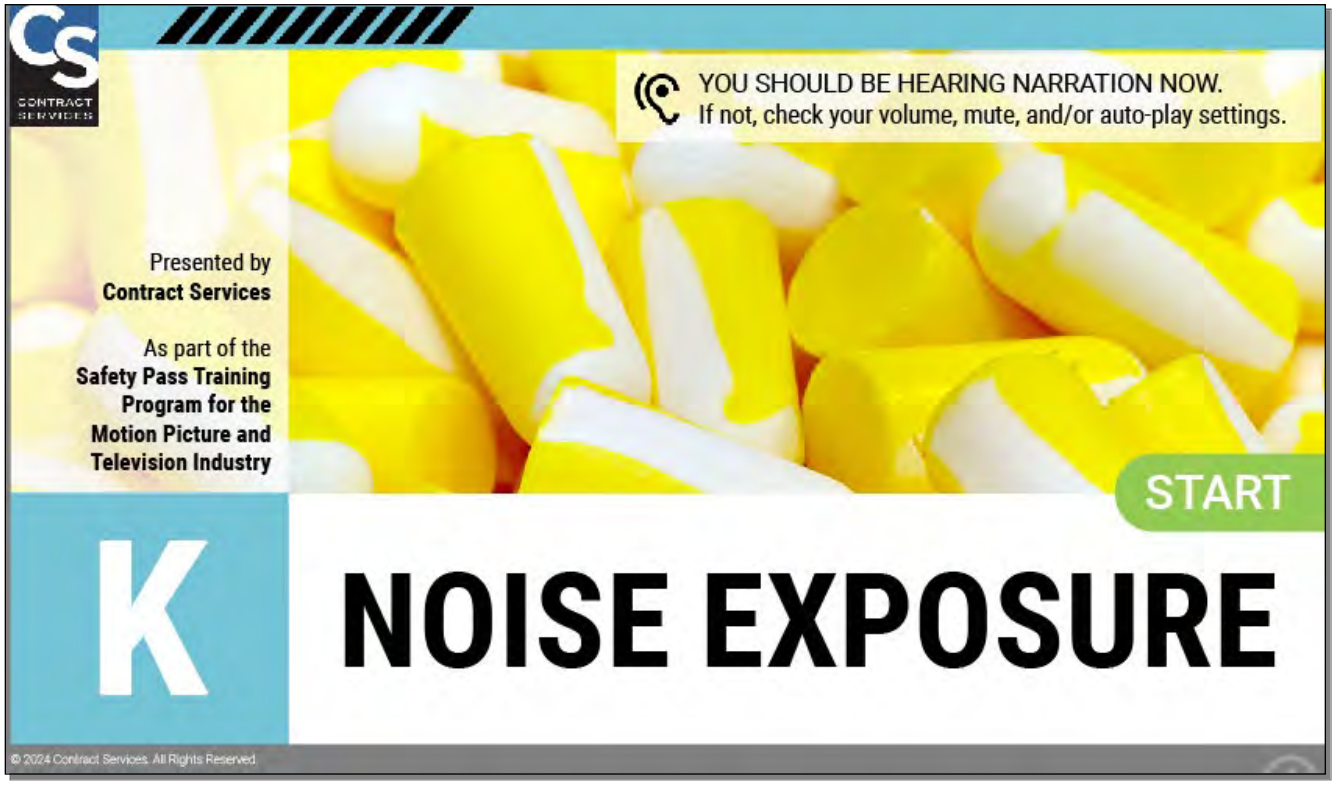
The Safety Pass Program derives from Federal and California Occupational Safety and Health Administration (OSHA) safety regulations. However, the material included in this workbook and its accompanying presentation should be used only as a general guideline. It is not intended as a legal interpretation of any federal, state, or local safety standard.

During the course of your employment, you may be acting as a supervisor or manager.In California, individuals with management authority and actual authority for the safety of a business practice could be convicted of a crime if they have actual knowledge of a serious concealed danger and fail to warn the affected employees and report the hazard. If a hazard exists, immediately notify the employer or studio safety department of the hazard and insure that potentially affected employees are informed of the danger and that steps are taken immediately to mitigate it.

Although the information contained in this training program has been compiled from sources believed to be reliable, the Alliance of Motion Picture and Television Producers, Contract Services Administration Trust Fund, Contract Services Administration Training Trust Fund, and the instructor make no guarantee nor warranty as to, and assume no responsibility for, the accuracy, sufficiency, or completeness of such information.

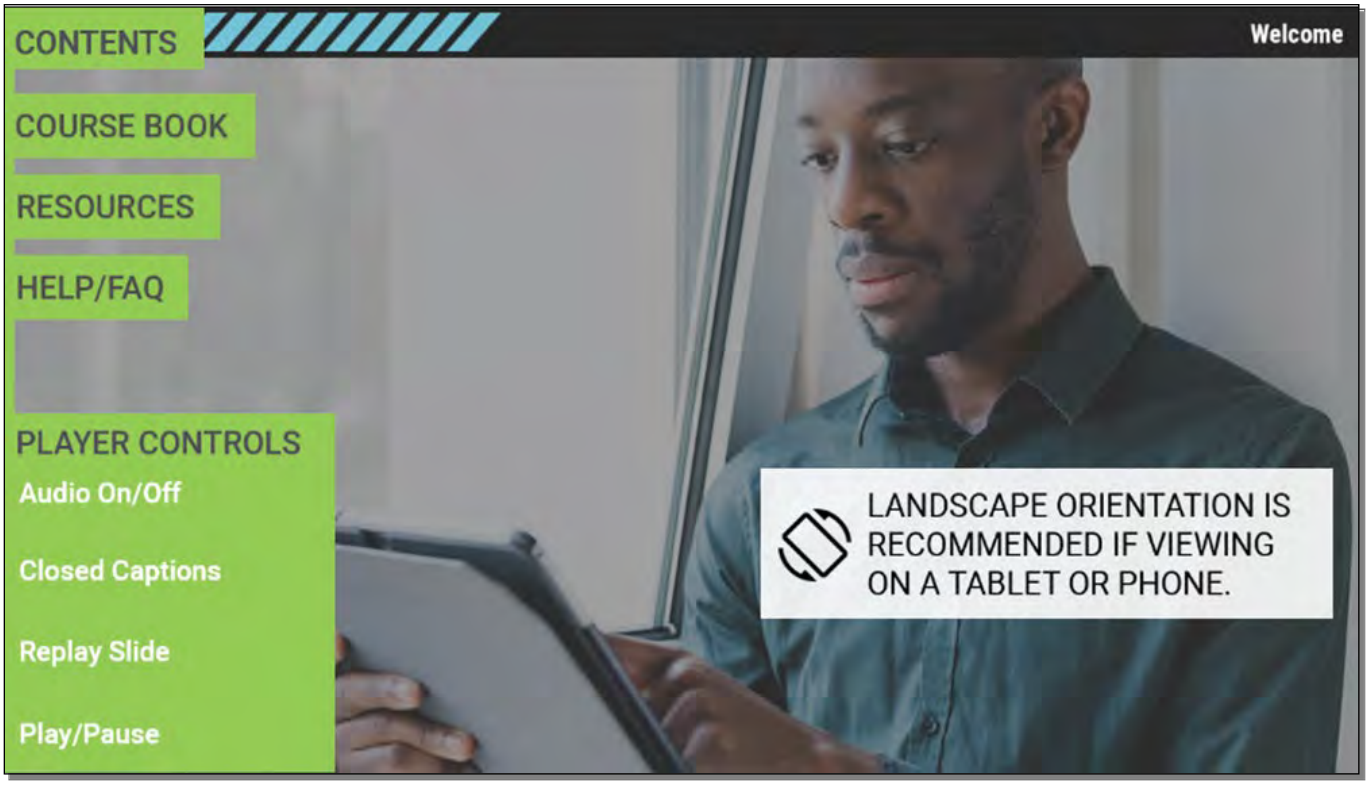
The Entertainment Industry is committed to maintaining a safe and healthful working environment.

Slide 1 - Welcome



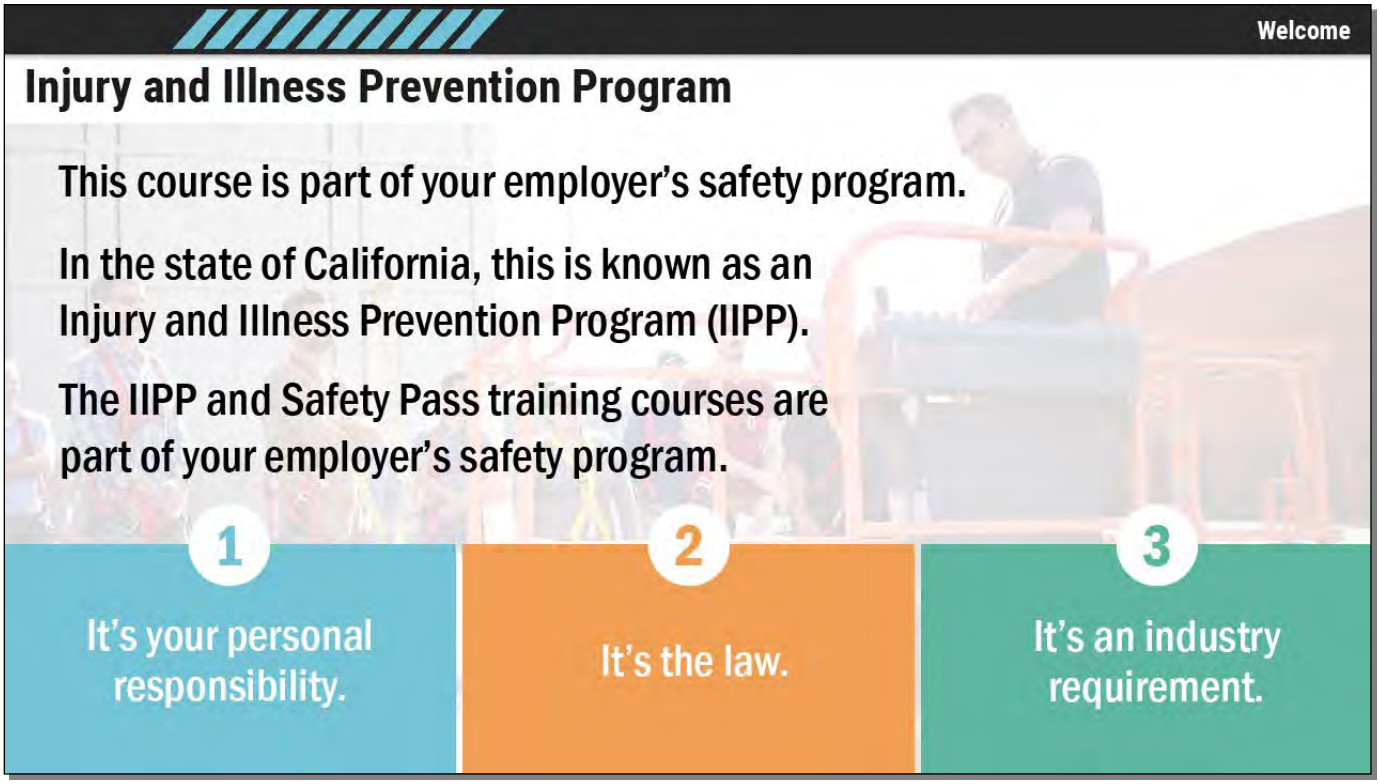
Hello, and welcome to Course K, *Noise Exposure.* This 60-minute course is part of the Safety Pass training program for the motion picture and television industry, presented by Contract Services. At the end of the presentation there will be a test. You must score at least 70% on the test to pass the course. Click START to begin.

Slide 2 - Navigation and Resources



At any time during the presentation, you can use the buttons on the side of the player window to view the Table of Contents, open the course book PDF, link to course references and resources, or get technical support or help from an instructor about course content. When you're ready to continue, select the NEXT arrow.

Slide 3 - IIPP and Three Reasons



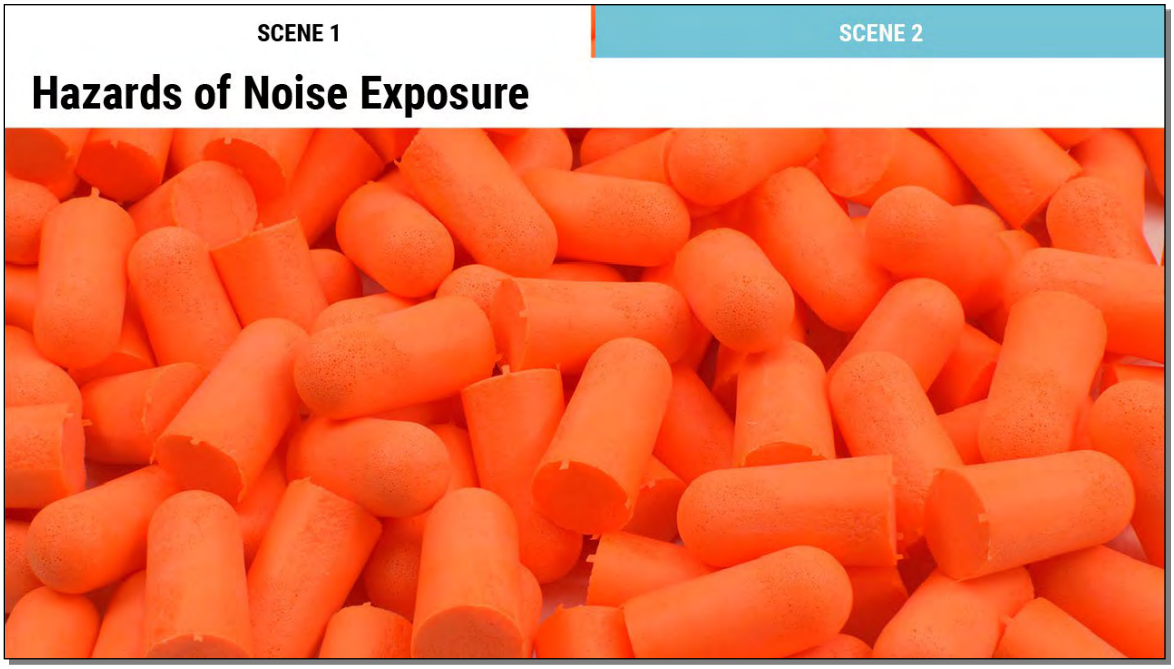
This course is part of your employer's safety program. In the state of California, this is known as an Injury and Illness Prevention Program (or IIPP). The IIPP and Safety Pass training courses are part of your employer's safety program. There are three reasons to get safety training.

First, you are personally responsible for your safety. You owe it to yourself and your coworkers to avoid accidents and injuries. The way you make a living and your quality of life depend on it.

Second, it is the law. Occupational safety and health standards guarantee the right to a safe workplace and require employers to train their employees in safety.

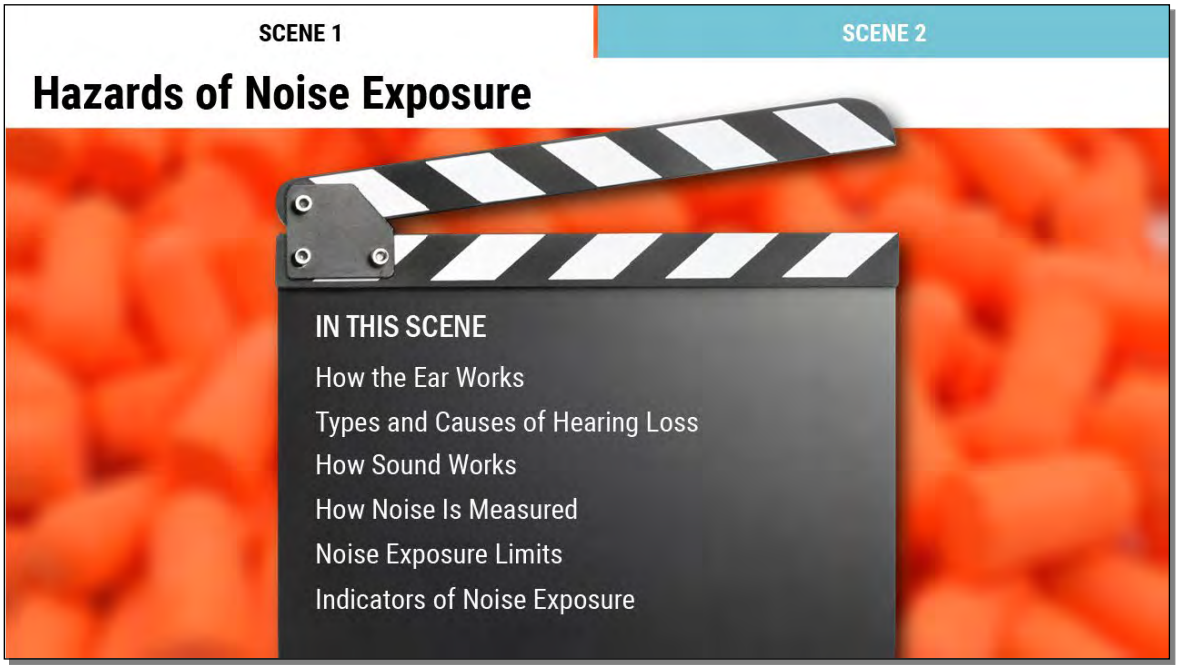
And third, the industry requires it. This course is part of a cooperative commitment between major motion picture and television studios and industry labor unions to deliver safety training.

Slide 4 - Scene 1



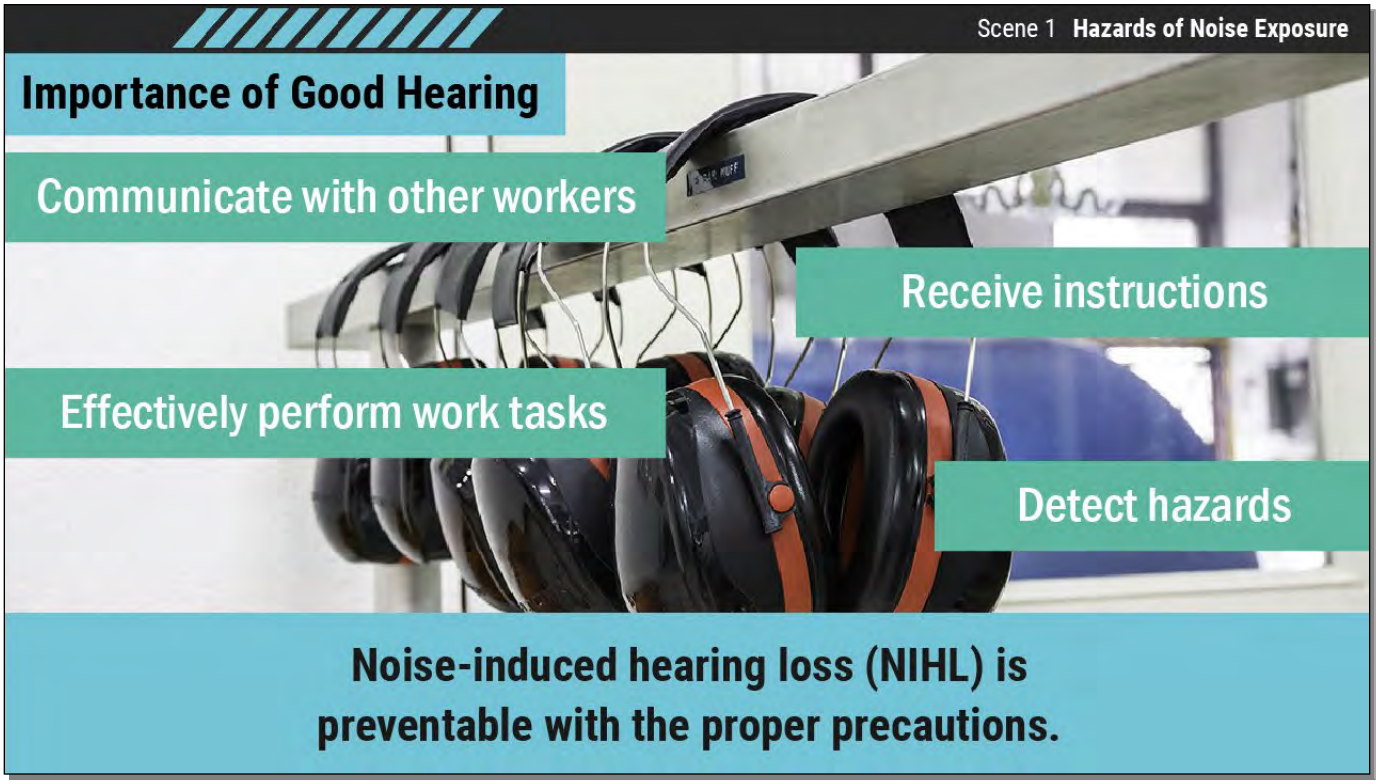
Scene 1, Hazards of Noise Exposure.

Slide 5 - In This Scene



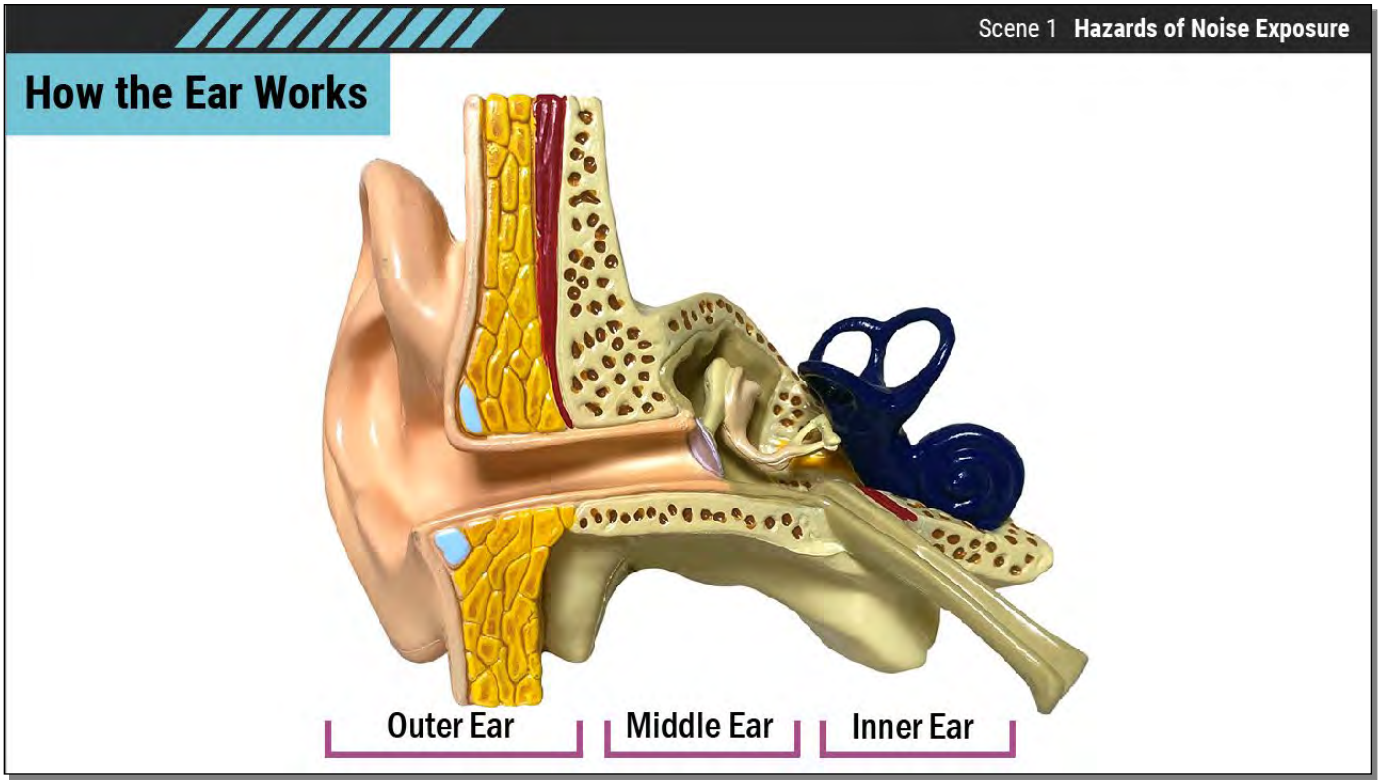
In this scene, we will cover how the ear works, types and causes of hearing loss, how sound works, how noise is measured, noise exposure limits, and indicators of noise exposure.

