How Do We Protect Our Ears?

Guide to Instruction

How Do We Protect Our Bodies?
How Do We Protect Ourselves?

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**Tips For Use**

Double click the application file `PLANET ProtectEars.exe`. The module opens to the **MENU** screen, displayed below.

Use your mouse to adjust the program window to the desired size and position. Click the top of the window frame and drag into position. Click on a frame corner to increase or decrease the size. If appropriate, click the **Hide Windows Toolbar** checkbox to hide your toolbar.

The module screen titles appear in the large list box. Use the vertical scroll bar to show the first screen. Click a screen title to move to the screen. Then use **Next** to move through screens.

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**Notes**

Don’t outrun your computer!

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**Script Error?** Very rarely, you may see this message as you click through a module. It asks: Continue? Click YES.
How Do We Protect Our Ears?
A PLANET Safety Training Program for Land Care Employees

How Do We Protect Our Ears? is designed for presentation by supervisory personnel with safety experience or by safety personnel or by professional trainers or educators knowledgeable about the land care industry. This is not self-paced learning.

As an instructor, you must do more than present knowledge. You must impact a trainee’s attitudes, beliefs, and behaviors. How Do We Protect Our Ears? is designed using the QUESTIONING METHOD. Research shows that trainees must be able to voice their objections to new ideas and contribute their own solutions to problems. In this Guide, the main column displays course content in Q&A form. The right column contains other relevant information designed to spark the interaction you need for effective instruction.

Course Length  One 2-hour session or two 1-hour sessions.

Course Materials
- Web download or DVD or USB program application, computer with projector and speakers
- Instructor Guide
- Trainee Worksheets — download PDFs
- At least one noise meter
- Foam and pliable hearing protectors for demonstrations (and to provide each trainee on completion of training)
- Assortment of muffs for demonstrations
- Pens or pencils for all trainees to use in completing worksheets
- At least one calculator for every 5 trainees.
- PLANET Jeop-EAR-dy Game (separate application - optional)
- Wall poster (optional)

English and Spanish. With the web download or DVD or USB application, the presenter can switch instantly between English and Spanish. All of the above training products come in English and Spanish.

Special Considerations. This program is designed for a maximum of 20 to 25 trainees. The trainees need tables/desks at which to complete the worksheet exercises. You also need a separate table for display/demonstration of hearing protection.

Course Overview  This is one of two courses developed by PLANET with an OSHA Susan Harwood grant. These courses use the constructionist learning method and the EPPM model (FEAR/Solution methodology) in which trainees are presented a potentially scary situation they may face, and then are provided methods to solve it. The premise is that if the fear is presented with solutions, it is not overwhelming and can lead to adoption of positive beliefs, attitudes, and behaviors. These courses have been developed around a theme of “protecting our body parts” in an effort to make the hazards personal for the trainee. For example, this module focuses on protecting “our” ears. The other module focuses on protecting our hands, feet, torsos, eyes, and heads.

Notes
Successful presentation of this module requires safety knowledge and experience. It also requires careful preparation. In addition to detailed review of the module with this guide, you may decide which screens to include or not include in your training.

Also see www.osha.gov and search “noise” to read background information about the noise standard and hearing conservation requirements.
How Do We Protect Our Ears?
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Learning Objectives
Trainees who complete this program should attain specific, measurable changes in knowledge, beliefs, attitudes, and skills:

KNOWLEDGE
- How many tools/equipment in land care work are too noisy? (Almost all)
- What is the dB level at which hearing damage is likely? (80 dBA - NIOSH)
- How many dBs indicate double the noise level? (3 dBA is doubling - NIOSH)
- What is an NRR? (Noise Reduction Rating in dBs)
- How much should we de-rate the NRR for foam plugs? (50%)
- How does distance affect noise levels? (Double distance to decrease noise by factor of 4)
- What is tinnitus? (Constant ringing in the ears in most people with hearing loss)

BELIEFS
- I don’t need to wear hearing protection all the time in noise to be protected. (FALSE)
- Wearing hearing protection in noise some of the time is better than not wearing it at all. (FALSE)
- Land care tools are not really that noisy. (FALSE)
- You get used to the noise. (FALSE)
- Hearing protection is hard to use. (FALSE)
- I can’t hear warnings if I wear hearing protection. (FALSE)

ATTITUDES
- I already have hearing damage so it can’t help me. (FALSE)
- I need to wear hearing protection all the time to protect my hearing. (TRUE)
- My hearing is important to me. (TRUE)
- Being deaf wouldn’t be so bad. I wouldn’t have to hear my spouse/partner! (FALSE)

SKILLS
- Proper donning and doffing of foam plugs, flexible plugs, and muffs.
**Module Structure**

20 main screens - some with interactive demos and/or additional diversion screens

1 interactive quiz

OPTIONAL: PLANET Jeop-EAR-dy Game (separate application)

**Module Outline**

S-1: Why Do We Need to Protect Our Ears?

There are many noise sources in land care work. Some of the most common are:

- Cutters, grinders, chippers, choppers.
- Blowers and vacuums.
- Gasoline powered equipment and vehicles
- Impact tools

Can you name other tools and equipment you use that are noisy?

S-2: What Is Noise?

Noise is unwanted sound ENERGY. We measure noise in decibels (dBs)

- Decibels are NOT like temperature - Temperature change from 70 to 90 adds 20 degrees more heat energy
- dB change from 70 to 90 adds 100 times more noise energy
  * Increase 3 dB = 2 x noise
  * Increase 10 dB = 10 x noise
  * Increase 20 dB = 100 x noise

- 90 dB is 1 BILLION times louder than the lowest sound we can hear (0 dB)

Noise above 85 dB can cause harm.

This is a key screen and should consume about 20 minutes of training time. The screen introduces trainees to NOISE as ENERGY and describes how it is measured.

Once the concept of energy is introduced, you can describe energy as FORCE. Talk about hitting a nail with a hammer. The FORCE drives in the nail. And the NOISE you hear is part of that energy being released into the air. Other examples are when a car hits a barrier or when you trip and fall. All of these RELEASE ENERGY as NOISE.

And the noise in your daily work is ENERGY releasing from tools and equipment. In essence, the noise represents inefficiency in the tool or equipment because the energy is going into noise instead of into the work itself. That is why well-maintained tools and equipment are less noisy than poorly maintained tools/equipment. So this energy can do work or it can destroy.

**WORKSHEET #1** Have trainees use the Trainee Work Sheet and Worksheet #1 to determine how many times louder 5 pairs of dB values are: 85 vs 95, 80 vs 90, 85 vs 105, 70 vs 80, and 80 vs 83. This exercise can be done individually or by breaking trainees into small teams (small teams recommended). Trainees can tear along the dotted line to use the scales and/or they can use the formulas to do the math.
S-3: Is Our Equipment Noisier Than 85 db?

Yes. Most of it is. Some are more than 1,000 times noisier.

Ask trainees to choose tool or equipment from group at left and guess its dB level. Click on the choice. The tool or equipment will appear larger in the center screen and its dB levels will be displayed. The levels correspond to the dB/Sound Pressure gauges at right. To stop the a demo, click the original tool/equipment. Ask trainees to make another choice and repeat. As a comparison, click the mosquito at top right of the group.

This is a key screen and should consume about 10 minutes of training time.

At the conclusion, ask trainees if they agree tools/equipment used in land care are noisy. Then introduce the optional exercise.

WORKSHEET #2 (OPTIONAL) Have trainees figure out how many times too noisy (above 85 db) some of the commonly used tools are. The worksheet shows dB ratings. It is expected that some assistance for trainees in making these calculations will be needed. Calculators are used.

Note that none of these calculations are very difficult, especially if guided by the hand of a good instructor and trainees work in teams. By doing these calculations, trainees should be building self efficacy, which is an essential requirement for effective behavioral change.

S-4: What’s Wrong With Noise?

It can damage your hearing – and your health.

Noise can cause
- Permanent hearing loss
- Constant ringing in your ears (tinnitus or TIN-EYE-TUS)
- Health problems, like high blood pressure
- Inability to hear warnings

A 25-year-old land care worker regularly exposed to occupational noise without hearing protection may have the hearing of a 50-year-old who is not exposed.