Slide 6 - Importance of Good Hearing



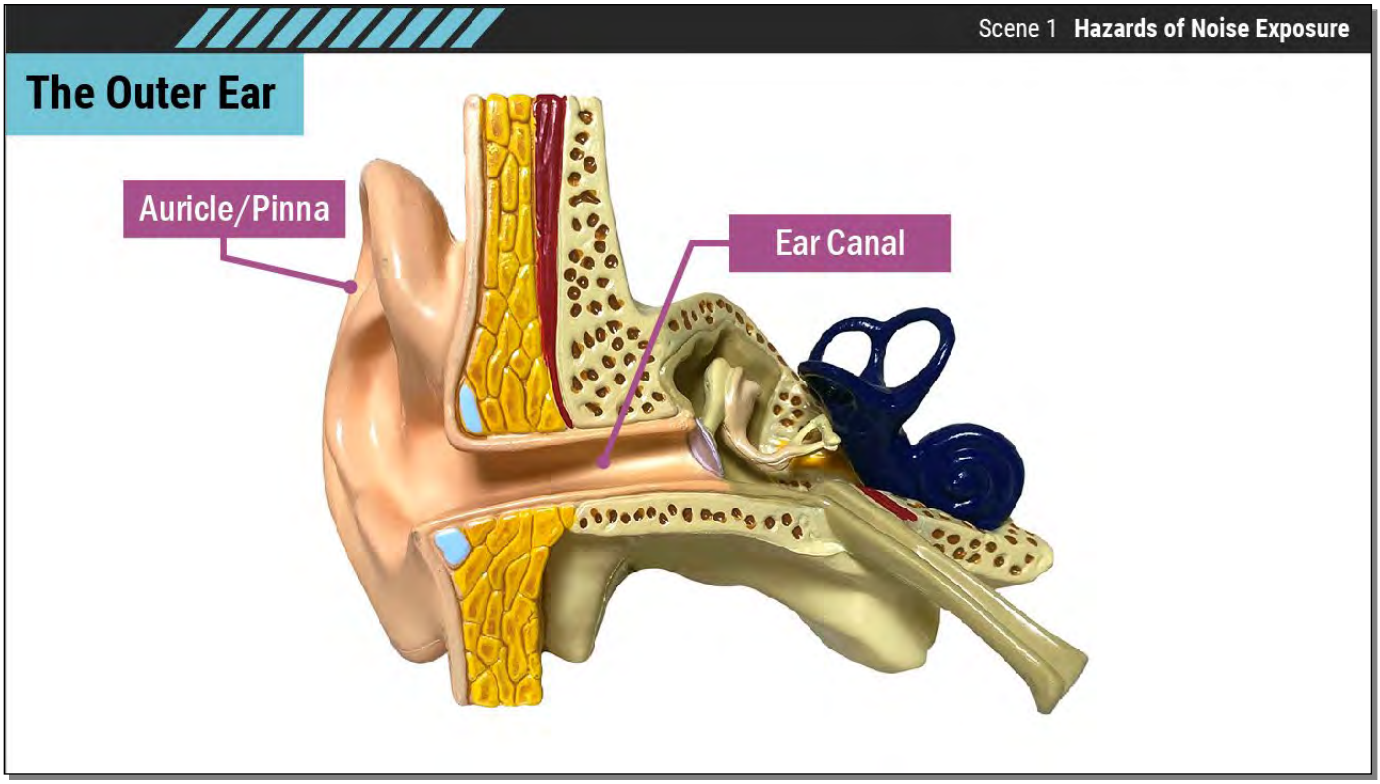
Hearing helps you on the job in many ways. It allows you to communicate with others, receive instructions, effectively perform certain work tasks, and helps you detect workplace hazards. However, the sounds of the workplace can also be harmful. Every year, millions of workers in the United States are exposed to hazardous noise levels, and thousands of them will suffer permanent hearing loss as a result. Noise-induced hearing loss (or NIHL) is preventable by following the proper precautions. Knowing how to identify noise hazards and protect your hearing should be a priority on every job.

Slide 7 - How the Ear Works



The ear has three parts: the outer ear, the middle ear, and the inner ear.

Slide 8 - The Outer Ear

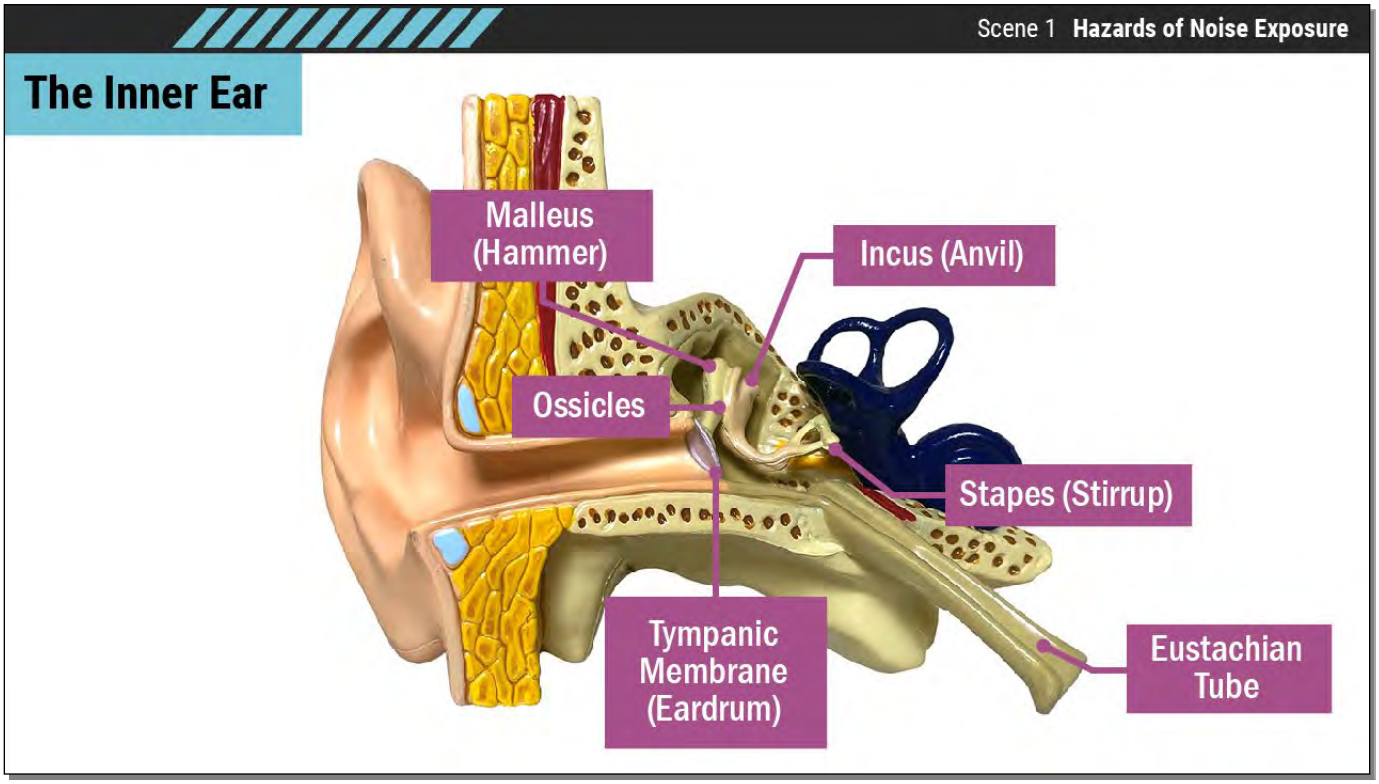


The outer ear, also called the auricle or pinna, collects and funnels sound waves down the ear canal to the middle ear.

Slide 9 - The Outer Ear

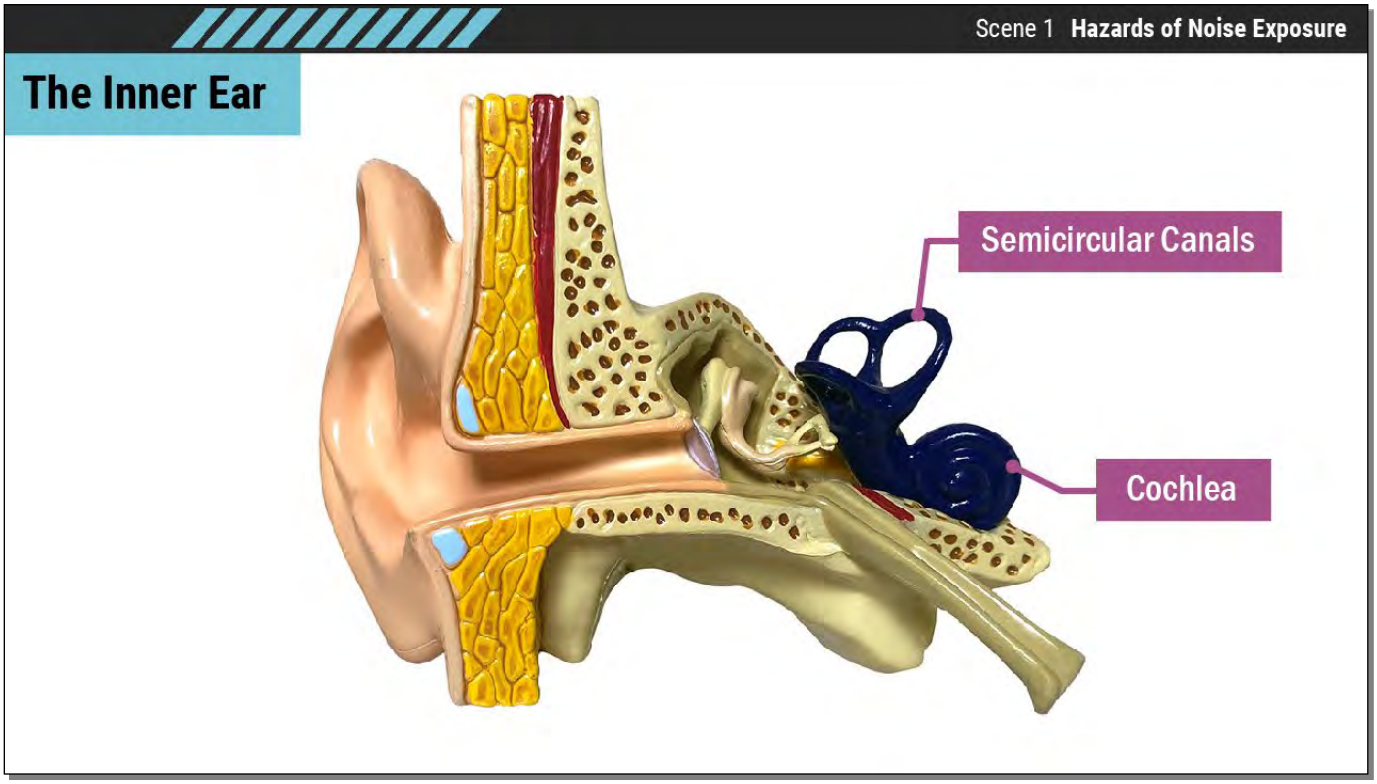
The folds of the outer ear enhance sound and help us determine the direction of the sound's source. Sounds coming from the front and sides are slightly louder, while sounds coming from behind are slightly reduced. Cupping the hand behind the ear provides additional amplification because it enlarges the sound collection area of the pinna.

Slide 10 - The Inner Ear



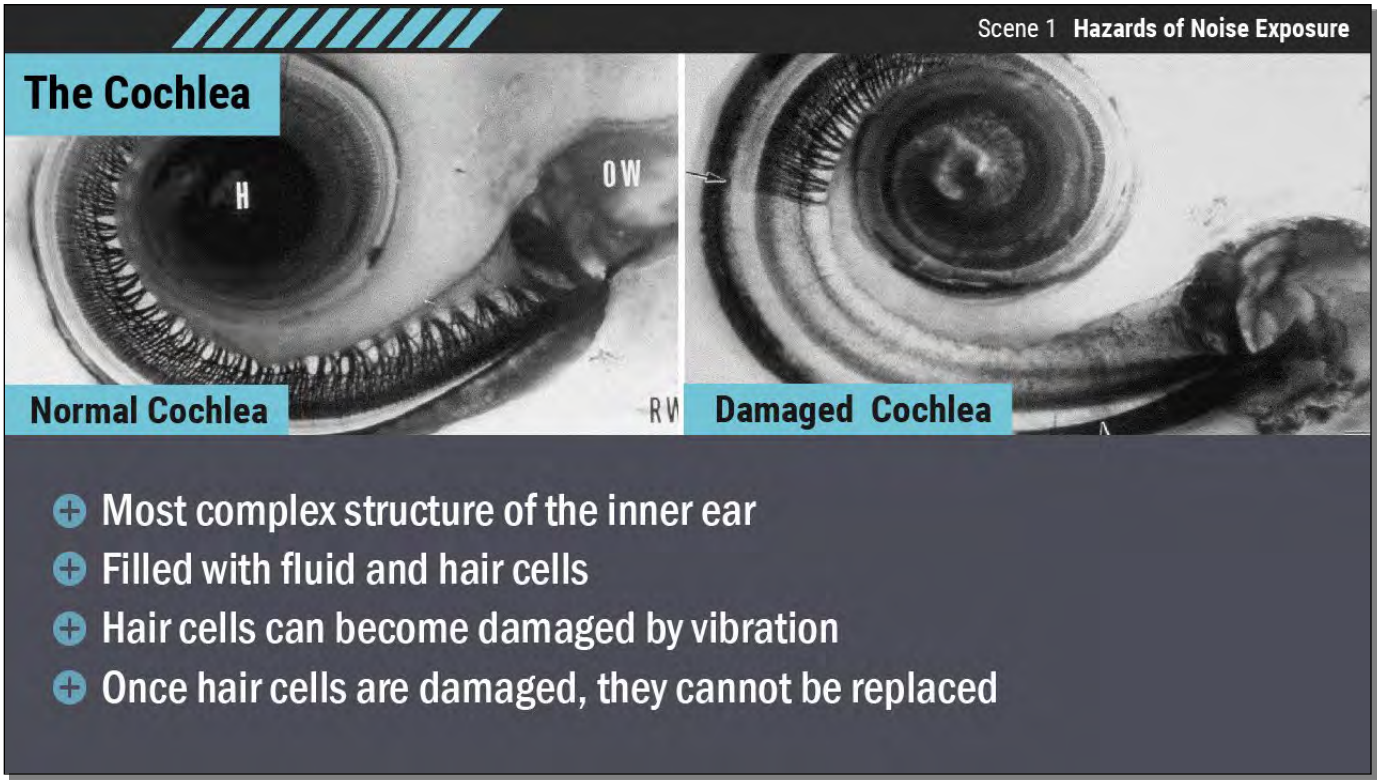
The tympanic membrane, commonly called the eardrum, separates the middle ear from the outer ear. The sound waves collected by the outer ear cause the eardrum to vibrate. If the pressure of the sound waves is too severe, it can rupture the eardrum. The ossicles are the smallest bones in the human body. They are called by the Latin names for their shapes: the malleus, or hammer; the incus, or anvil; and the stapes, or stirrup. All three are small enough to fit on a dime. The Eustachian tube equalizes air pressure around the eardrum.

Slide 11 - The Inner Ear



In the inner ear, the cochlea picks up the vibrations of the ossicles and transmits them as impulses through the auditory nerves. The brain interprets the impulses as sounds. The semicircular canals are filled with fluid and help maintain balance.

Slide 12 - The Cochlea



The cochlea is the most complex structure of the inner ear. It is filled with fluid and hair cells. The hair cells vibrate and send nerve impulses to the brain which interprets the impulses as sound. The hair cells can become damaged by too much vibration caused by loud noises. Once the hair cells are damaged, they cannot be replaced, creating hearing loss.

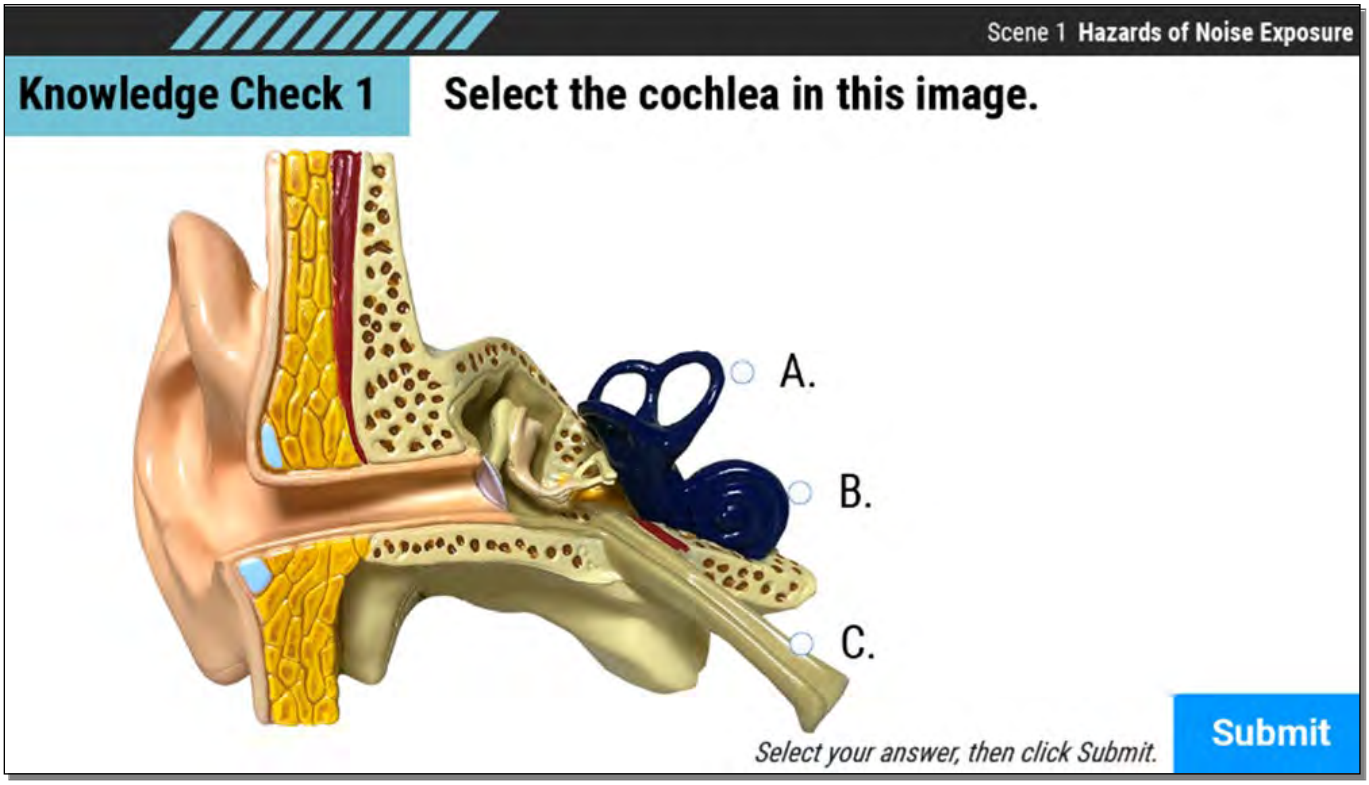
Slide 13 - Types of Hearing Loss 1

Conductive hearing loss is related to issues in the outer or middle ear. It can be caused by: malformations of the outer or middle ear structures, infections and allergies, a perforated eardrum, a blockage of the middle ear, or otosclerosis, which is an abnormal formation of new bone in the middle ear that prevents the stirrup bone from vibrating in response to sound. Conductive hearing loss tends to be temporary and is often treatable.

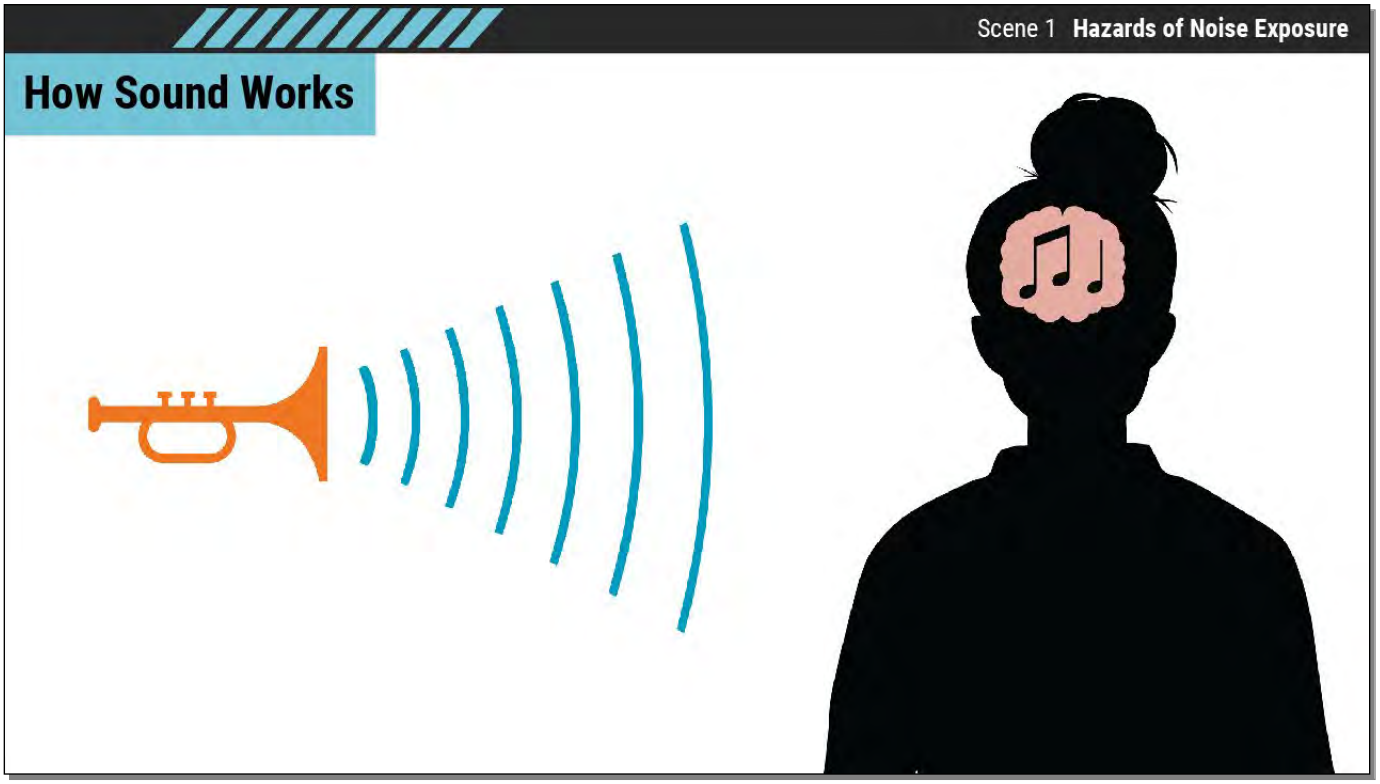
Slide 14 - Types of Hearing Loss 2

Sensorineural hearing loss is related to the inner ear. It can be caused by: malformations of the inner ear, physical trauma or disease, genetics, presbycusis (which is age-related hearing loss), use of certain medications, or noise-induced hearing loss. Noise-induced hearing loss is usually a result of acoustic trauma to the inner ear from loud noise exposure. Mixed hearing loss is a combination of sensorineural and conductive damage. Ready for a knowledge check?

Slide 15 - Knowledge Check 1

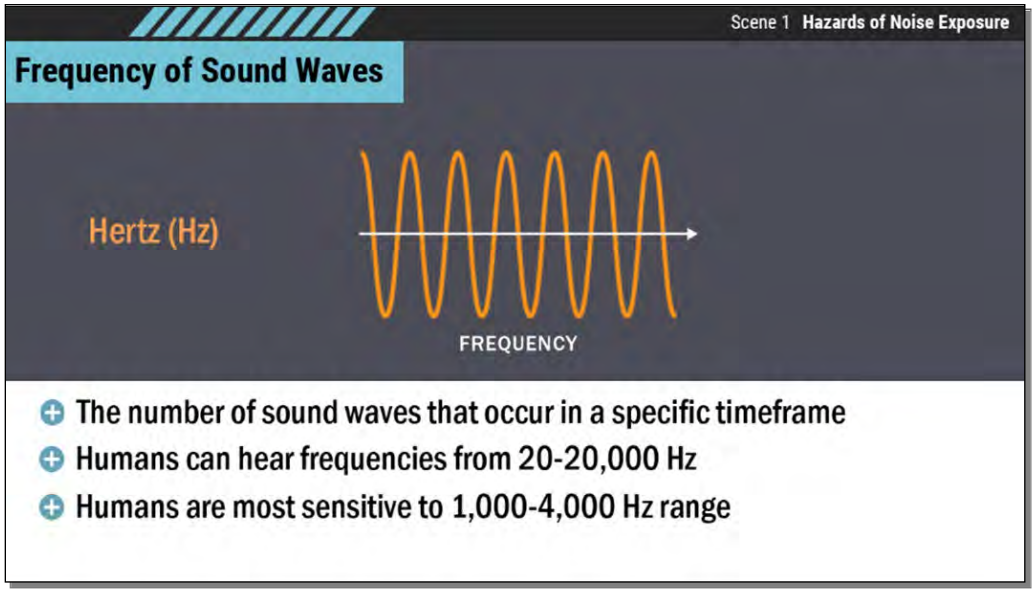


Slide 16 - How Sound Works

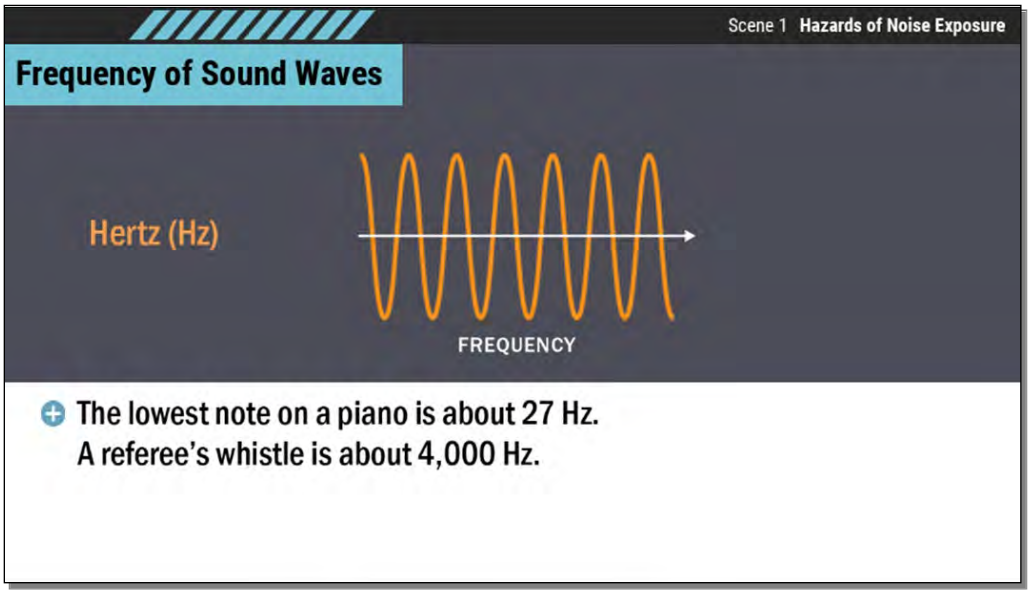


How does sound work? Sound is a wave of pressure that travels through air, liquids, or solids, vibrating the molecules. Your ears collect the waves and your brain interprets them as sound.