The purpose of this screen is to introduce the FEAR/hazard (See Course Overview, page 2).

The screen begins with a bucolic park-like scene. The birds chirp. As lines are added, workers begin doing lawn care tasks and the noise from their equipment grows.

The conclusion of this screen is that a 25-year old land care worker exposed to high levels of occupational noise without hearing protection may have the hearing of a 50-year old. Ask trainees if they know why. This serves as the pivot point for the hazards of noise exposure and opens the next discussion of HOW noise damages our ears.
S-5: How Does Noise Damage Our Ears?

Most hearing damage is due to injury to hair cells in the cochlea. Noise is usually the cause:

- Noise energy moves hair cells in the cochlea
- The hair cells send signals to the brain
- But if energy is too high for too long, hair cells wear out and signals to the brain weaken or distort
- Fortunately, when noise exposure stops, hair cells can recover

Unfortunately, with years of excess noise exposure, damage to hair cells is permanent:

- The hair cells die, no option for repair, and permanent deafness or tinnitus results.

Use the animation to talk about how noise energy is transmitted through ear parts to hair cells and to the brain. Emphasize that short-term hearing loss (STHL) is like pounding your hand on concrete until the fingers stop working. Wait long enough and the swelling goes down and they work again. But do it often enough and your hand will become useless.

Dancing Hair Cell Demo

- Click text or strike 1 to play video/audio demo.
- The purpose is to demonstrate how tiny and fragile human hair cells are.
- Ask trainees to imagine their own tiny hair cells pulsing to loud noise during their workday. Ask whether they think it is worth it to work without ear protection.

S-6: What’s It Like To Have Damaged Hearing?

After years of noise, the inner ear nerves die.

You slowly lose ability to hear/understand speech:

- You hardly notice difference until 9 dB loss
- At 25 dB loss, hard to understand speech
- Suddenly you realize you are hearing impaired

Speech/sounds are not just lower:

- You cannot hear certain frequencies at all
- Speech is in the frequency range you cannot hear
- You may also develop a constant ear ringing (tinnitus)

Exposure to higher levels of noise for continuous periods uses up your lifetime hearing capacity too soon.

Hearing Loss Demo

- Click each green bar, left to right, to play audio demo of speech.
- Click red to play audio demo of speech plus tinnitus.
- The tinnitus audio is distracting but resist the urge to turn it off. Let trainees experience the full effect. Calmly ask if they want to hear that for a lifetime.

Notes

S-5 Allow discussion of question before showing red line. Do not allow trainees to confuse the acute rupture of an ear drum with the gradual and permanent loss of hearing from damage to the cochlea hair cells.

Tinnitus audio effect plays as you move through this screen. When you reach the last line, strike down arrow again to stop audio.

S-5 Click or strike red 1 to show Dancing Hair Cell Demo. Click BACK to return.

The dancing hair cell was recorded in a laboratory.

S-6 Many people think that hearing loss just means sounds become lower and lower until you hear nothing. Helping trainees to understand how hearing loss REALLY works is essential for MOTIVATING them to wear hearing protection.

S-6 Click or strike red 1 to show Hearing Loss Demo. Click BACK to return.

Note: Hearing disability is usually denoted as an average hearing threshold level (HTL) of greater than 25 dB for both ears at selected frequencies.
S-7: Can I Get Hearing Damage From My Work?

Your daily noise exposure determines most of your risk.

Two main factors
• Higher noise exposure = more risk
• Longer noise exposure = more risk
• Risk also increases as you age

At age 25, odds of hearing loss from work at 97 dB for 8-hour day over 10 years is 64 in 100 (NIOSH) or about 2 in every 3 workers

At 82 dB, odds would be only 2 in 100 workers
At 76 dB, odds would be 0 in 100 workers

Click a tool to see lifetime risk to unprotected worker.

By age 45, permanent hearing loss/tinnitus is likely for 1 in 4 workers.*

*Exposed for 10 or more years above 90 dB without hearing protection.

Use this title question to ask the trainees, “What do you think the odds are that you could have hearing loss 10 years from now, IF you don’t do something to protect your hearing?” Let some express opinions without being judgmental, but identify any trainees who might be moving into “denial” at this point.

S-8: How Do I Know If I Have Noise Problems?

Use this checklist to find out.

✓ Must raise voice to talk to someone 3 feet away
✓ Can’t hear coins jingle in pocket at work
✓ Ringing or hollow sound in ears after work
✓ Clients complain about job noise
✓ Trouble hearing well after work
✓ Tools have noise warnings
✓ After time away from work, noises seem louder
✓ Employer has OSHA noise violations
✓ Workplace noise measured 80+ decibels (dB)

“Yes” to any of these questions may mean you have too much noise at work and/or already have some hearing damage.

These questions focus on two possibilities. (1) The workplace is so noisy that workers experience these effects. (2) The worker already has hearing problems and no matter where he or she would be working would experience these effects.
S-9: If I Have a Problem, What Can I Do?

Use a combination of 4 basic controls.

4 options reduce your risk of hearing damage

• Modify Noise Source – Use less noisy equipment, maintain/clean
• Rotate Work Tasks – Work less time with noisy equipment, alternate noisy/less noisy tasks, use work planning/scheduling
• Increase Distance from Noise – Move away from noisy equipment. Doubling distance cuts noise by a factor of 4
• Use Hearing Protection – Properly select, fit, and use plugs/muffs

Properly selected, fitted, and worn, HPDs can reduce noise exposure 7-26 dBA.

This screen begins the discussion of what a worker and an employer can do to prevent the harm. The traditional OSHA hierarchy of hazard controls is addressed in this screen, with substitution and engineering controls first and personal protective equipment last. But the focus for the training module is increasing distance from noise and using hearing protection.

Modifying noise sources and rotating work tasks are likely to be beyond the control of workers engaged in this training. These decisions are associated with supervisors. Consequently, too much emphasis on these controls could undermine trainee self-efficacy and result in rejection of the hazards and controls.

On the other hand, increasing distance from noise and, to a larger extent, hearing protection are within the control of the workers. Therefore, these options are less likely to undermine worker self-efficacy, making them appropriate training topics for the EPPM concepts used in this training module (see Course Overview on page 2).

CAUTION: Task switching is often frowned on because it spreads the risk among workers, decreasing it for one while increasing it for another. So task switching is usually acceptable only when no worker faces risks greater than 4 or 5 in 100. That is the same expectation as 8 hours of exposure at the 85 dBA action level.

These sheets list quieter mowers and chain saws. You can find many other examples of quieter equipment on the Internet.
**S-10: What Ear Protection Is Available?**

There are 4 basic types. Which type do you like?
- Roll down
- Molded
- Ear muffs
- Banded ear caps

Warning: Cotton, paper, wax, or headphones are not hearing protectors!

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**S-10 Diversion 1: How Good Are Roll Down Plugs?**

They have advantages and disadvantages.

**Advantages**
- Can be very comfortable
- NRR is readily available
- Disposable, no cleaning required

**Disadvantages**
- Hardest to wear correctly
- Need clean hands to insert

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**S-10 Diversion 2: How Good Are Premolded Plugs?**

They have advantages and disadvantages.

**Advantages**
- Easy to insert, come in different sizes
- Can be inserted with dirty hands
- Disposable or reusable

**Disadvantages**
- Good fit may be difficult
- Can be uncomfortable

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**S-10 Diversion 3: How Good Are Ear Muffs?**

They have advantages and disadvantages.

**Advantages**
- Easiest protector to use
- Can attached to a hard hat
- Reusable

**Disadvantages**
- Can be uncomfortable
- May feel heavy or bulky

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**S-10 Diversion 4: How Good Are Banded Ear Caps?**

They have advantages and disadvantages.

**Advantages**
- Very easy to put on and take off
- Can be inserted with dirty hands
- Reusable

**Disadvantages**
- Can be hard to get a good fit
- Band may “squeeze” your head
- Your voice may sound loud to you

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**PLANET - Professional Landcare Network**
S-11: How Do Ear Protectors Work?