Slide 17 - Frequency of Sound Waves

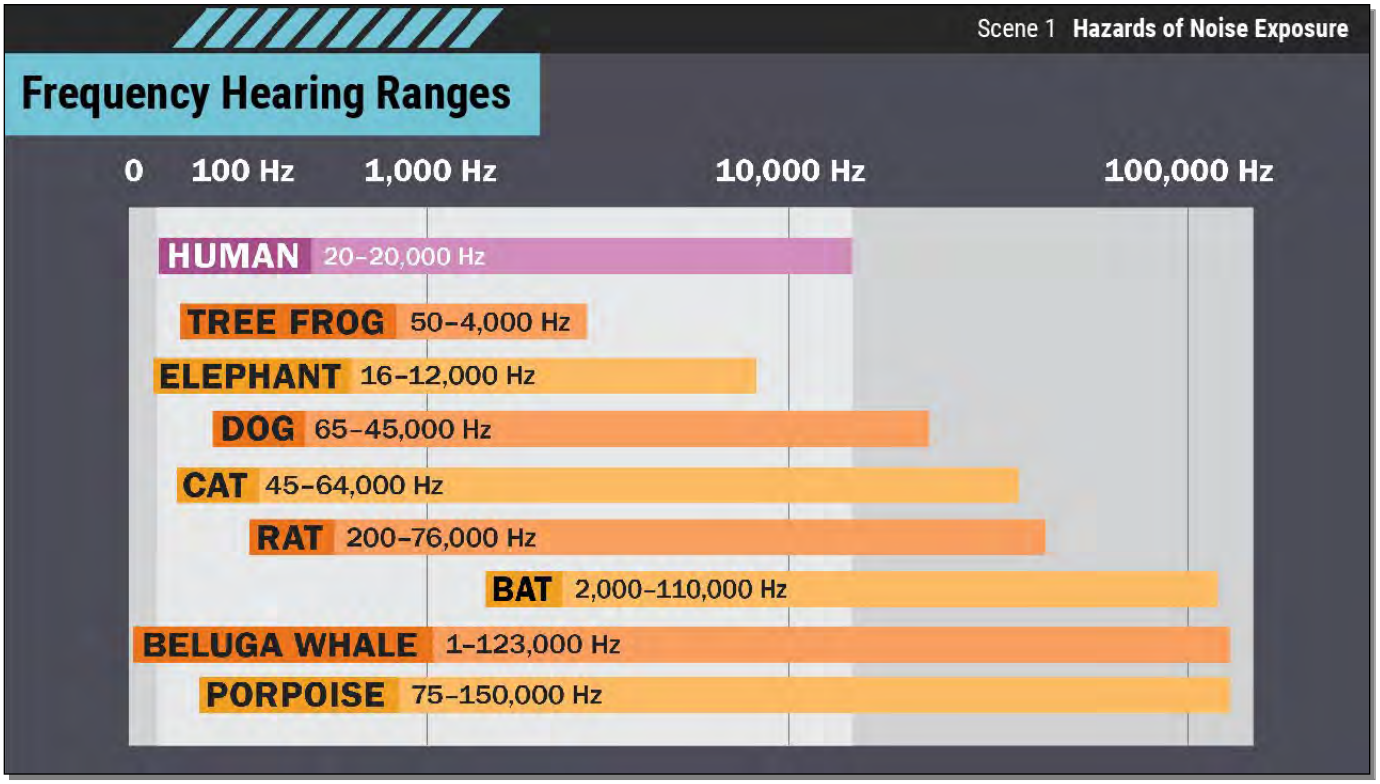


Sound waves are described in two main ways: frequency and intensity. Let's start with frequency. Commonly referred to as pitch, frequency is the number of sound waves that occur within a specific timeframe. Frequency can be measured in Hertz, abbreviated as H-Z, and which describes the number of waves in one second. The more waves, the shorter the wavelength and the higher the frequency and the pitch. The hair cells of the human ear are tuned to frequencies from 20 to 20,000 Hertz. The hair cells are most sensitive to the 1000 to 4000 Hertz range, which corresponds to the frequencies of human speech.



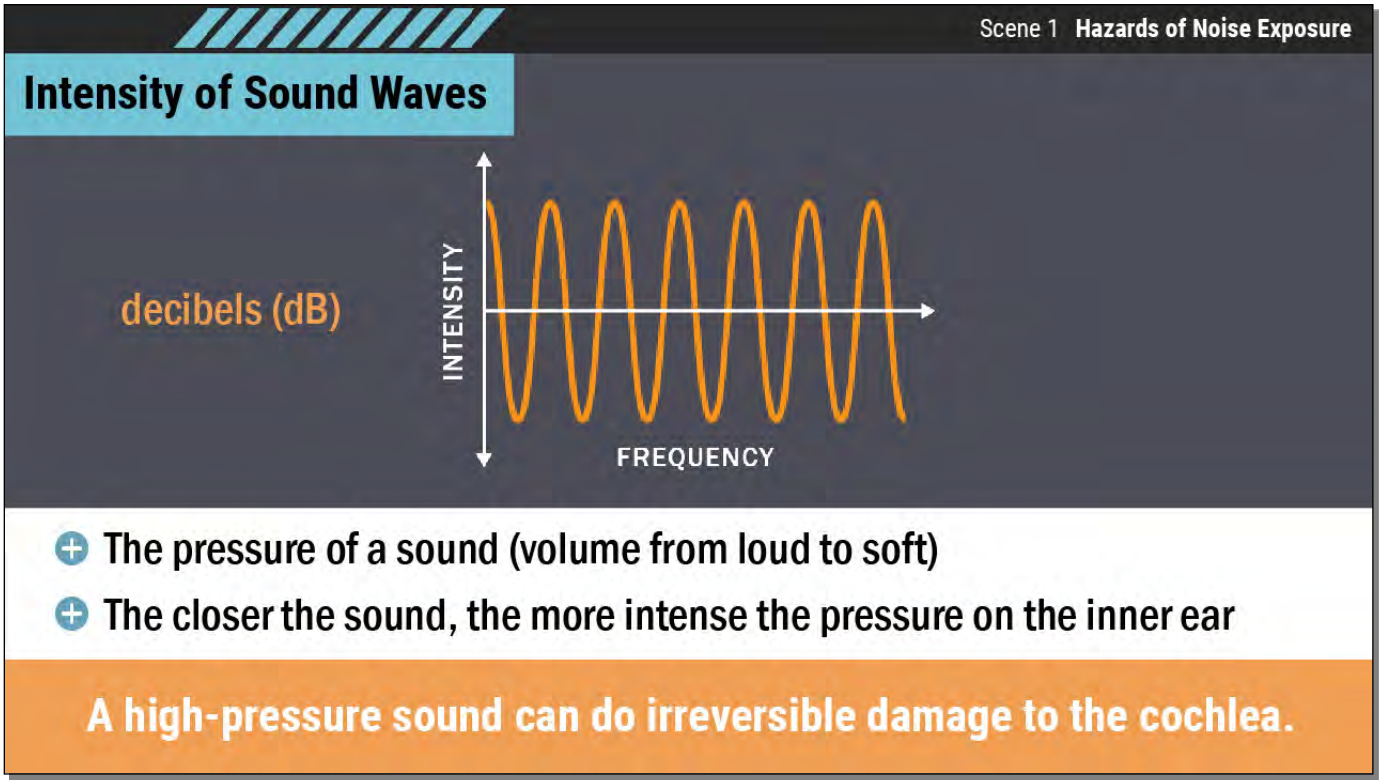
The lowest note on a piano is about 27 Hertz. A referee's whistle is about 4,000 Hertz.

Slide 18 - Frequency Hearing Ranges



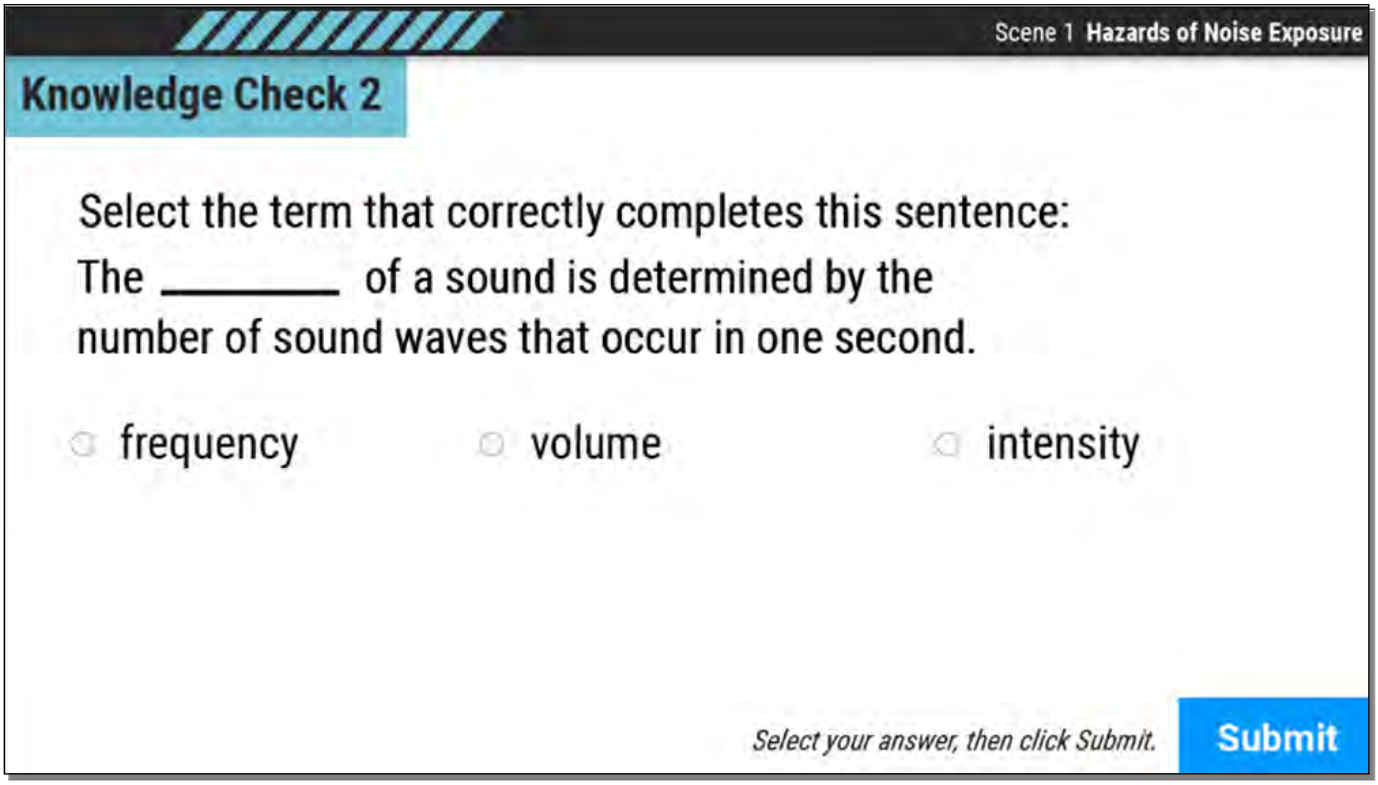
This chart shows the human hearing range in Hz as compared to other animals.

Slide 19 - Intensity of Sound Waves

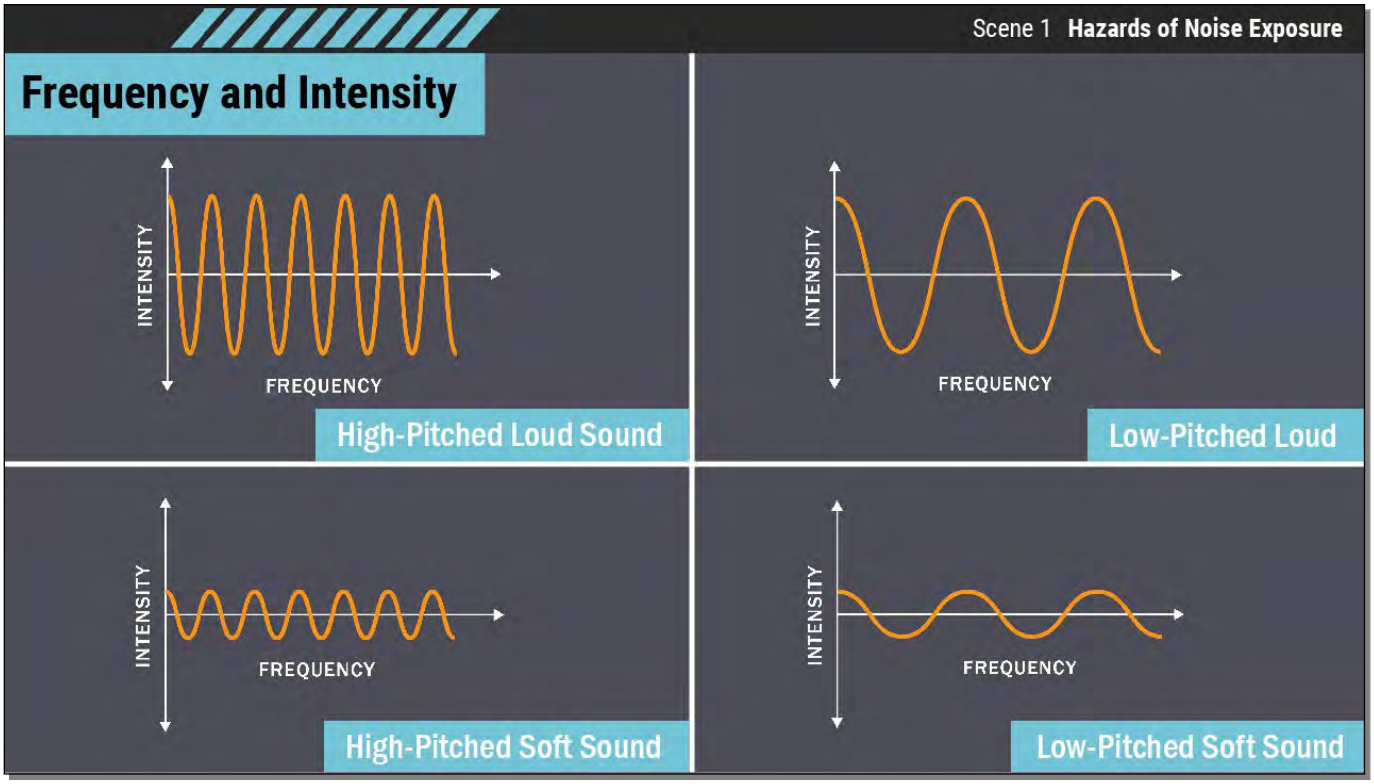


Intensity describes the pressure of a sound wave, or, what we would call volume. The taller the wave, the more pressure or loudness. Sound intensity is measured in decibels, abbreviated dB. The closer the sound source, the more intense the pressure will be on the inner ear. The intensity of the sound is potentially more harmful to human ears than the frequency. A high-pressure sound can do irreversible damage to the cochlea. Continuous exposure to sounds that are over 85 dB may cause hearing damage. Let's try a knowledge check question.

Slide 20 - Knowledge Check 2

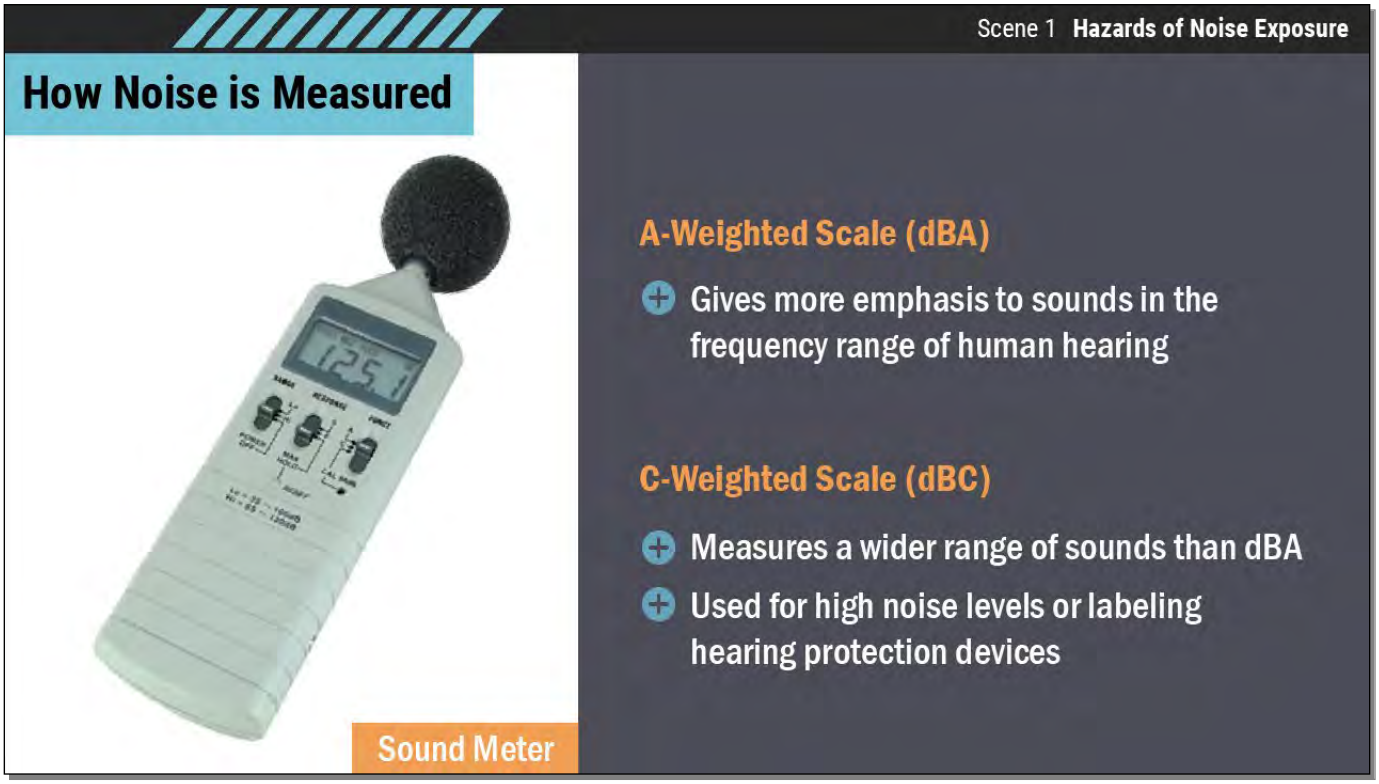


Slide 21 - Frequency and Intensity



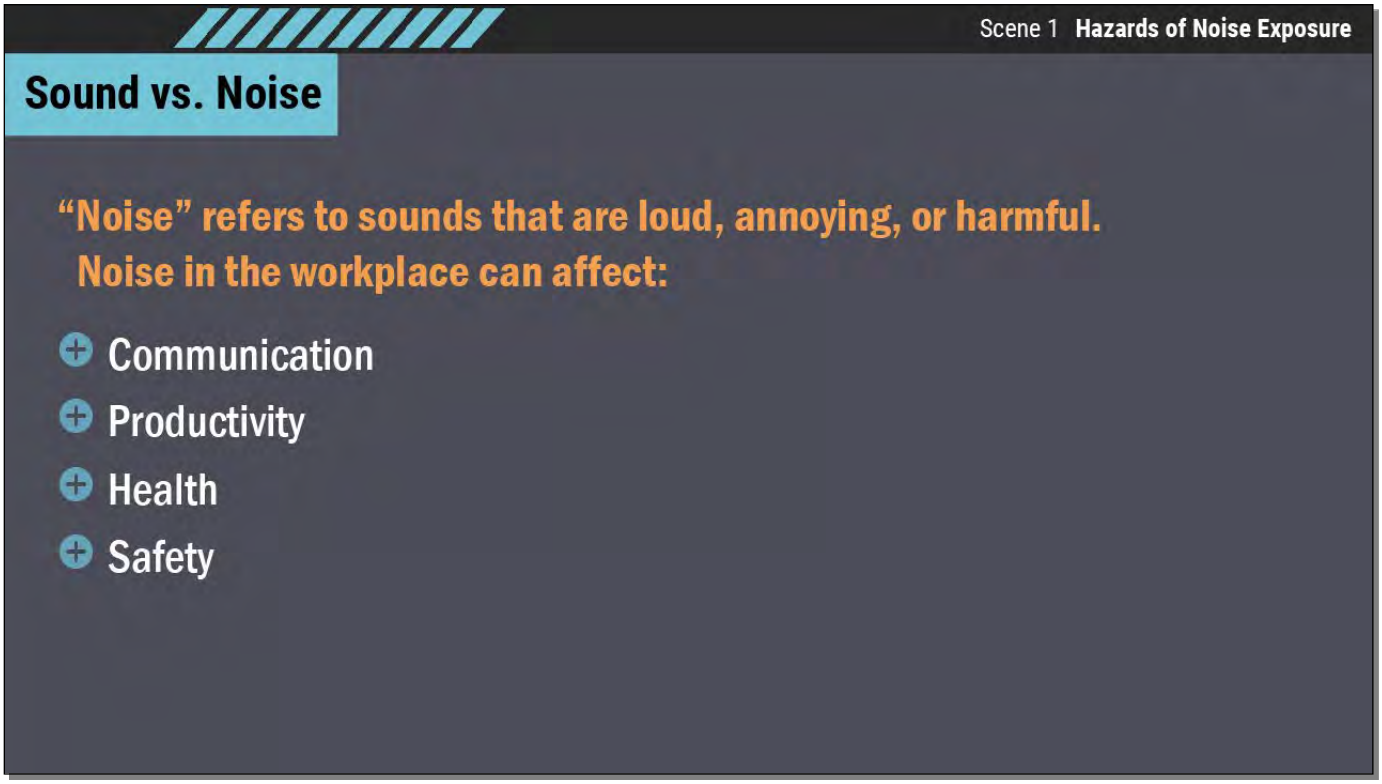
These diagrams show how frequency and intensity combine to make sounds.

Slide 22 - How Noise is Measured



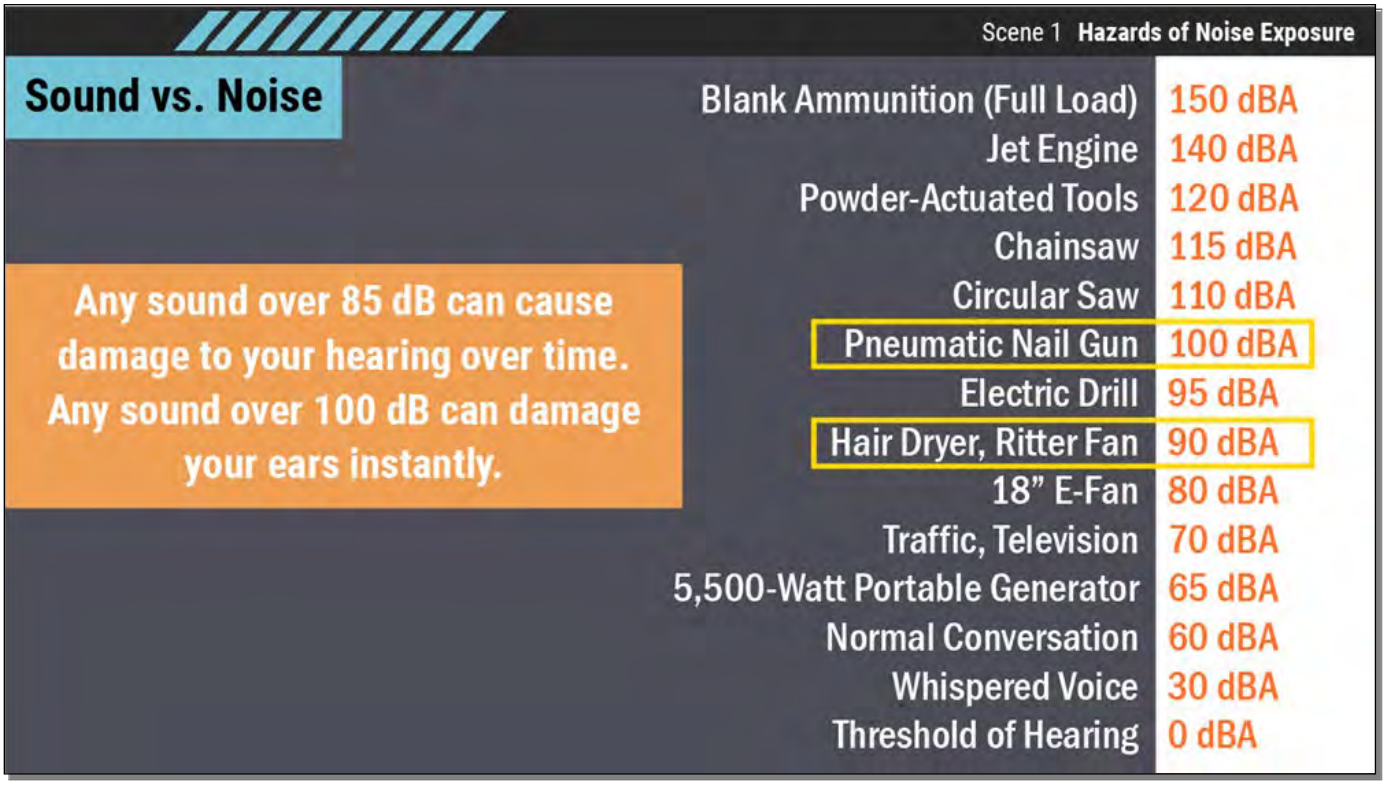
Noise levels are typically measured using a sound meter that gives a reading in decibels. The meter can be adjusted, or weighted, to emphasize or filter out different frequency ranges. Workplace noise is commonly measured using the A-weighted scale, called dBA, which gives more emphasis to sounds in the frequency range of human hearing. The C-weighted scale, or dBC, measures a wider range of sounds than dBA and is used for high noise levels and for labeling hearing protection devices.

Slide 23 - Sound vs. Noise



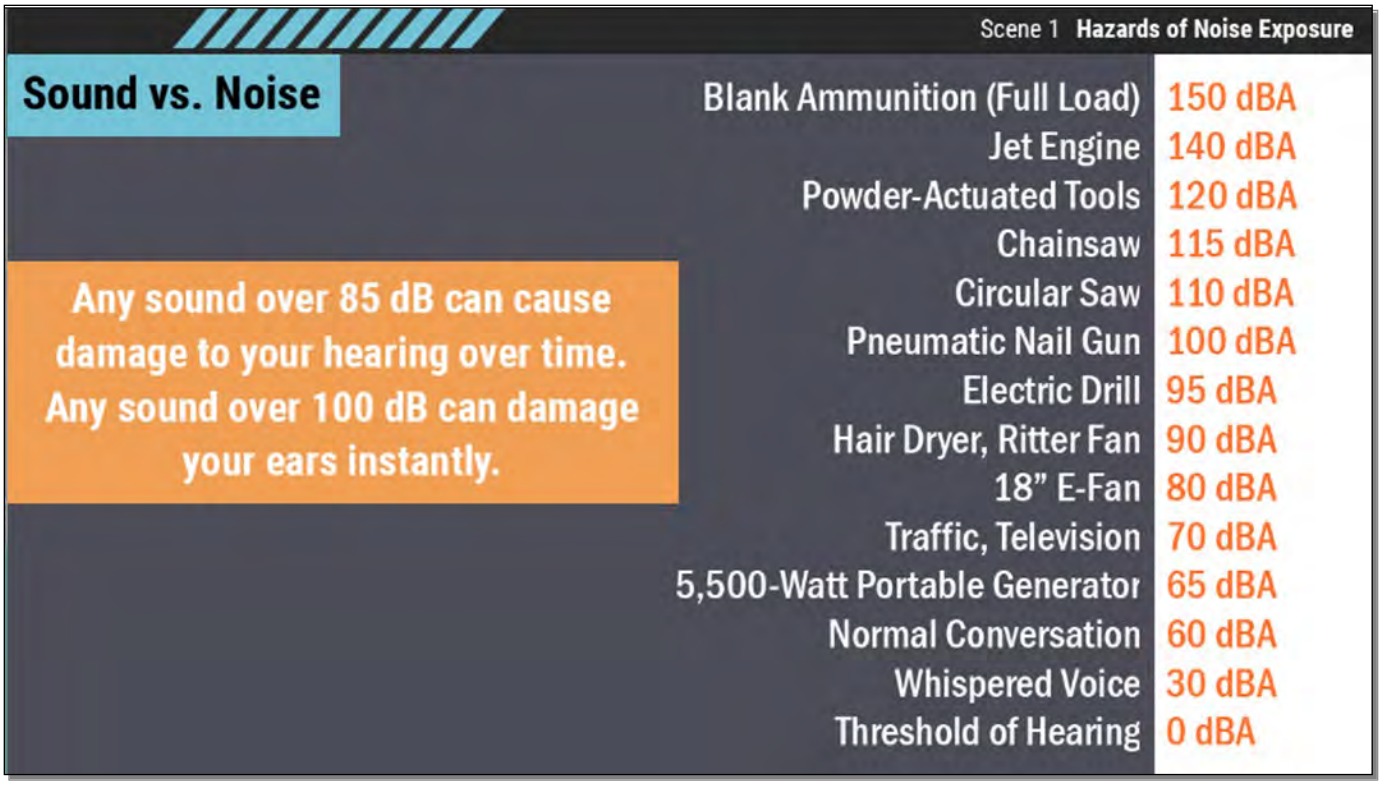
There is no technical definition of “noise,” but it generally refers to sounds that are loud, annoying, or harmful. Noise in the workplace can affect communication, productivity, health, and safety.

Slide 24 - Sound vs. Noise



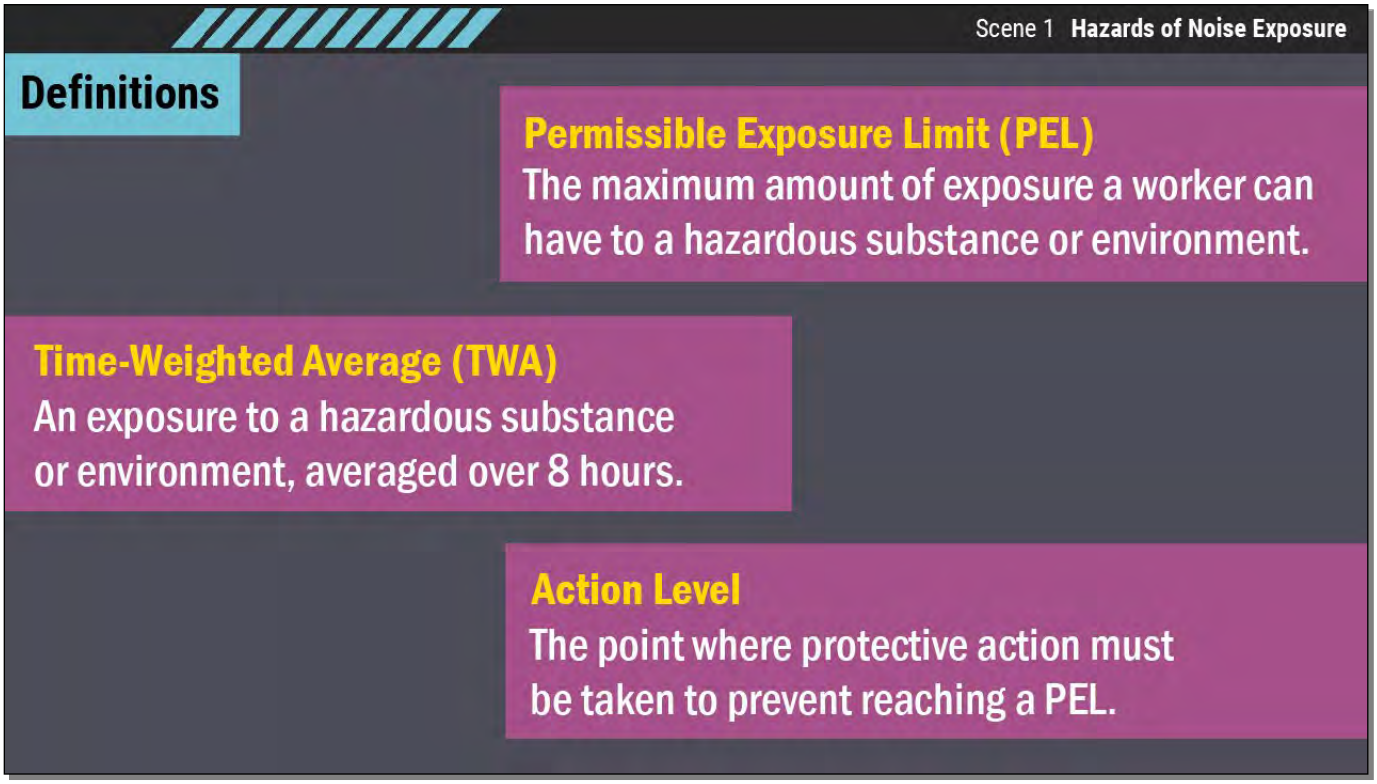
The items listed represent a range of decibel levels of common sounds. The distance from the noise source will also affect the decibel level. A worker using a nail gun is at a higher exposure from the sound than a worker that is across the shop floor. The decibel scale is logarithmic, which means an increase of 10 decibels indicates an increase of sound pressure by 10, so the sound of a nail gun at 100 decibels isn't just 10 decibels more than the sound of a hairdryer at 90 decibels, it's 10 times more.

K-Noise Exposure



But, that same pressure increase of 10 decibels may only sound twice as loud to your ears. This means that as sound gets louder, the pressure on your ears increases much more than you can hear. Any sound that is over 85 decibels can cause damage to your hearing over time and any sound over 100 decibels can damage your ears instantly. It is prohibited for workers to be exposed to steady noise above 115 dBA or impulse noise above 140 dBA without using hearing protection.

Slide 25 - Definitions

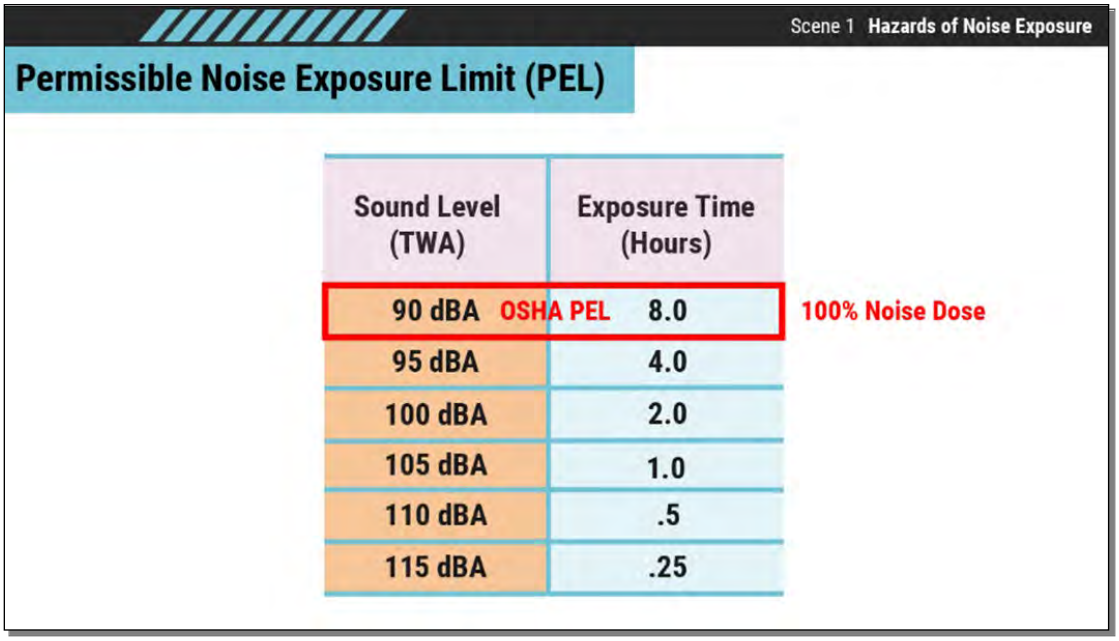


A permissible exposure limit, or PEL, is the maximum amount of exposure a worker can have to a hazardous substance or environment. The limit may be defined by time or by quantity. A PEL can be applied to loud noise, chemicals, dust, asbestos, lead, or other harmful substances.

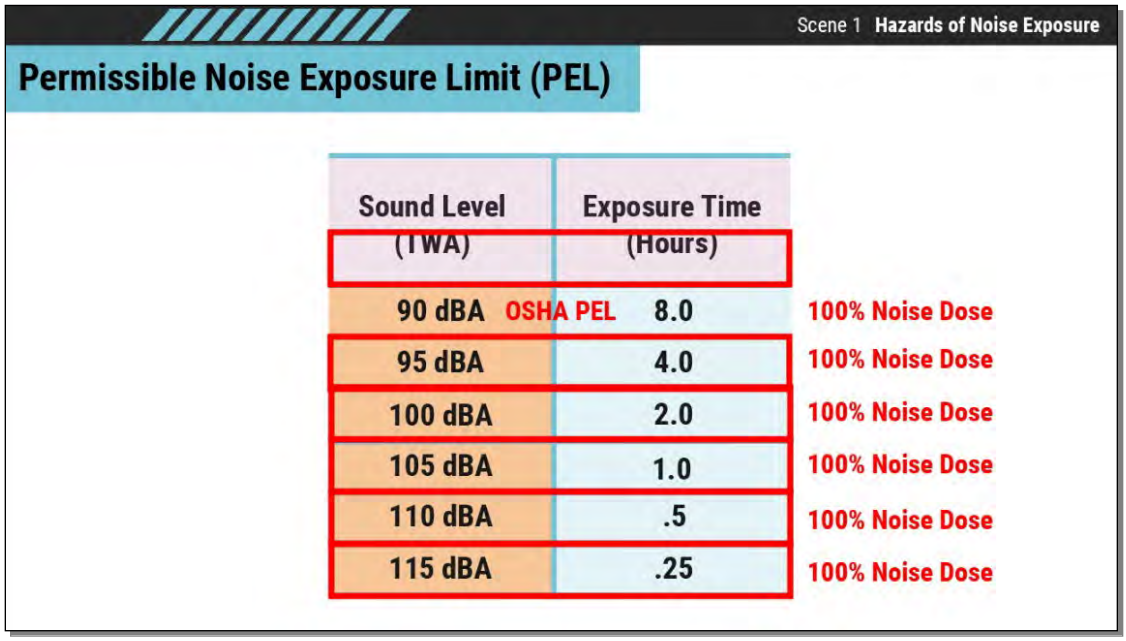
A time-weighted average is an average of the exposure over 8 hours, which is considered by OSHA to be a standard workday. However, it is preferable for an employee to avoid reaching the PEL, since it represents the maximum exposure to a hazardous condition.

An action level is a measurement or set level lower than the PEL. When the action level is reached, the employer must take some kind of action to prevent employees from reaching a PEL.

Slide 26 - Permissible Noise Exposure Limit (PEL)

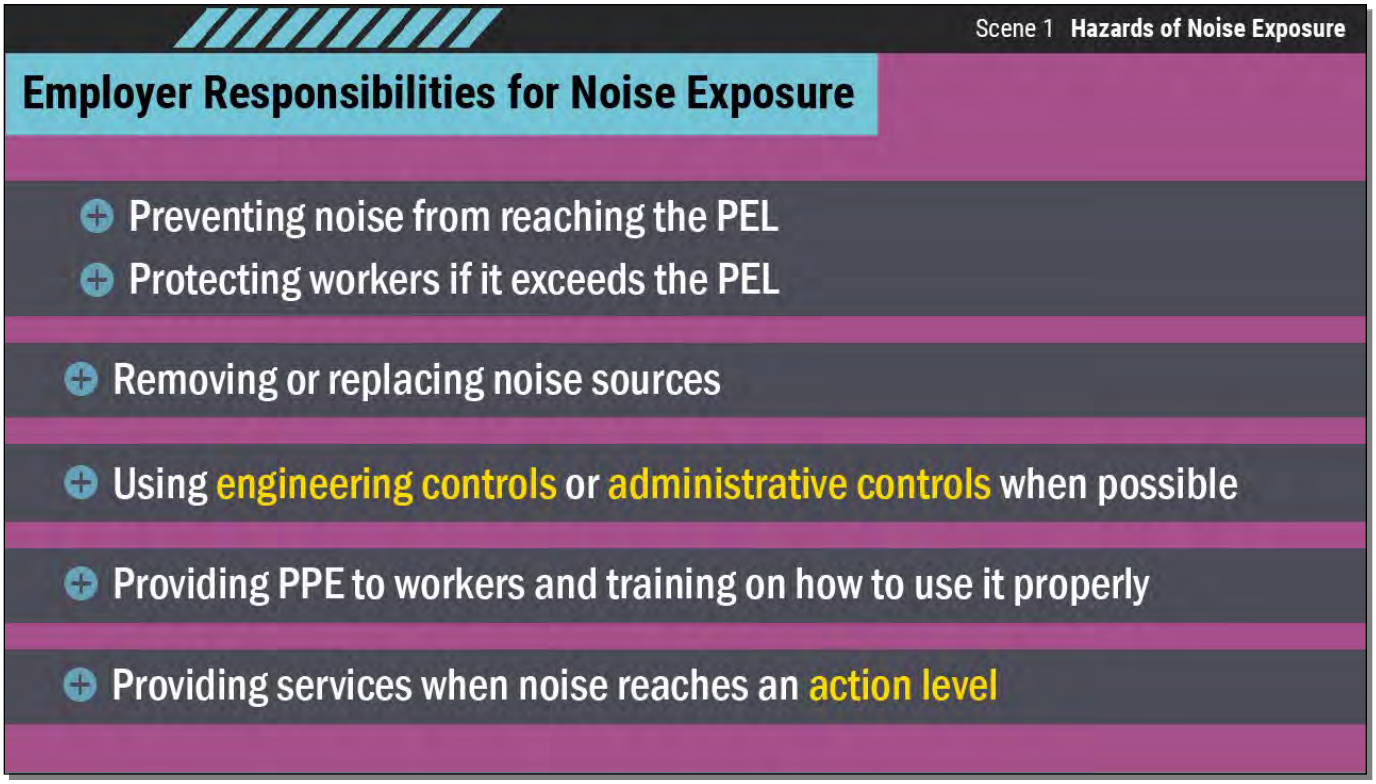


This table shows OSHA limits on the maximum amount of time that a worker can be exposed to high noise levels. The permissible exposure limit for noise exposure is 8 hours at a time-weighted average of 90 decibels (dBA). This is also called a 100% noise dose. It is the longest amount of time a worker can be exposed to that noise level before experiencing possible hearing damage.



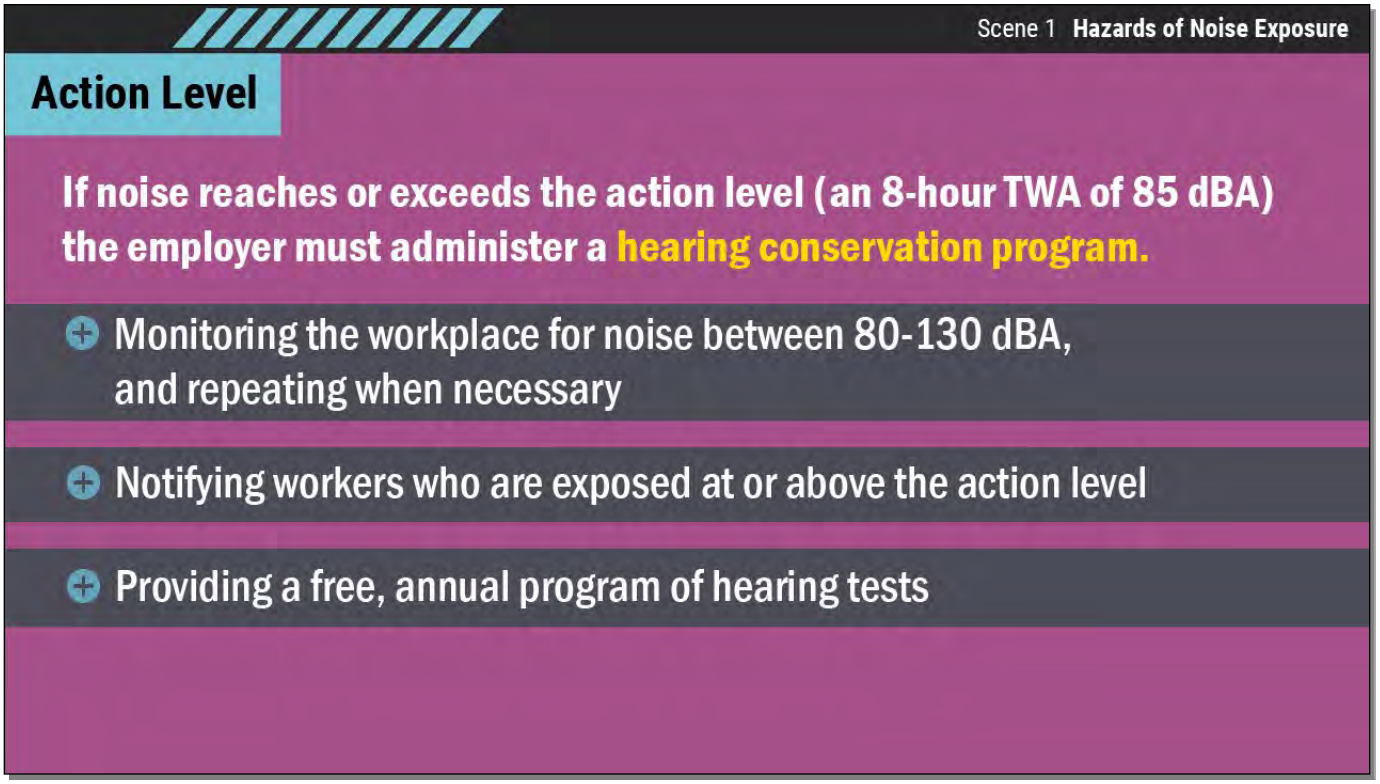
Notice that, on the table here, for every increase of 5 dB, the allowable exposure time is cut in half.

Slide 27 - Employer Responsibilities for Noise Exposure



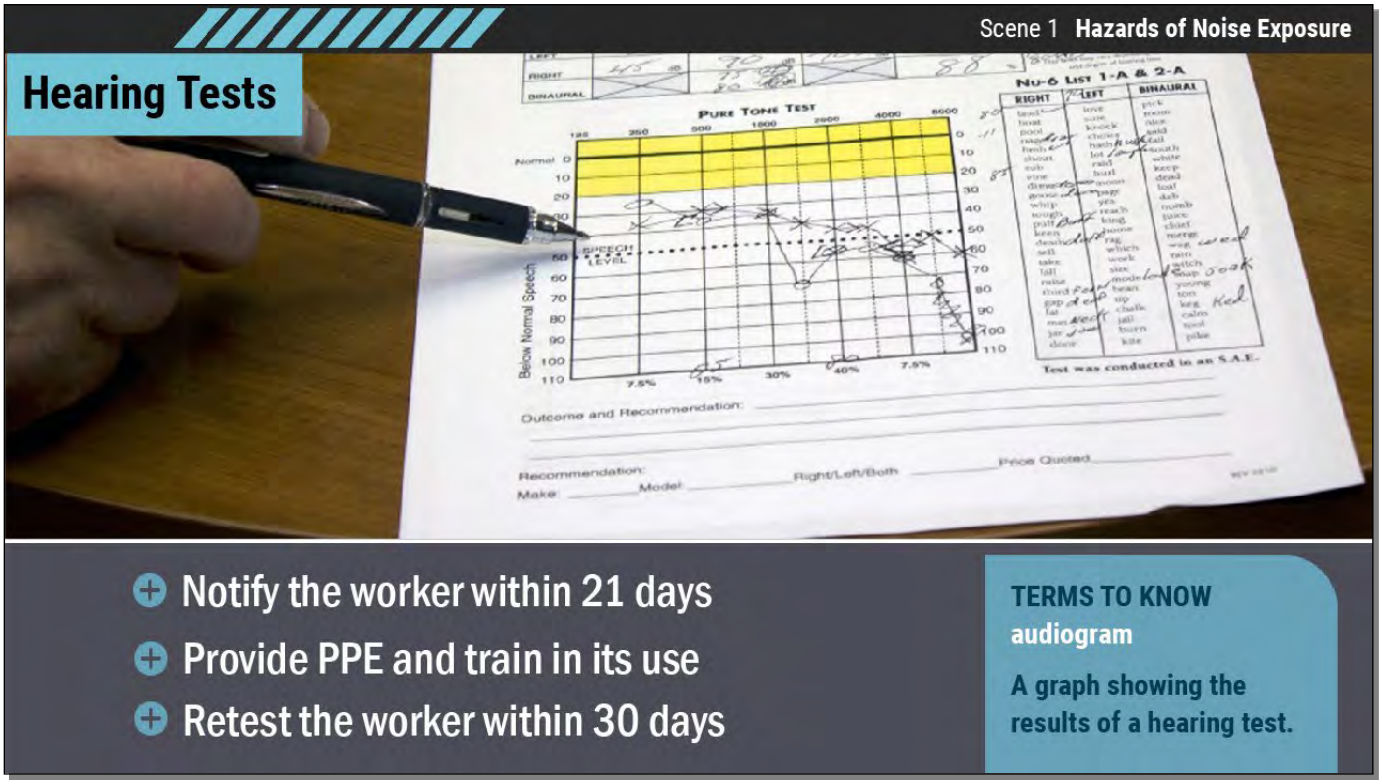
Employers must protect workers from noise exposure by either preventing noise from reaching the PEL or protecting workers if it exceeds the PEL. This could include removing or replacing noise sources, using engineering controls or administrative controls, when possible, to reduce noise, providing personal protective equipment (PPE) to workers and training them on how to use it properly, or providing services when noise levels reach an action level. We will discuss noise controls and PPE shortly.

Slide 28 - Action Level



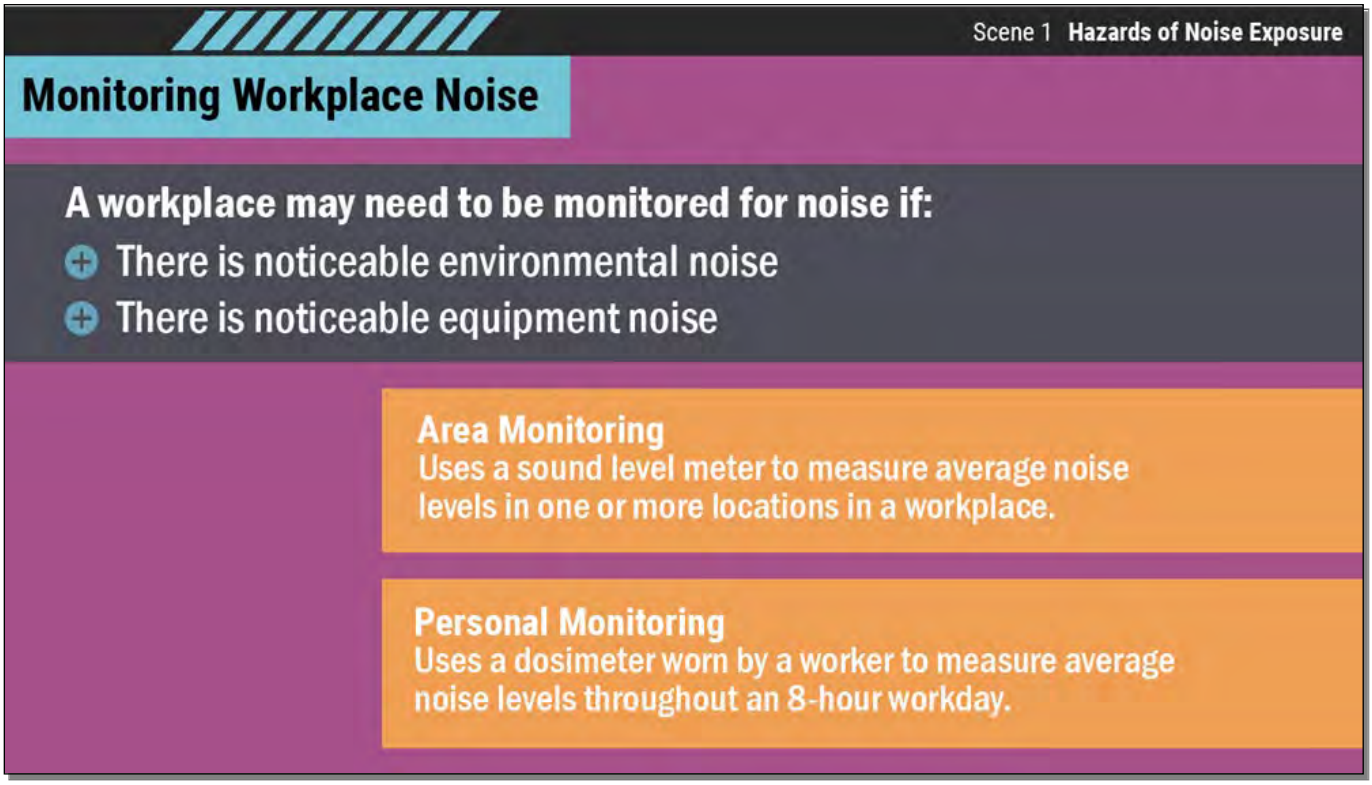
As we have mentioned, an employer should take action in the workplace before noise reaches the PEL. If noise reaches or exceeds the action level of an 8-hour time weighted average of 85 dBA, the employer must administer a hearing conservation program. This includes monitoring the workplace for noise between 80 and 130 dBA and repeating the monitoring when necessary, notifying workers who are exposed to noise at or above the action level, and providing a free annual program of hearing tests.

Slide 29 - Hearing Tests



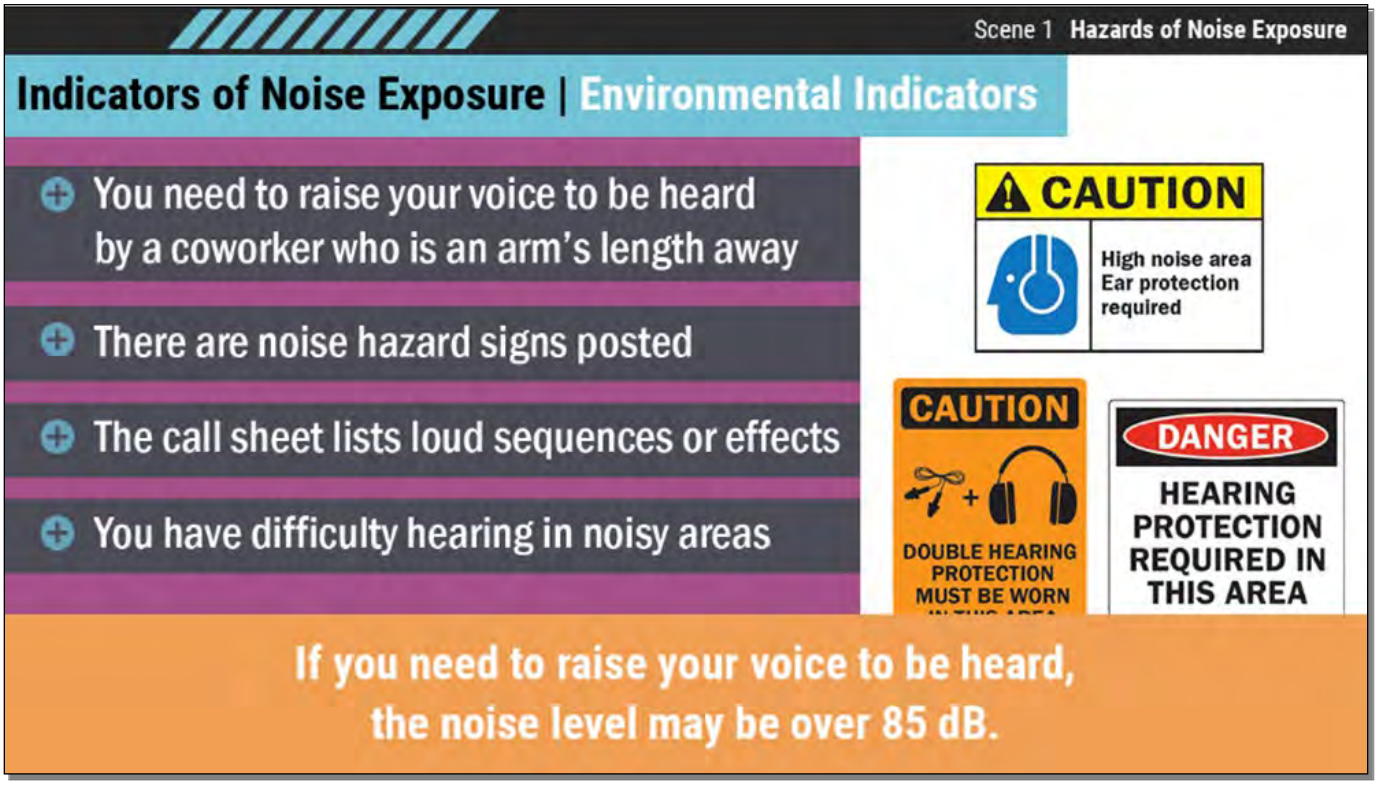
The hearing tests provided by the employer must include a baseline audiogram to compare against future tests. If the difference between two tests shows a decline in hearing by more than 10 dB, the employer must notify the worker within 21 days, provide PPE and train in its use, and retest the worker within 30 days.

Slide 30 - Monitoring Workplace Noise



A workplace may need to be monitored for noise if there is noticeable environmental noise or noticeable equipment noise. Area monitoring uses a sound level meter to measure average noise levels in one or more locations in the workplace. Personal monitoring uses a dosimeter worn by a worker to measure average noise levels throughout an 8-hour workday. The results of the monitoring will determine what actions the employer must take, or what controls may need to be implemented.

Slide 31 - Indicators of Noise Exposure 1



Even if your workplace has not been measured for noise, you may be experiencing or noticing some issues on your own. Here are some environmental indicators that you might be exposed to high levels of noise: you may need to raise your voice to be heard by a coworker who is an arm's length away, you notice that there are noise hazard signs posted in the area or on equipment, the call sheet lists loud sequences or effects, or you have difficulty hearing in noisy areas. One rule of thumb is that if you need to raise your voice to be heard, the noise level may be over 85 decibels.

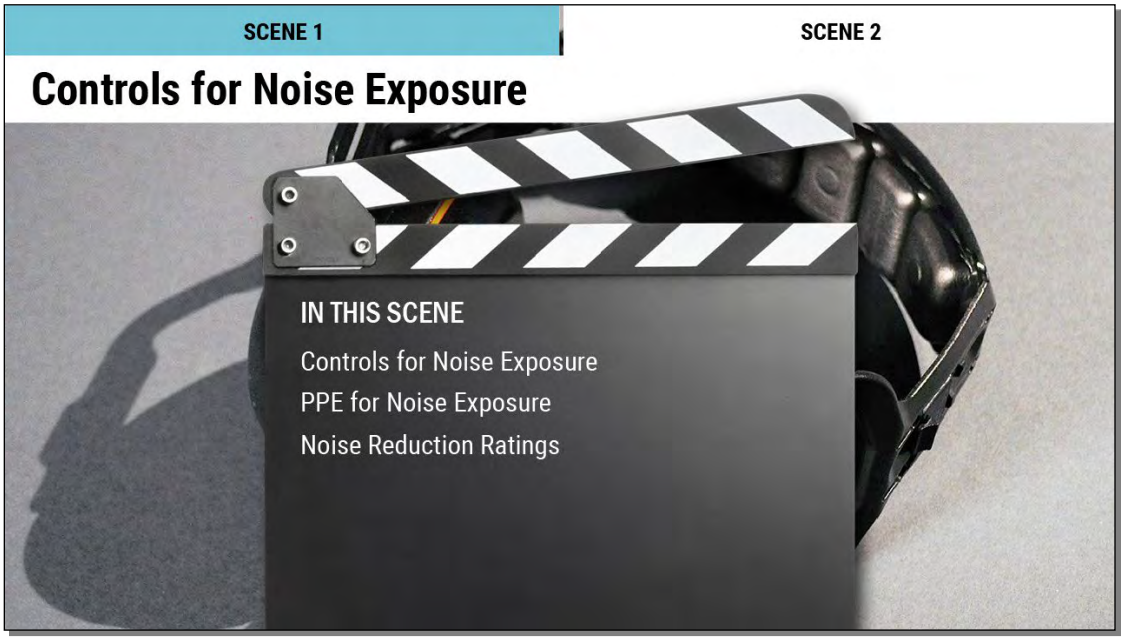
Slide 32 - Indicators of Noise Exposure 2

A decline in hearing ability may be gradual and it may not cause any pain. Here are some of the physical signs: you have difficulty distinguishing words in a conversation, you experience a ringing or buzzing sound after exposure to noise or when you leave work (this is called tinnitus), you experience a temporary hearing loss after you leave work, or you have difficulty hearing high-pitched sounds. If you feel that you are being overexposed to noise, contact your supervisor, studio safety representative, or call the safety hotline at (888) 7-SAFELY. This number can also be used to report hazardous situations anonymously.

Slide 33 - Scene 2

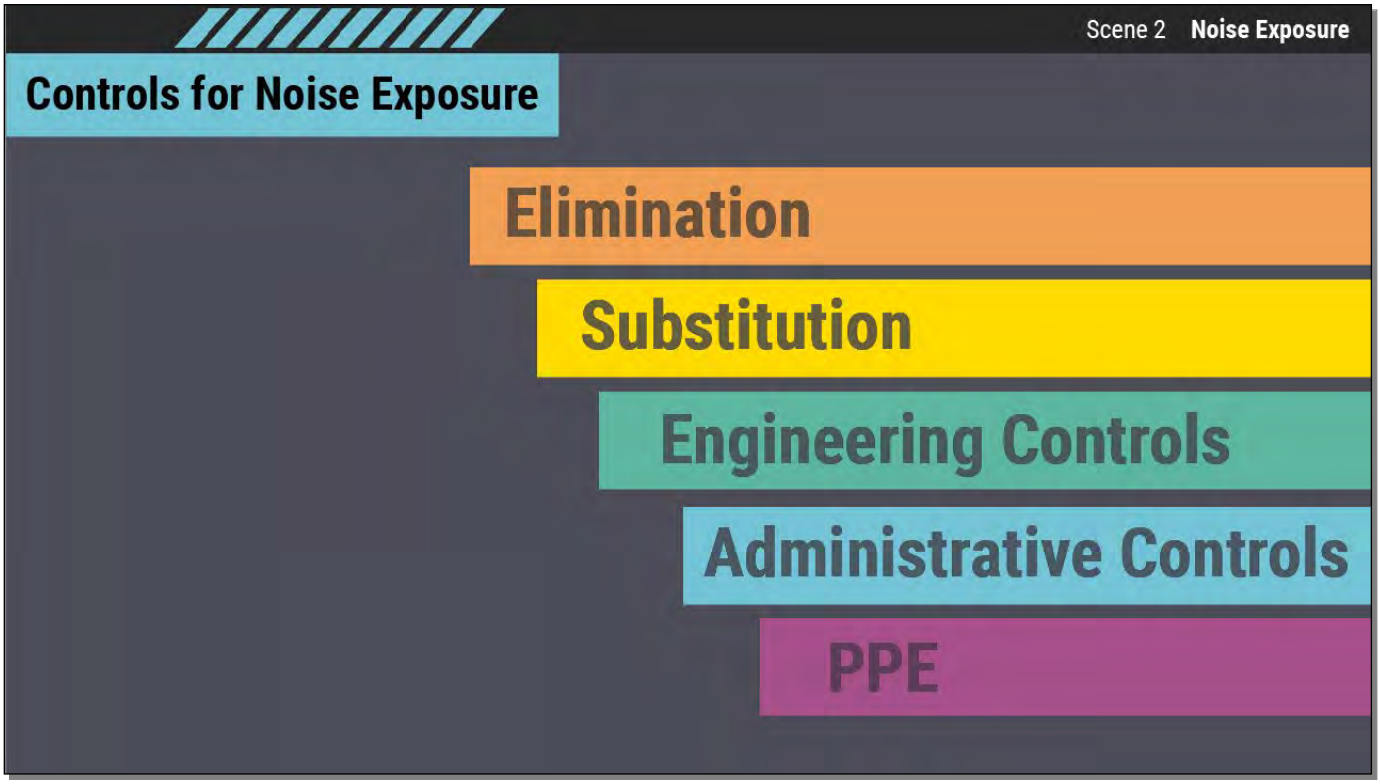
Scene 2, Controls for Noise Exposure.

Slide 34 - In This Scene



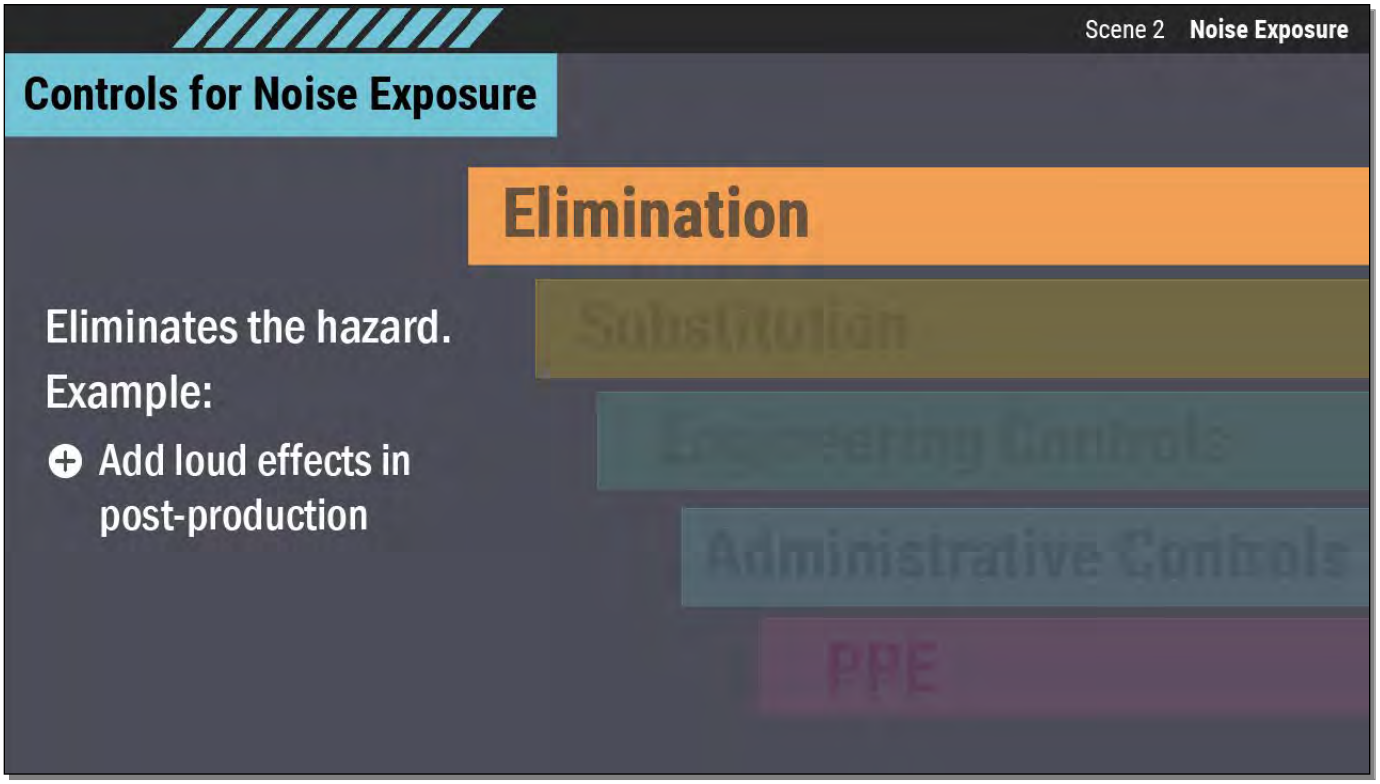
In this scene, we will cover controls for noise exposure, personal protective equipment for noise exposure, and noise reduction ratings for hearing protection.

Slide 35 - Controls for Noise Exposure



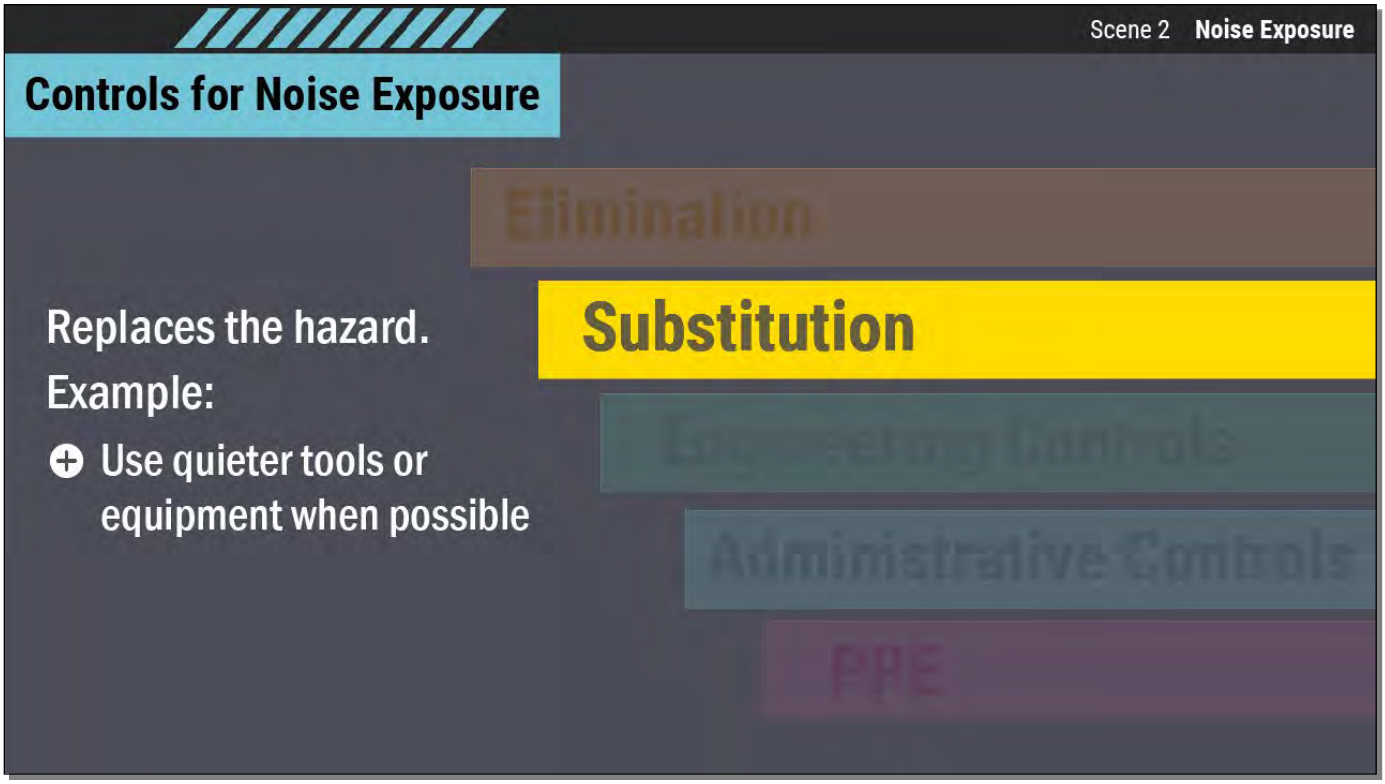
If workplace noise levels exceed safe standards, measures must be taken to prevent or mitigate exposure. The hierarchy of hazard controls includes elimination, substitution, engineering controls, administrative controls, and the use of PPE.

Slide 36 - Elimination



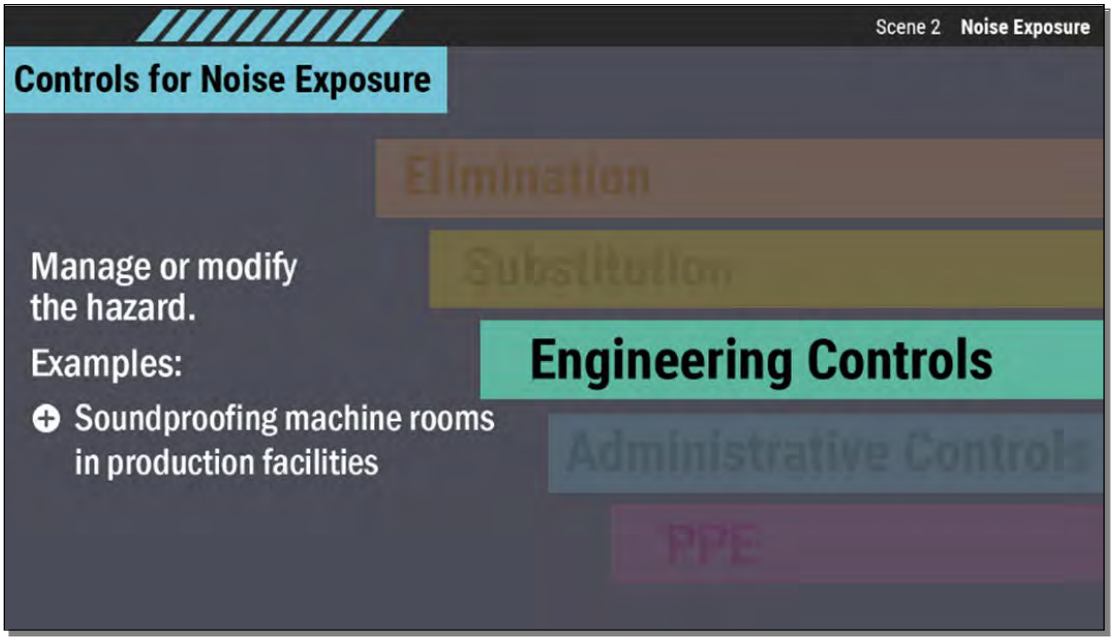
Elimination is the first line of defense in the hierarchy, because it removes the hazard altogether. All of the other controls focus on reducing the hazard by affecting either the noise source or the worker. One way that noise could be eliminated would be adding loud effects in post-production instead of exposing the cast and crew to excessive noise while shooting.

Slide 37 - Substitution

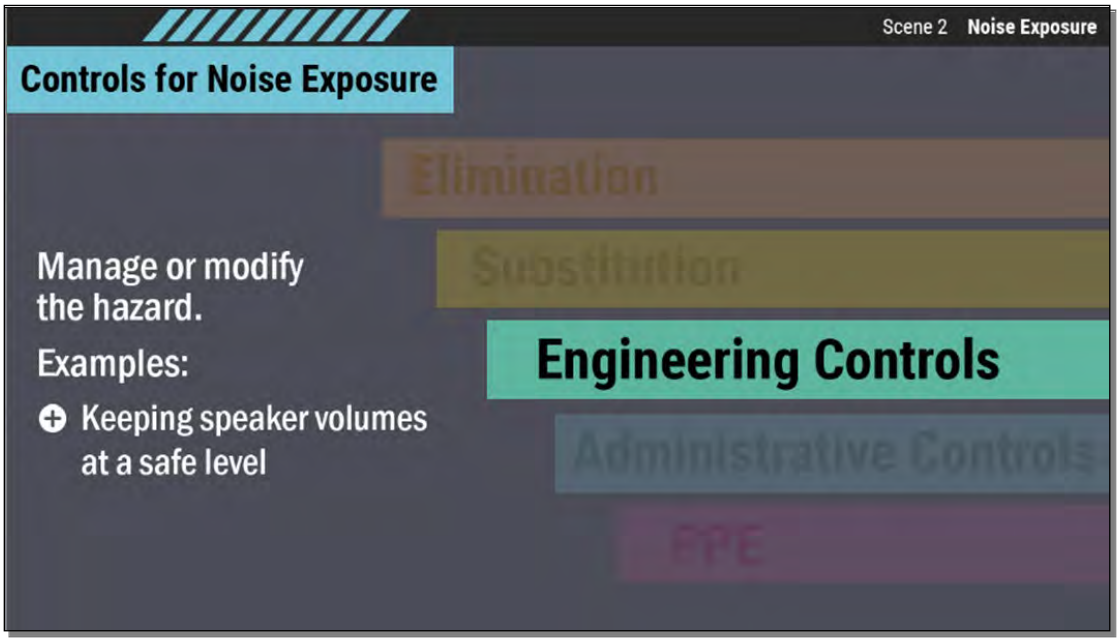


The substitution method replaces a loud noise with a quieter one. For example, instead of using a loud fan or compressor, find a model that has a lower sound level. Note that newer models of tools and equipment are often designed with this in mind.

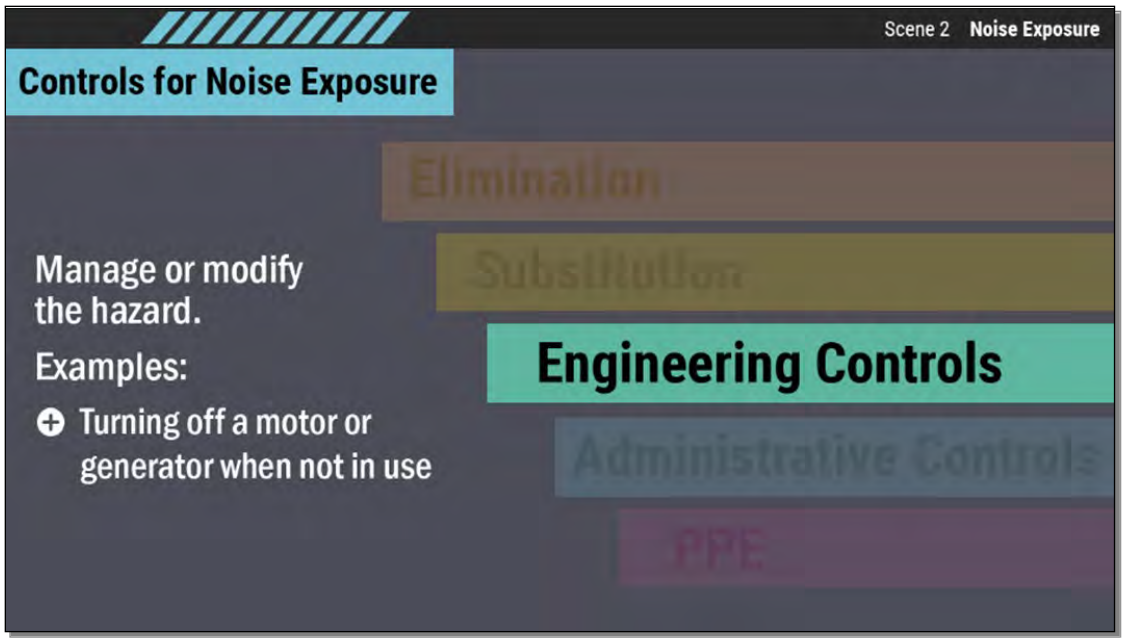
Slide 38 - Engineering Controls



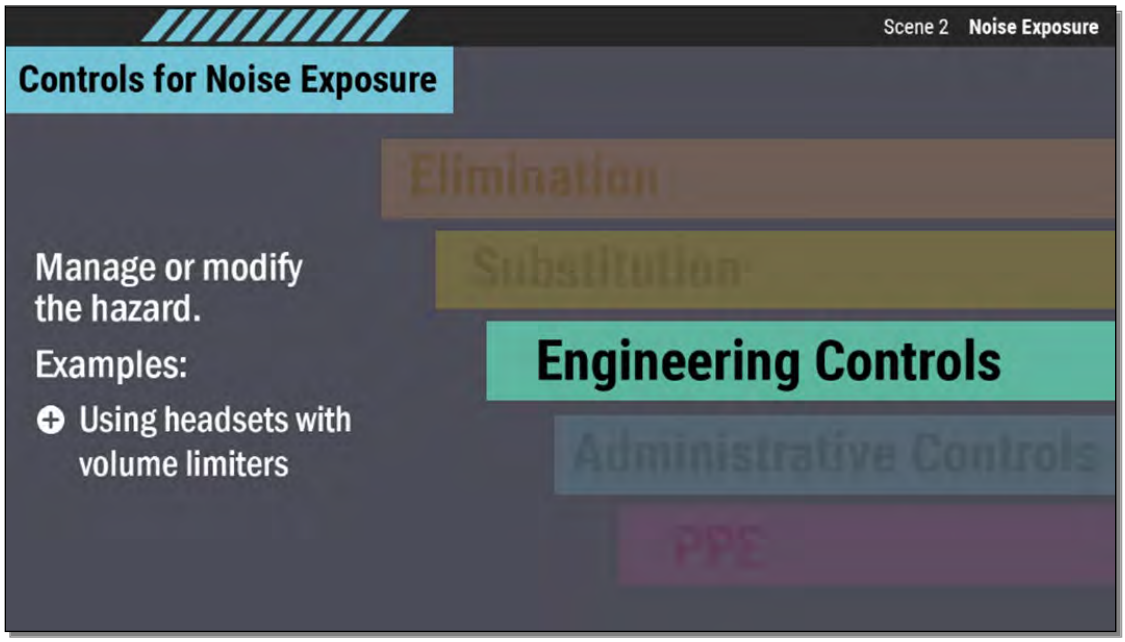
If a noise source cannot be removed or replaced, it may be possible to manage or modify it to be quieter. These are engineering controls, which focus on moving the sound source away from the worker or lessening its effect on the worker. Some examples of engineering controls for sound would be soundproofing machine rooms in production facilities,



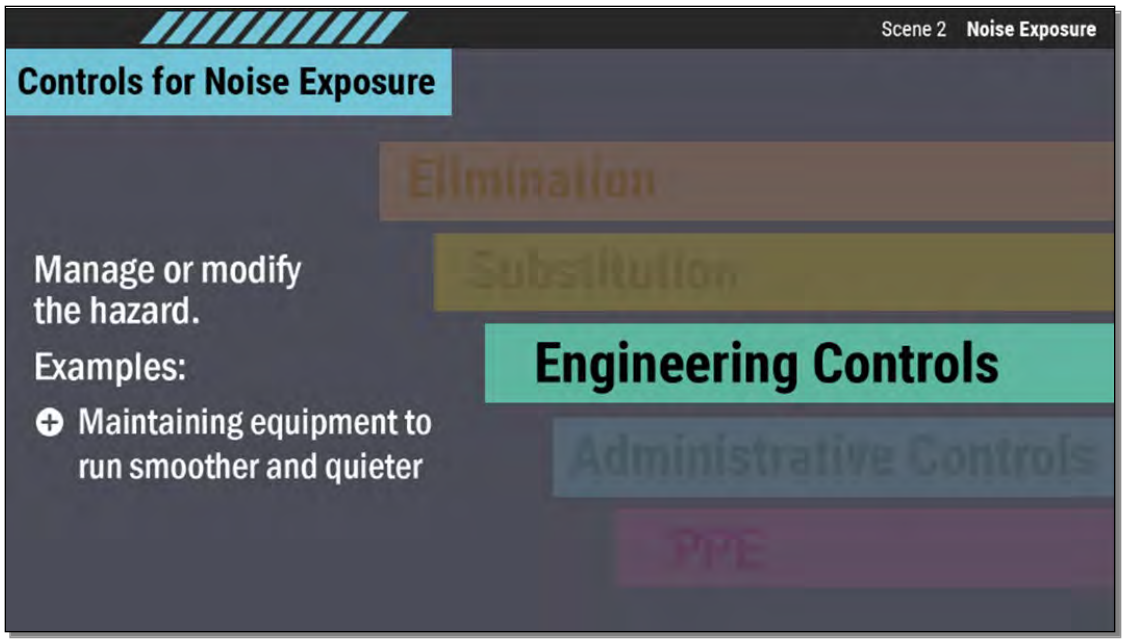
keeping speaker volumes at a safe level,



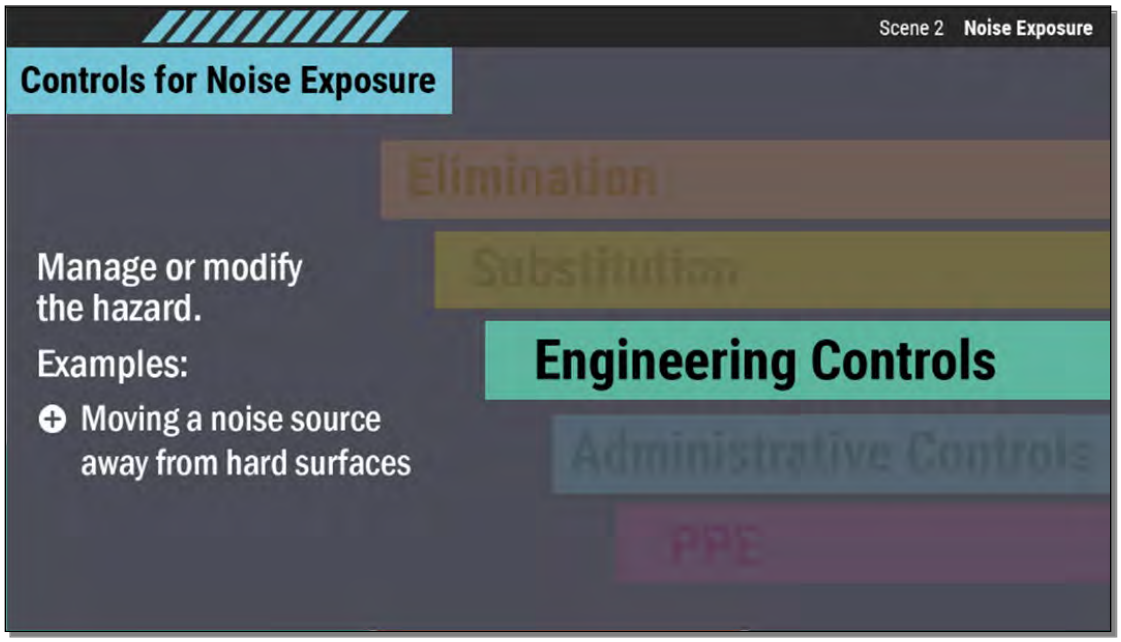
turning off the motor or generator when not in use,



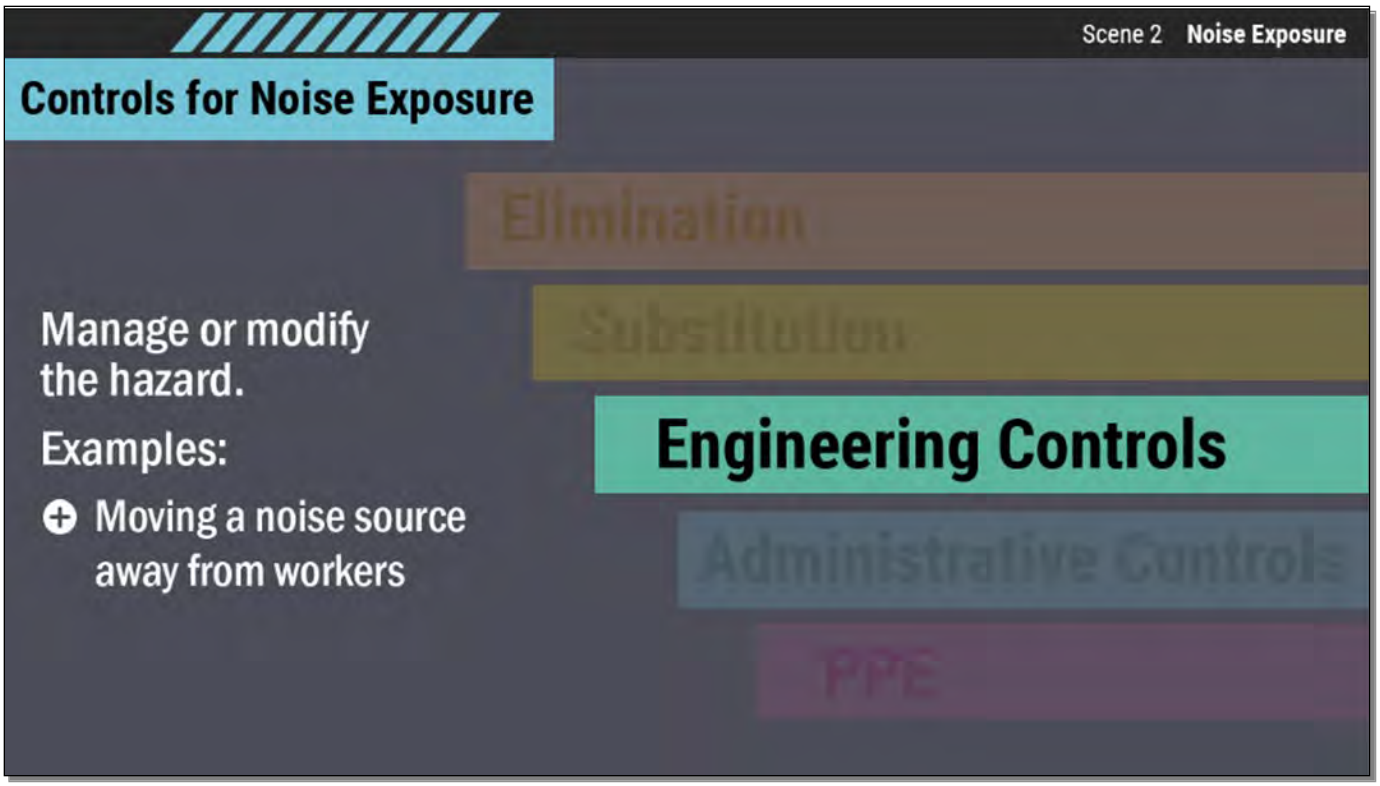
using headsets with volume limiters,



properly maintaining equipment to run smoother and quieter,

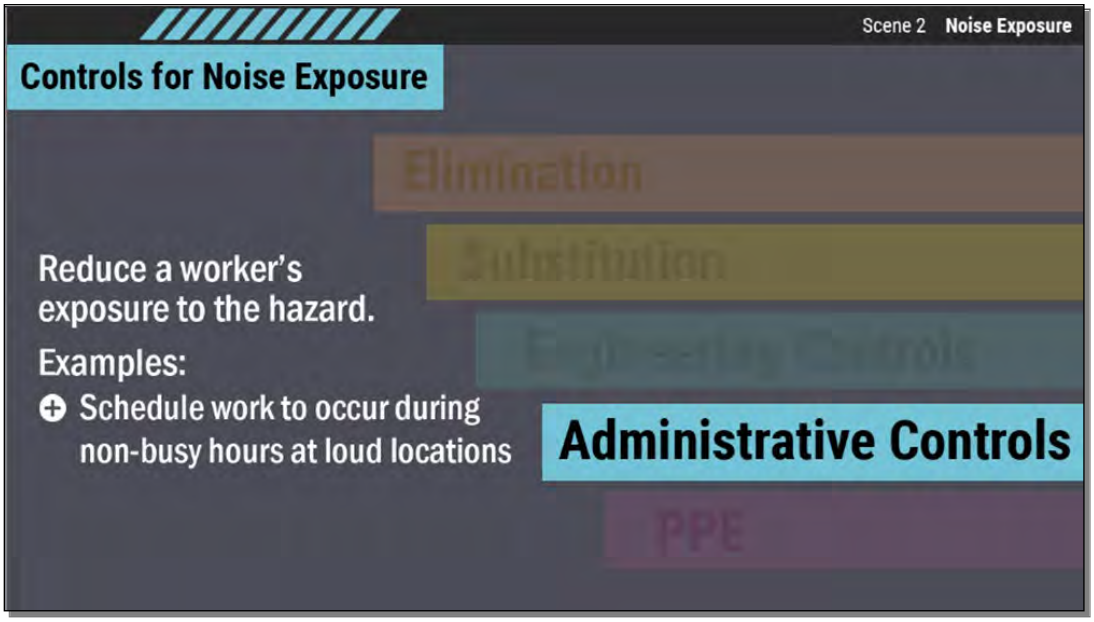


moving a noise source away from hard surfaces lessening the reflection of the sound,

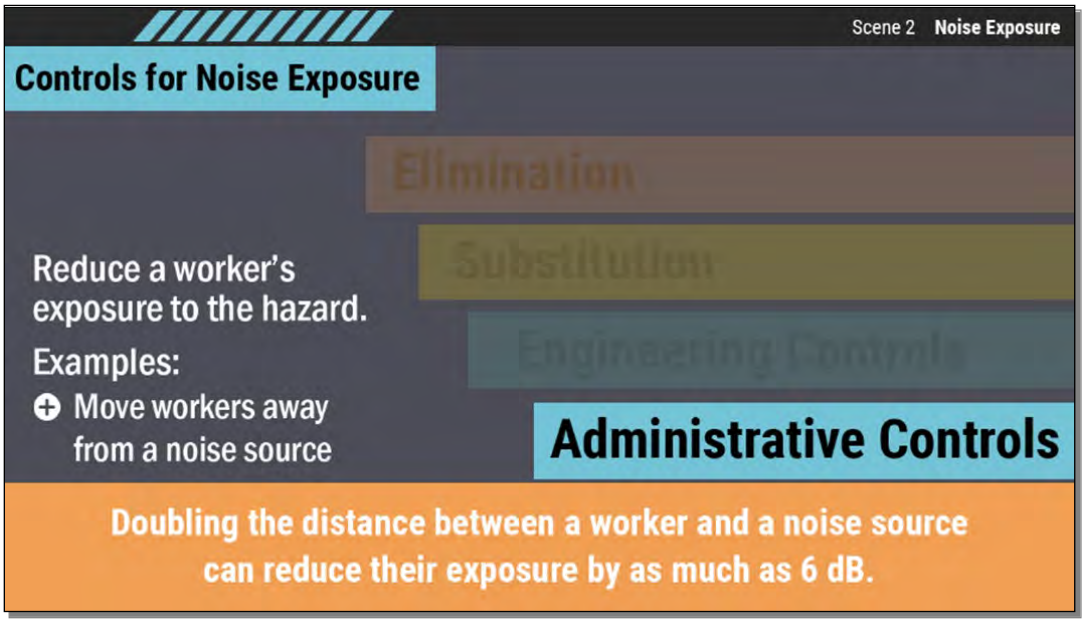


or moving a noise source away from workers.

Slide 39 - Administrative Controls

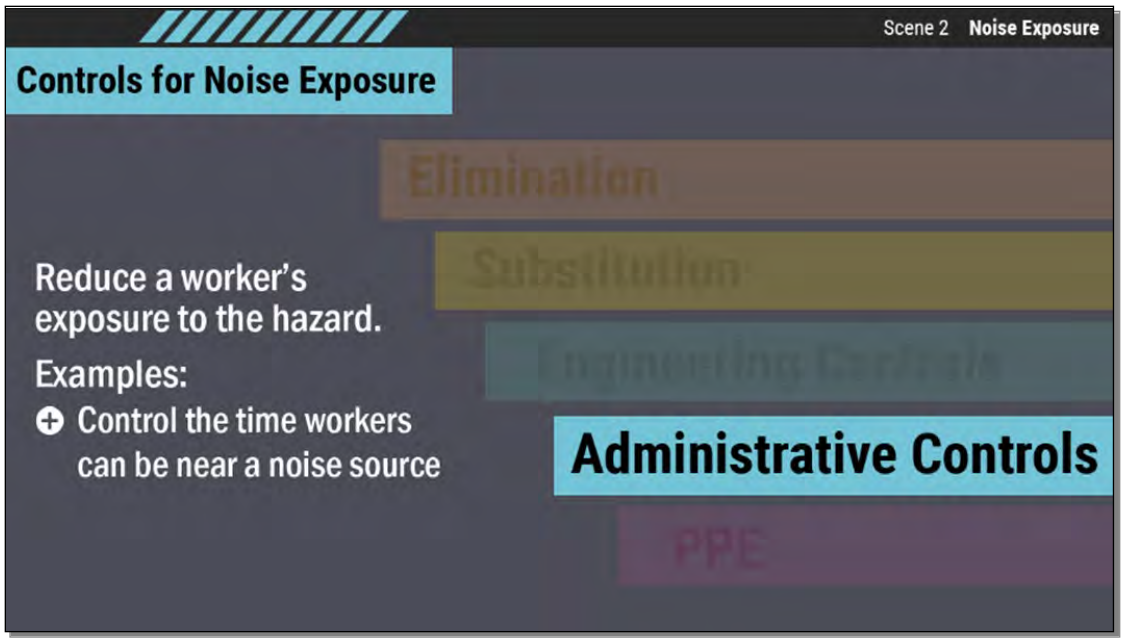


If a noise source cannot be modified, administrative controls focus on moving the workers away from the noise source or limiting their time near the noise source. Here are some examples of administrative controls. Schedule work to occur during non-busy hours at loud locations such as airports, factories, or construction sites.

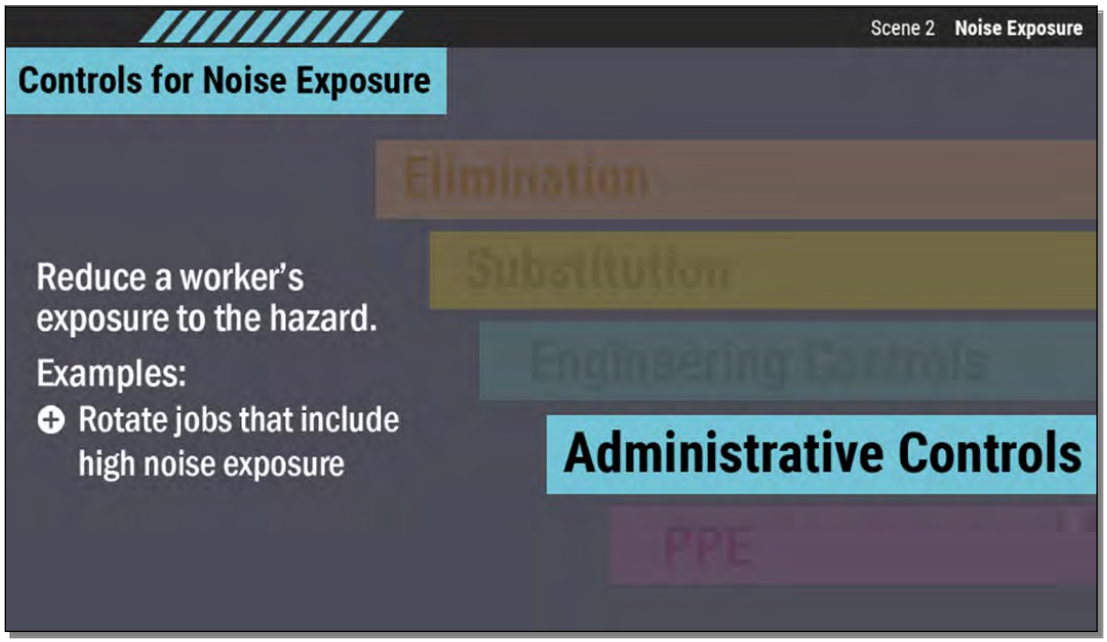


Move workers away from a noise source--for example, move a spot operator away from a bank of speakers. Note that doubling the distance between a worker and a noise source can reduce their exposure by as much as 6 db.

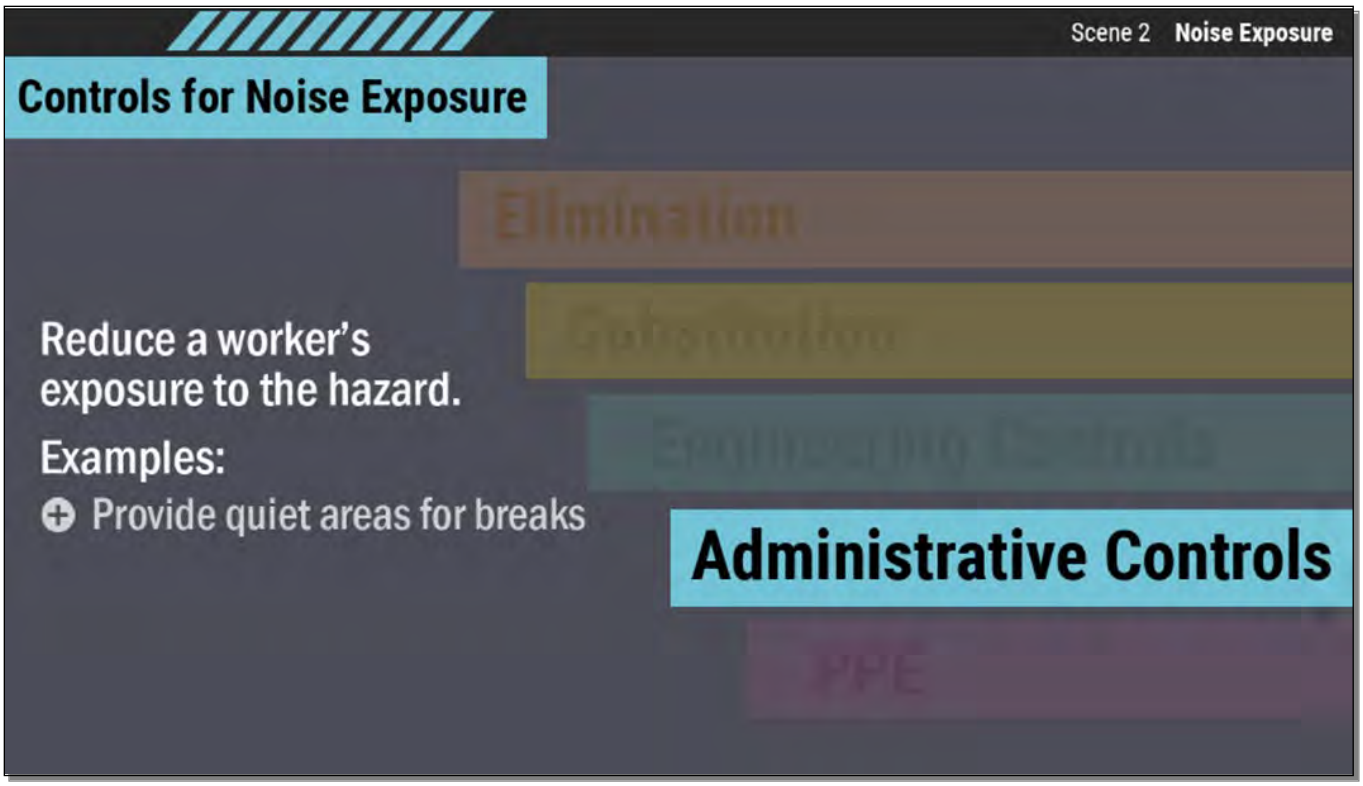
K-Noise Exposure



You can also control the amount of time workers can be near a noise source, such as clearing the set of nonessential personnel during loud sequences.

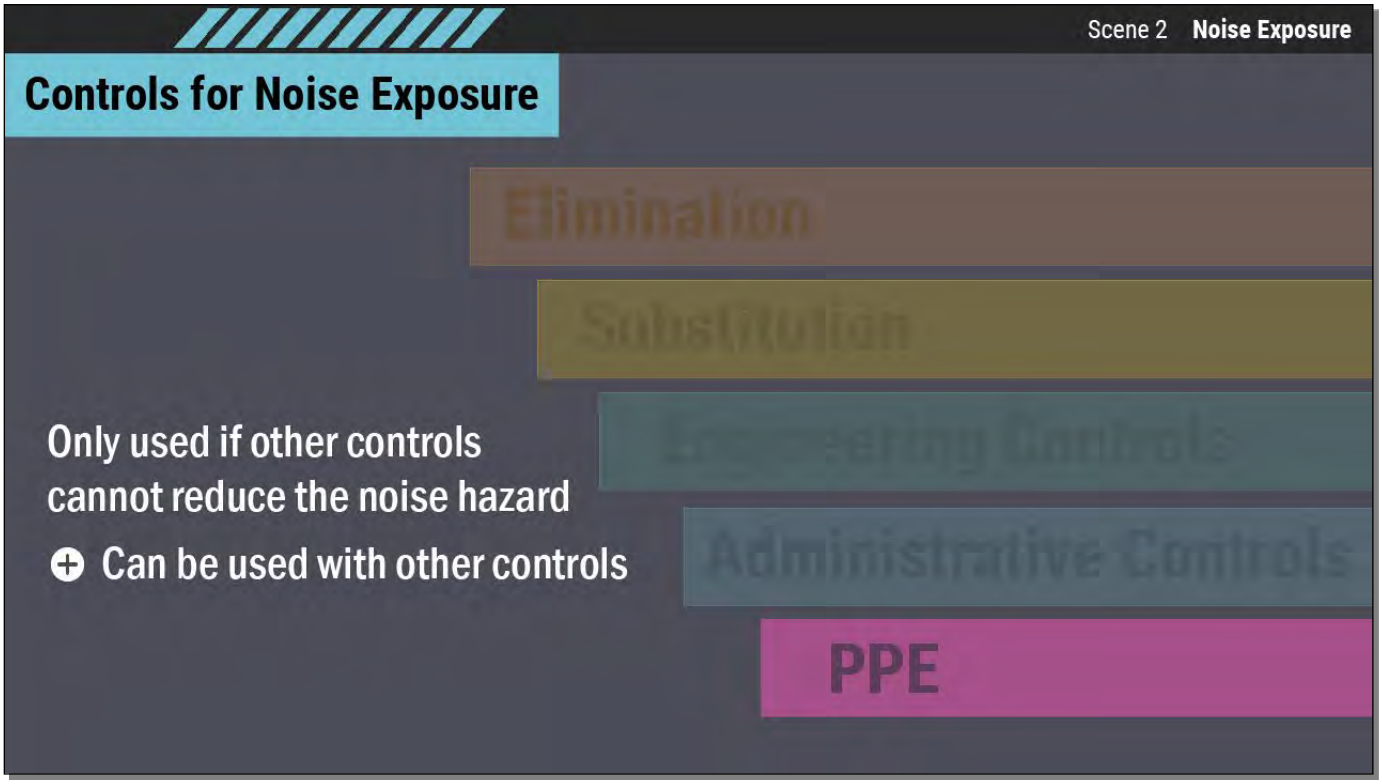


Rotate jobs that include high noise exposure.



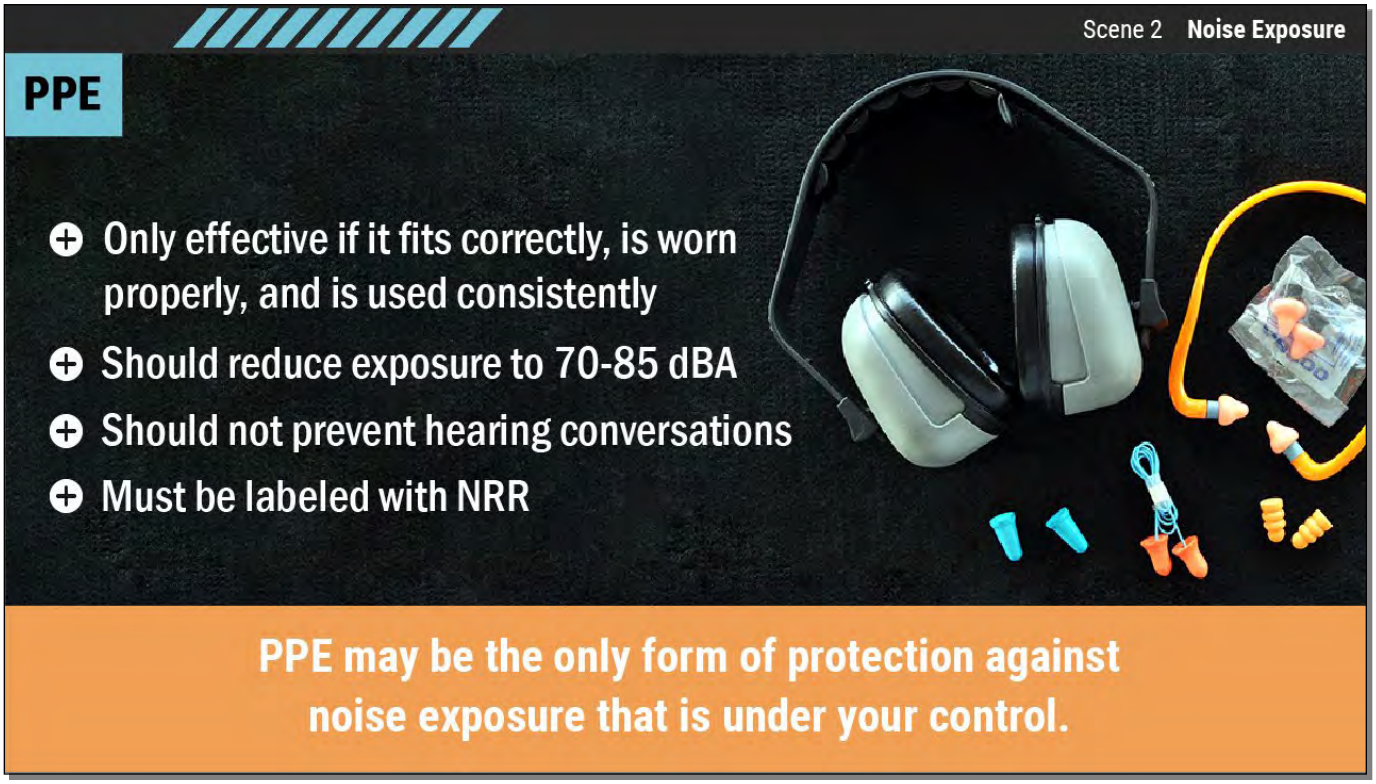
And, finally, provide quiet areas for breaks.

Slide 40 - PPE 1



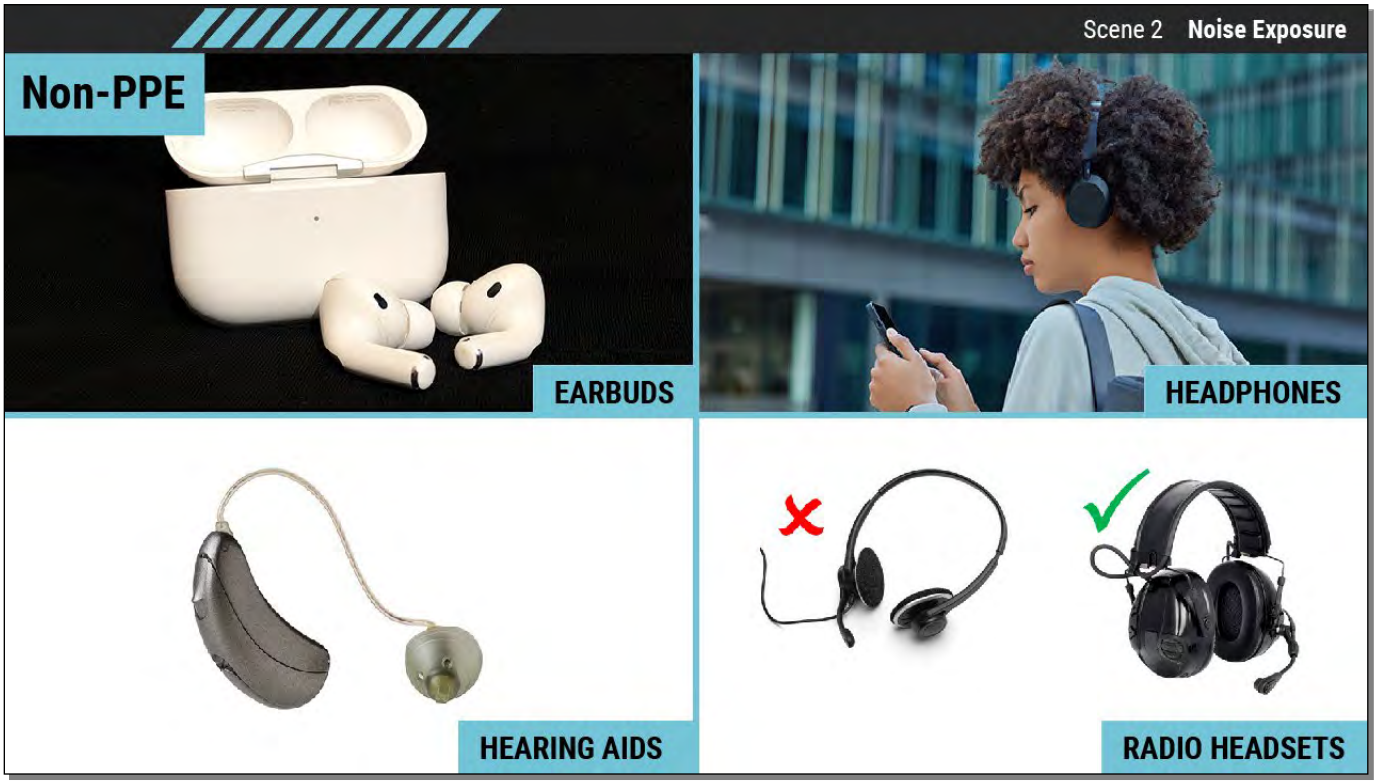
PPE is the last resort for controlling noise exposure and should only be used if other controls cannot reduce the noise hazard. It can also be used along with other controls.

Slide 41 - PPE 2



PPE is only effective if it fits correctly, is worn properly, and is used consistently. Ideally, the PPE should reduce exposure down to about 70 to 85 dB and should not prevent you from hearing a regular conversation. Hearing protection PPE must be labeled with a noise reduction rating, or NRR. We'll talk about NRRs in a moment. When PPE is offered on the job, take it--if you are subject to the possibility of NIHL, PPE may be the only form of protection against noise exposure that is under your control.

Slide 42 - Non-PPE

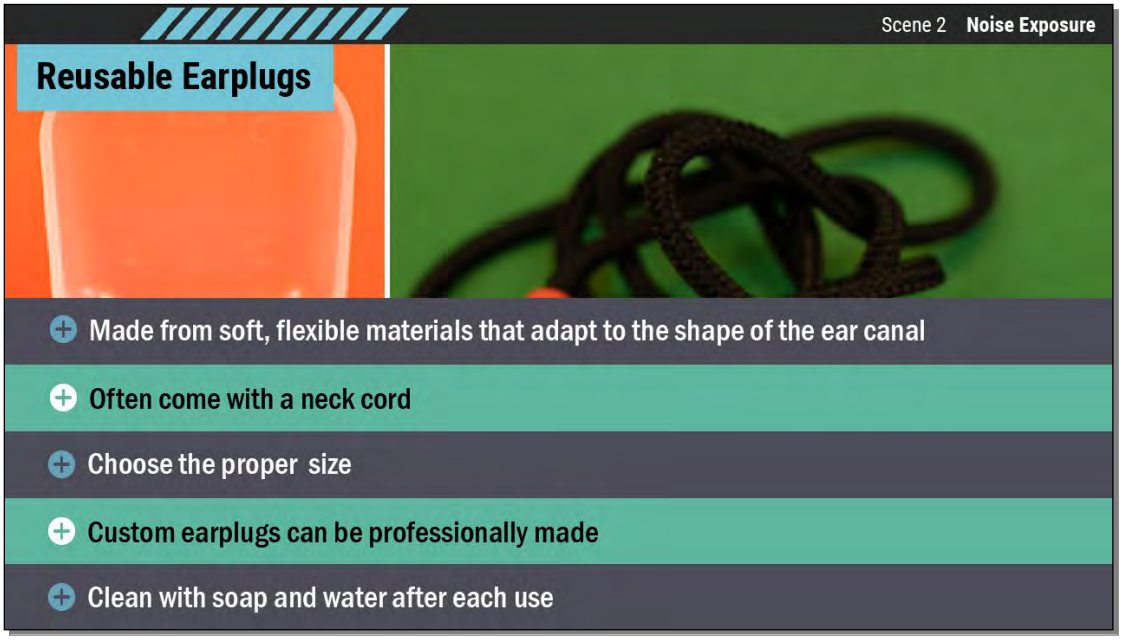


You should be aware that not everything you might wear on or in your ears will protect your hearing. For example, earbuds and headphones are not designed for hearing protection and cannot be used as a form of PPE. Hearing aids are also not forms of PPE, as they amplify sound and can cause further hearing damage. A radio headset does not typically give any noise protection, unless it is an earmuff-style headset that is rated for hearing protection, such as this one.

Slide 43 - Use and Care of PPE

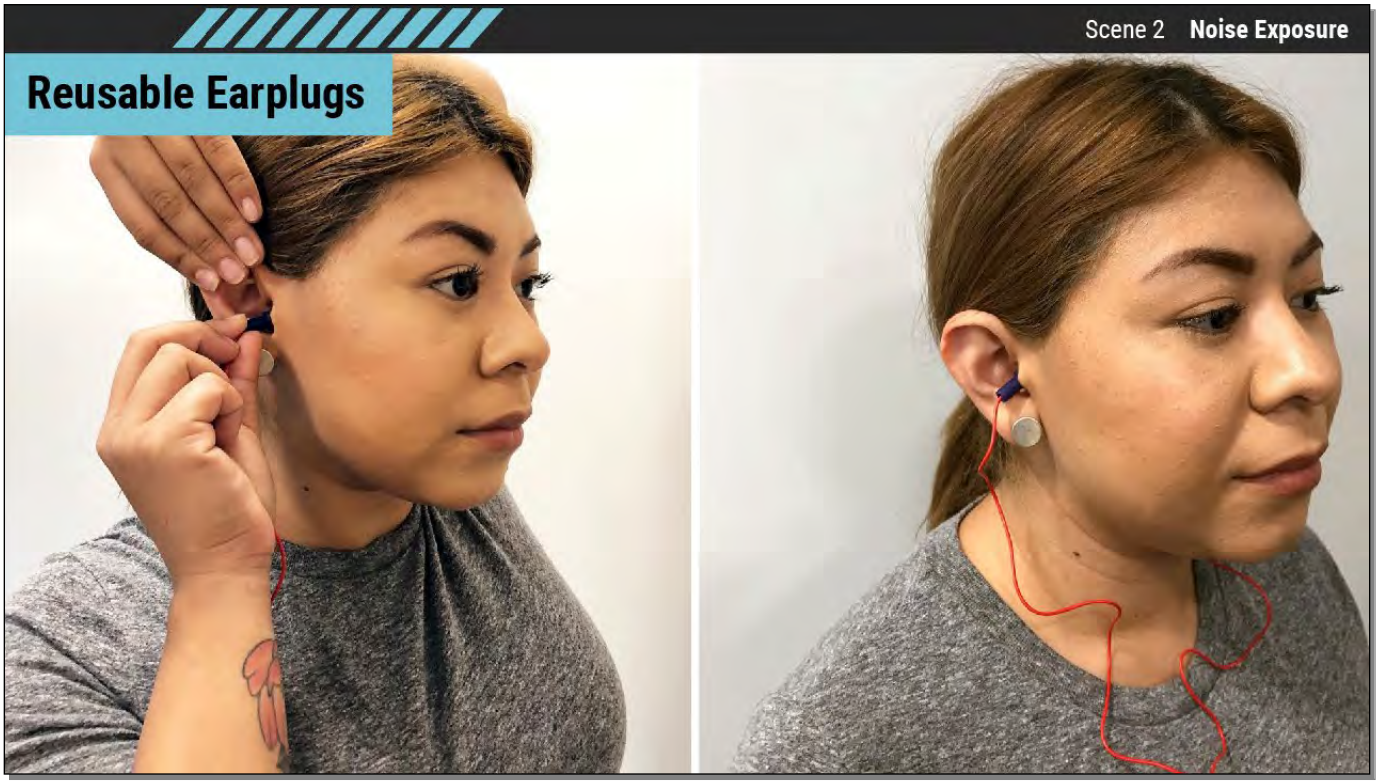
Let's talk about the use and care of PPE for hearing protection, beginning with earplugs. Earplugs are a common form of hearing protection and come in a variety of types. They are inexpensive, and easy to carry and use. Always make sure your hands are clean before handling earplugs.

Slide 44 - Reusable Earplugs 1



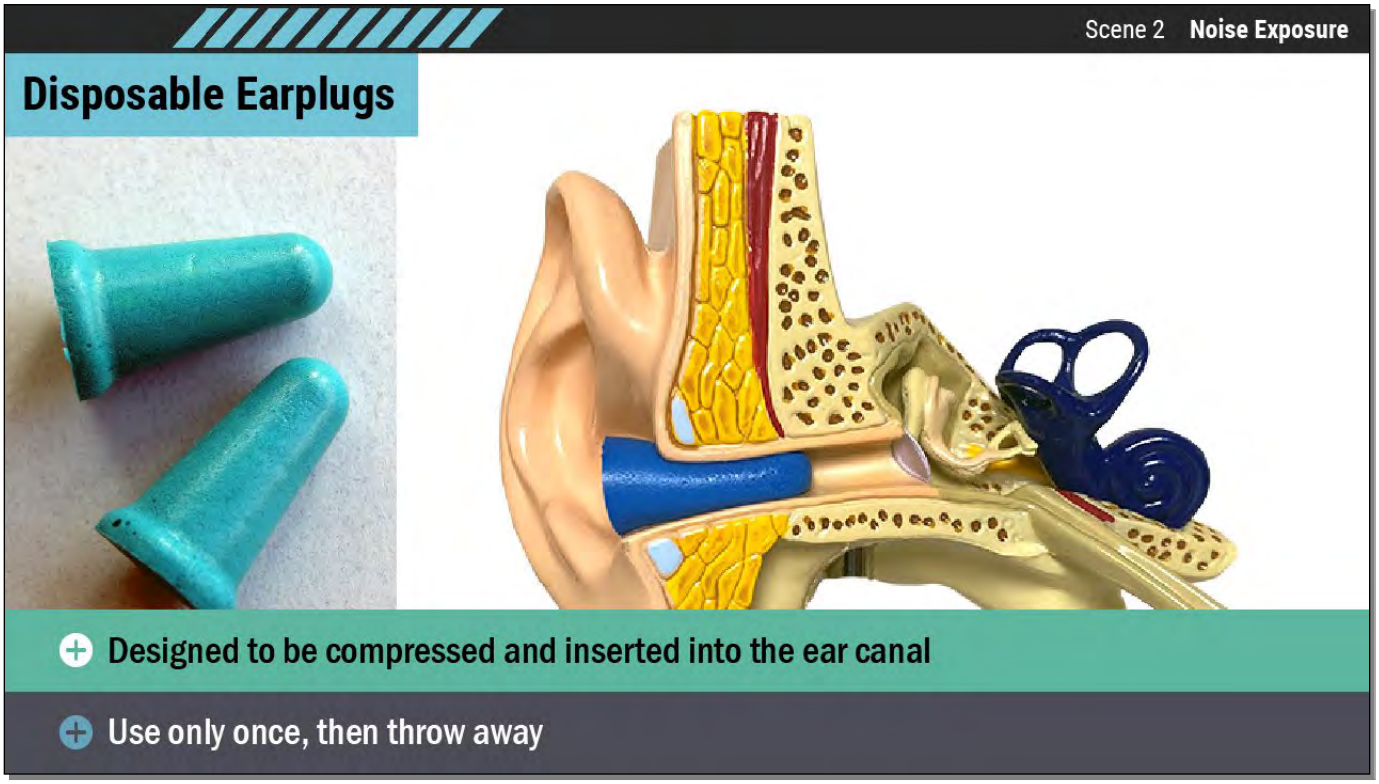
Reusable earplugs are made from soft, flexible materials that adapt to the shape of the ear canal. They often come with a neck cord. Choose the proper size--if they feel uncomfortable, they may be too large. You can also have custom plugs professionally made. Reusable earplugs should be cleaned with mild soap and water after each use.

Slide 45 - Reusable Earplugs 2



To fit reusable earplugs, reach behind your head and pull the top of your ear on the opposite side up and back. This opens the ear canal. Insert the earplug firmly into the ear canal. Repeat on the other side.

Slide 46 - Disposable Earplugs 1

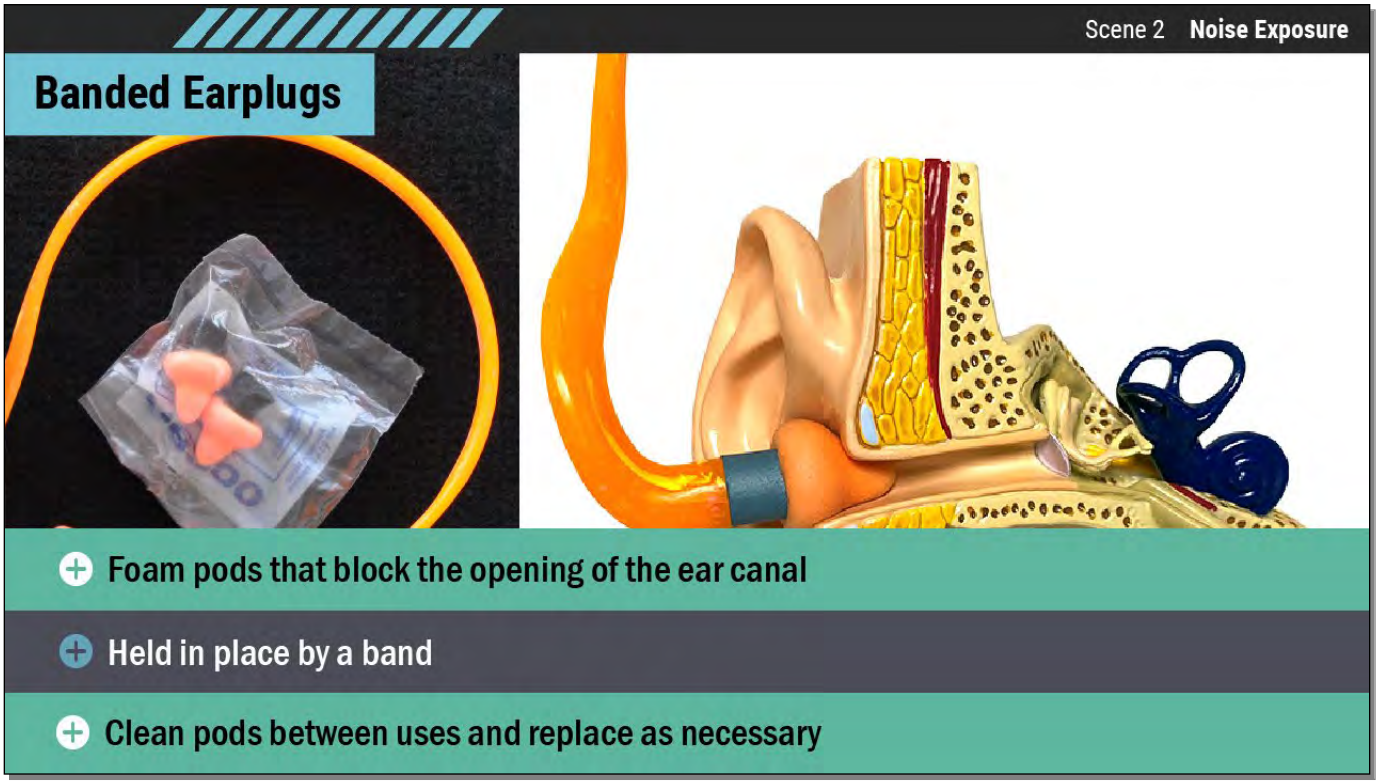


Disposable foam earplugs are designed to be compressed and inserted into the ear canal. Foam earplugs should be used only once, then thrown away.

Slide 47 - Disposable Earplugs 2

To fit disposable foam earplugs, first roll the earplug into a thin cylinder. While pulling the top of the ear up and back with the opposite hand, slide the earplug into the ear canal. Hold it in place for 30 to 40 seconds to allow the foam to expand. When inserted properly, foam earplugs should not be visible from the front.

Slide 48 - Banded Earplugs 1

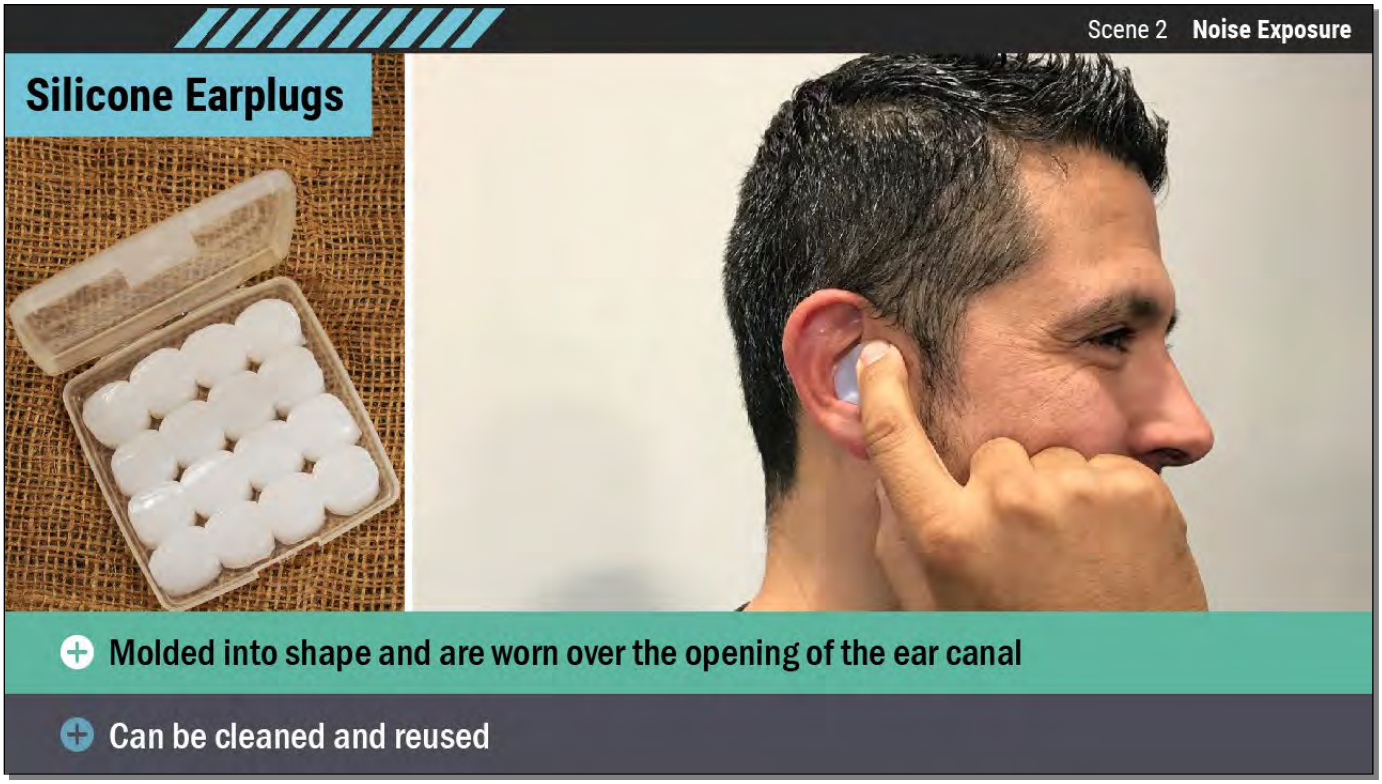


Banded earplugs, or ear caps, are foam pods that block the opening of the ear canal, rather than fitting inside the canal. They are held in place by a band which is designed to be worn behind the head or under the chin. Clean the pods between uses and replace them as necessary.

Slide 49 - Banded Earplugs 2

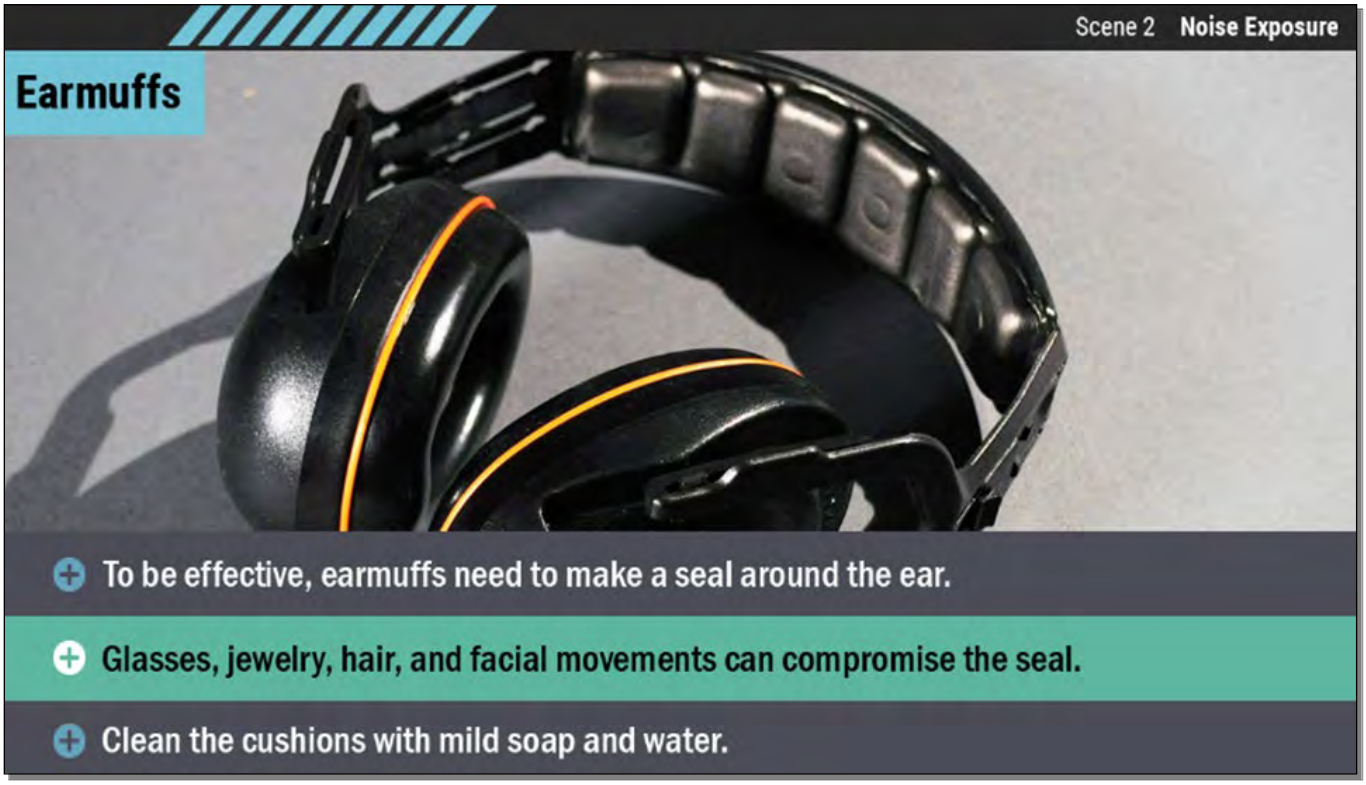
To fit banded earplugs, position the band behind the head or under the chin. Press each cap into the ear while pulling it up and back.

Slide 50 - Silicone Earplugs



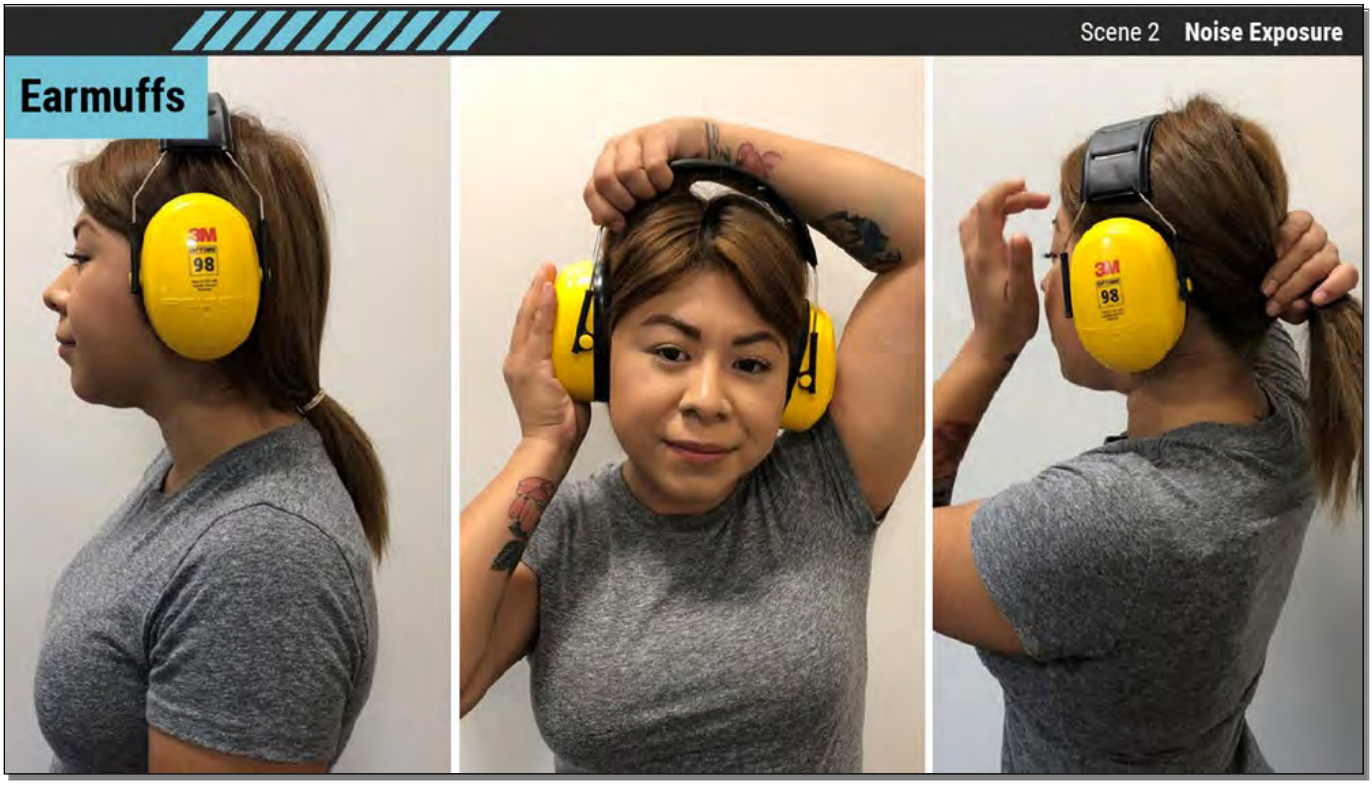
Silicone earplugs are molded into shape and are worn over the opening of the ear canal. They are waterproof and can be cleaned and reused. To fit silicone earplugs, roll the silicone into a ball. Then press the silicone over, but not into, the ear canal.

Slide 51 - Earmuffs 1



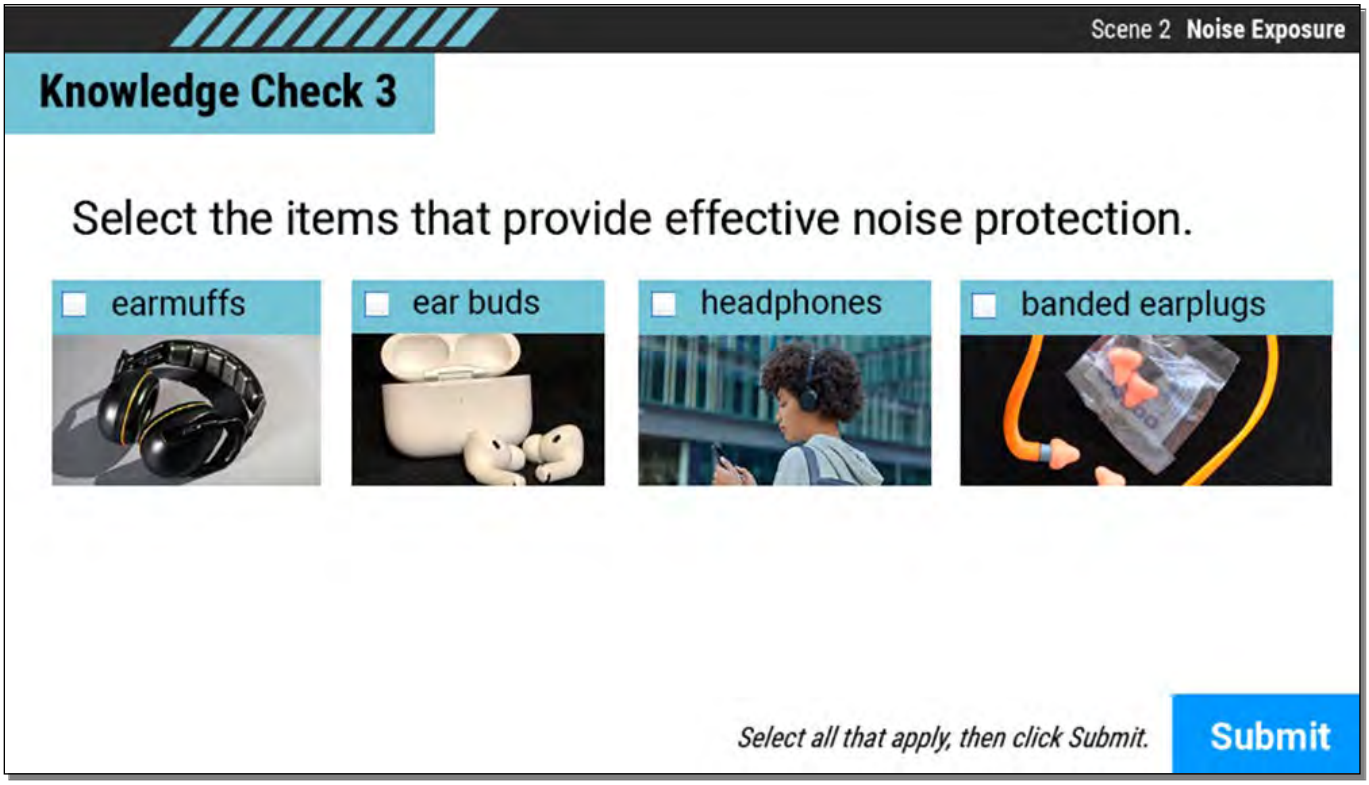
Earmuffs block noise by covering the entire ear with a padded cushion. To be most effective, earmuffs need to make a perfect seal around the ear. Note that glasses, earrings, beards, sideburns, long hair, and facial movement can compromise the seal and reduce the earmuffs' effectiveness. Clean the cushions often with mild soap and water, and replace them if they are damaged or cracked.

Slide 52 - Earmuffs 2

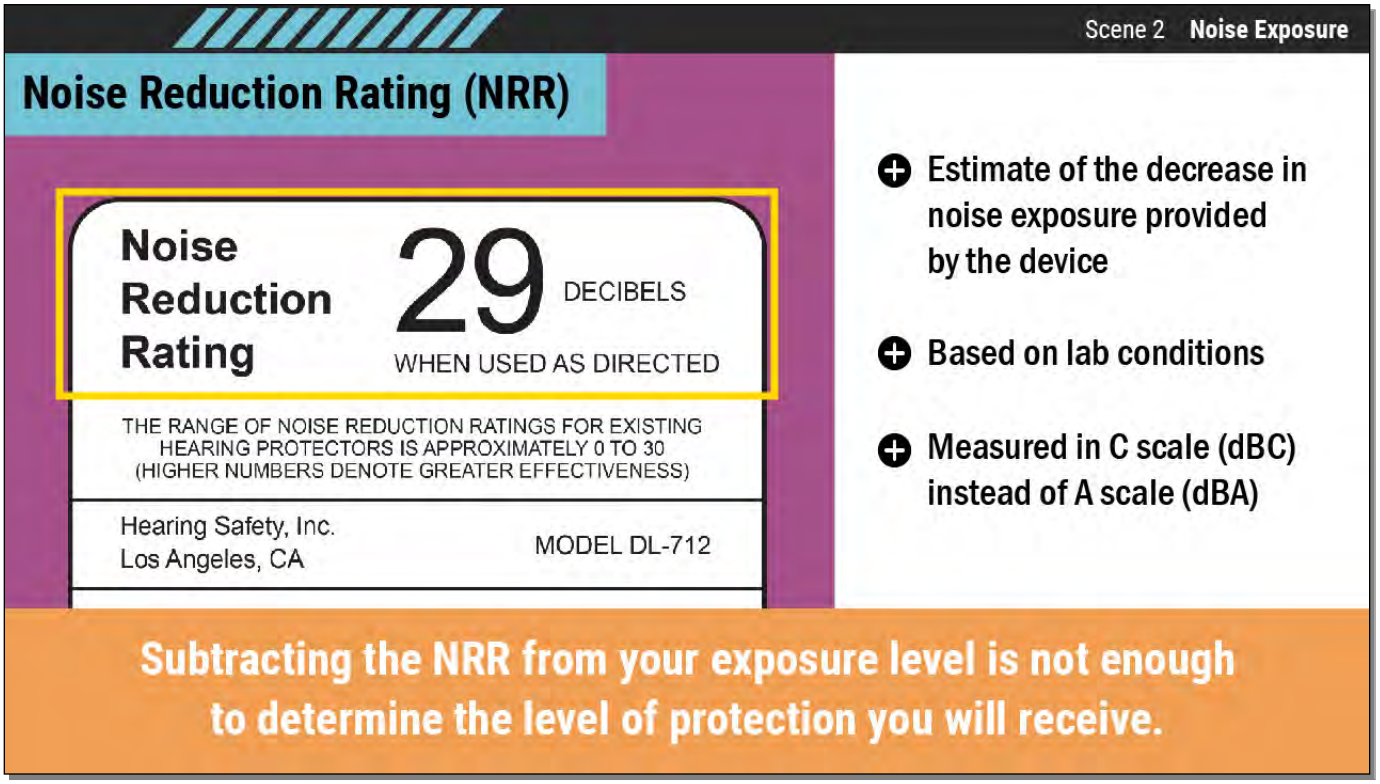


To fit earmuffs, position the band so that it's straight on the head. Adjust the height of the earcups until they fully enclose each ear. Check each earcup to see that the seal is not compromised by hair, glasses, or jewelry. Okay, let's check your knowledge.

Slide 53 - Knowledge Check 3



Slide 54 - Noise Reduction Rating (NRR)

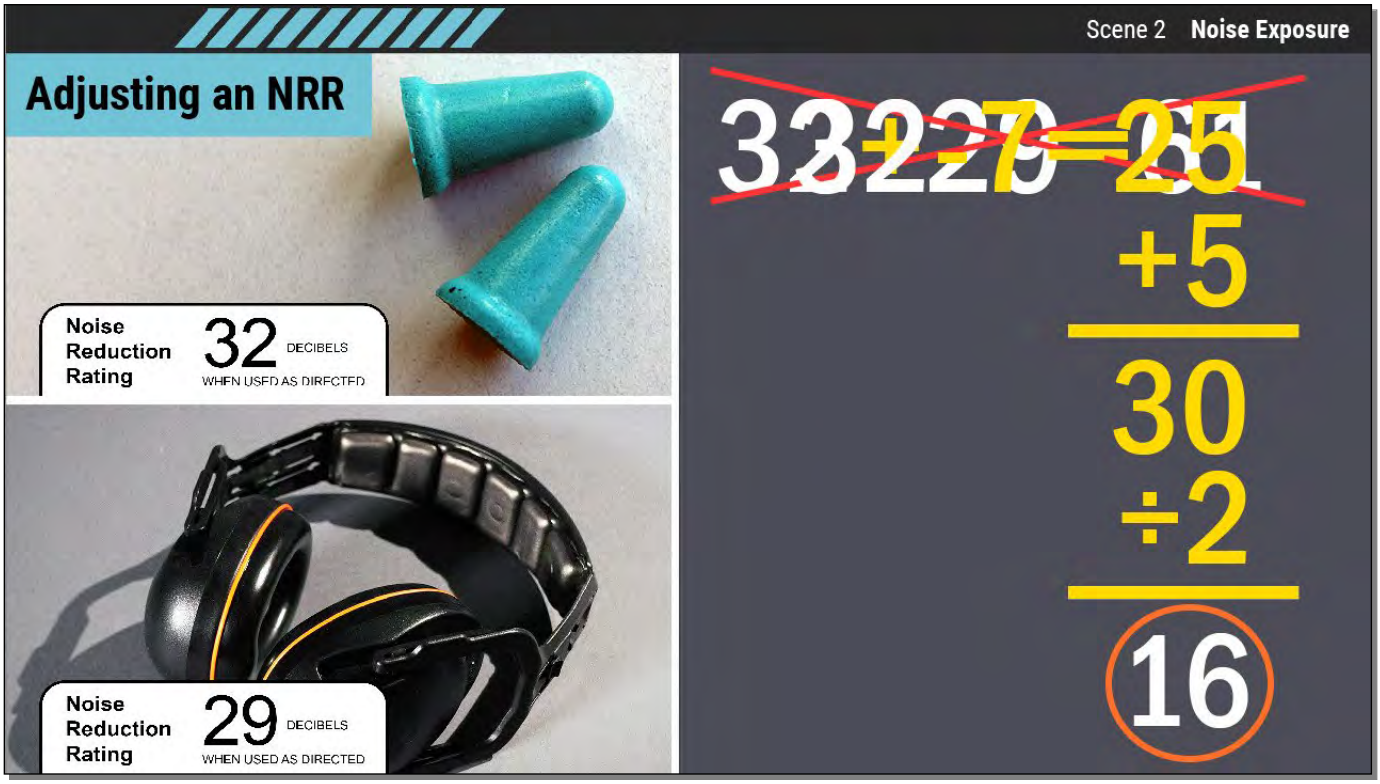


As mentioned previously, hearing protection devices are required to have a label that describes a level of protection called a noise reduction rating (or NRR). This number is an estimate of the decrease in noise exposure provided by the device. It's important to know, however, that the NRR is based on lab conditions for each manufacturer and represents a best-case scenario for usage. Therefore, it is not a hard and fast number. The number is also listed in decibels in the C scale, or dBC, and it's most likely that your environment is being measured in decibels in the A scale, or dBA. Given these facts, simply subtracting the published NRR from your exposure level is not always enough to determine the level of protection you will receive from a hearing protection device. To get a more realistic estimate of your protection you will need to adjust the NRR.

Slide 55 - Adjusting an NRR 1

To adjust the NRR of a hearing protection device such as these reusable earplugs, take the NRR listed on the label; in this case, 25, and subtract 7. This will account for the shift between dBC and dBA. OSHA also recommends that the result then be divided in half to more truly represent workplace conditions. So, the adjusted NRR for these reusable earplugs will be a reduction of 9 decibels when using them in the work environment.

Slide 56 - Adjusting an NRR 2

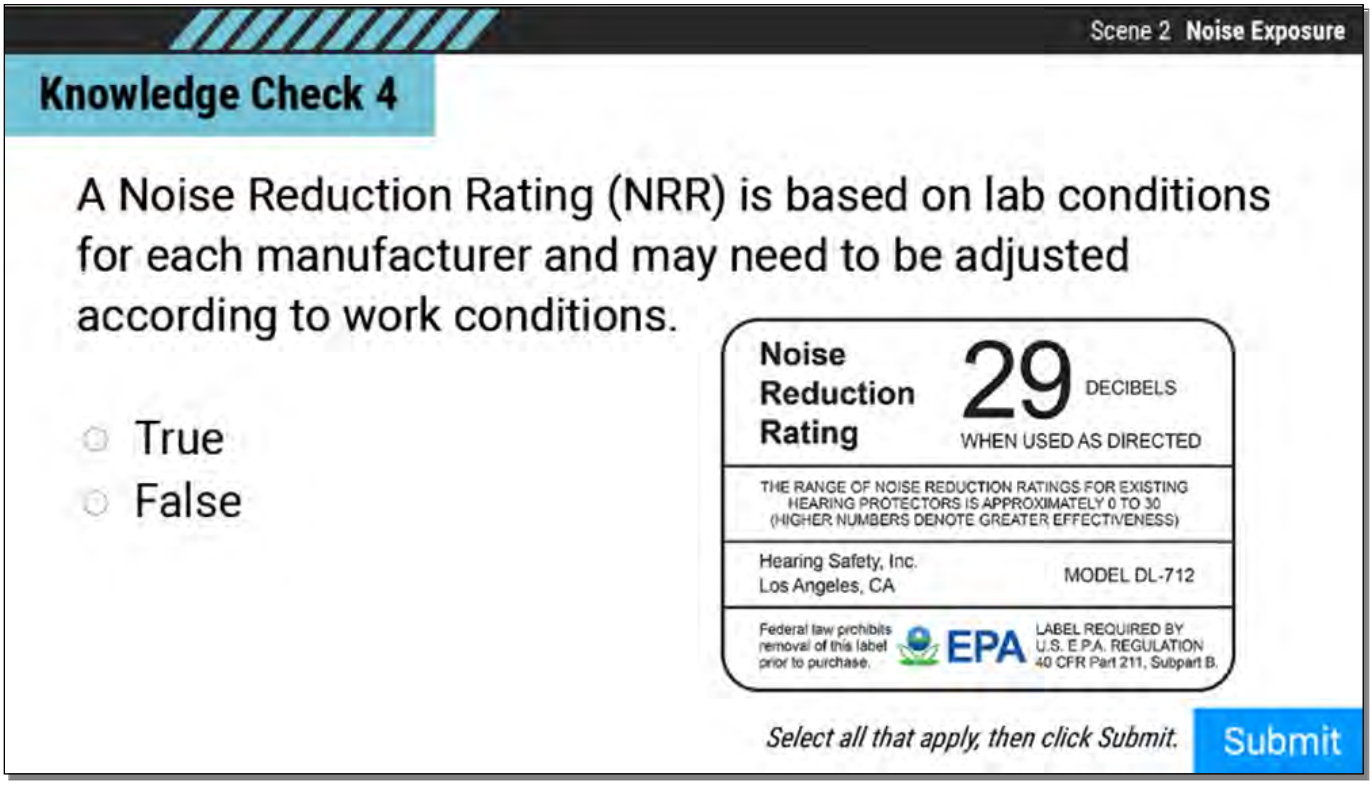


What if you're using dual protection, such as earplugs with earmuffs? It's not as simple as combining the two NRRs. Instead, you'll subtract 7 from the device with the higher NRR--in this case, the disposable earplugs--then count the protection of the device with the lower NRR as 5. Dividing the result in half, as recommended by OSHA, the final adjusted NRR is a reduction of 16 decibels when wearing these earplugs and earmuffs together in the work environment

Slide 57 - Overprotection

Whenever you're using hearing protection, choose the right protection rating for the job, and avoid overprotection. Reducing the noise level too much could cause you not to hear warning signals around you or interfere with effective communication. Or, you might be tempted to remove the device to be able to hear someone, which defeats your protection. Okay, let's check your knowledge.

Slide 58 - Knowledge Check 4



Slide 59 - In Closing

We've reached the end of the presentation. In summary, noise-induced hearing loss is preventable. Be aware of hazardous noise levels at work and home. Take measures to protect your hearing. Make sure your PPE fits properly, then use it correctly and consistently. Take responsibility for your own hearing health. Once hearing is damaged, it will never come back.

Slide 60 - Your Safe Attitude

Your safe attitude impacts how you act and react to workplace conditions and challenges. Speak up about safety issues. Ask questions. Look out for your coworkers and for yourself. Remember, safety starts with you.

Industry Safety Resources

Safety Bulletins

Safety bulletins are researched, written, and distributed by the Industry Wide Labor-Management Safety Committee for use by the motion picture and television industry. The Industry Wide Labor-Management Safety Committee is composed of guild, union, and management representatives active in industry safety and health programs.

These safety bulletins are guidelines recommended by the safety committee. They are not binding laws or regulations. State, federal, and/or local regulations, where applicable, override these guidelines. Modifications in these guidelines should be made, as circumstances warrant, to ensure the safety of the cast and crew.

The committee and these safety bulletins are representative of the commitment of both labor and management to safe practices in the motion picture and television industry. The members of the committee and all those who contributed to its work have devoted a great deal of time and effort to these guidelines because of the importance of safety to our industry.

Current safety bulletins are available on the CSATF website:

https://www.csatf.org/production-affairs-safety/safety-bulletins/

24-Hour Industry Safety Hotline

The 24-hour industry safety hotline number directs callers to an automated system that will assist them in reaching the desired Studio Safety Hotline.

888-7-SAFELY

A list of the Studio Safety Hotlines can also be found on the CSATF website:

https://www.csatf.org/production-affairs-safety/studio-safety-hotlines/

Safety is everyone's responsibility.