They block noise from entering the ear canal.
When properly selected and used
• Plugs go into ear canal and block noise energy there
• Muffs fit over entire ear and block noise from entering
• Banded ear caps work like plugs but are held in place by a muff-like band

Properly used HPDs offer Noise Reduction Rates (NRRs) of 8 to 25 dB.

S-12: What Is an NRR?

Manufacturers give ear protection a Noise Reduction Rating, NRR = dBs of noise reduction
• EX: An NRR of 25 means the ear protection should block 25 dBs of noise

Because of job conditions, NIOSH says to de-rate manufacturer’s NRR
• Formable plugs by 70% (EX: NRR 25 = 7.5 dB reduction)
• Foam plugs by 50% (EX: NRR 25 = 12.5 dB reduction)
• Muffs by 30% (EX: NRR 25 = 17.5 dB reduction)

With proper fitting and training, the field dB reduction can be closer to the NRR.

Earmuffs and insert earplugs sold on the market list a “Noise-Reduction Rating” (NRR) on the package. Ear muffs can have a dB rating from 19 to 31. Self-adjusting foam ear plugs could have a rating of 30 to 34 dB. Ribbed rubber plugs are around 27 dB. What does this mean for you? The level of noise at ear (dB) could be lowered by the NRR dB number the manufacturer uses for the product (noise level dB minus hearing protection NRR dB number = noise level dB at ear). However, the NRR value can be achieved only if hearing protection is worn properly.

NIOSH: Criteria for a Recommended Standard, Occupational Noise Exposure, June 1999. NIOSH recommends that “Subject Fit” data in accordance with ANSI S12.6-1997 be used. (No U.S. manufacturer has made “Subject Fit” test data available). NIOSH recommends the following de-rating of hearing protector NRR’s, if subject fit data is not available:
• Ear muffs: Subtract 25% from the manufacturer’s labeled NRR
• Formable earplugs: Subtract 50% from the manufacturer’s labeled NRR
• All other ear plugs: Subtract 70% from the manufacturer’s labeled NRR

The above de-ratings apply only when the noise measurement was made with a dB(C) scale. When only a dB(A) scale measurement is available, the de-rated NRR’s should be reduced by 7 dB. Observe that earmuffs require the lowest de-rating.

OSHA’s Field Manual: The agency has directed inspectors to use the following formula.
• If noise measurements are made with dB(A) scale, the following formula applies. (Noise level [98 dB] minus NRR / 2 [25 dB minus 7 dB divided by 2] = Noise level at ear, 89 dB).
• If the noise level measurements are made with dB(C) scale, this formula applies. (Noise level [98 dB] minus NRR / two [25 dB divided by 2] = Noise level at ear, 85.5 dB).

Although OSHA has only enforcement authority, its interpretation has held up in court. OSHA only recommends that the 50% safety factor is applied. Realize that if a company runs an effective hearing conservation program, it is not likely to be challenged. An effective hearing conservation program can be defined as a program that assures that no new permanent and noise induced hearing losses occur among its employees.
**S-13: How Do Ear Protectors Work?**

They block noise from entering the ear canal. When properly selected and used:
- Plugs go into ear canal and block noise energy there
- Muffs fit over entire ear and block noise from entering
- Banded ear caps work like plugs but are held in place by a muffy-like band

Properly used HPDs offer Noise Reduction Rates (NRRs) of 8 to 25 dB.

**S-14: How Much Does Ear Protection Help?**

Worn properly and regularly, it can bring risk way down.

Pick a tool and pick hearing protection to see difference

Ask trainees to choose tool/equipment from the group. Click the tool and see the dBs and the resulting Exposure for an 8-hour TWA (time weighted average). Then ask trainees to select a type of hearing protector. Click it and see the NRR and also see how the hearing protector impacts the Exposure.

**S-15: How Do I Select My Hearing Protection?**

Start with the basics. Figure your noise exposure, then pick HPDs based on:
- Best NRR
- Comfort
- Ease of proper use
- Ease of communication
- Not cotton, wax, or headphones

The best hearing protection is the one you wear.

**WORKSHEET dBA EXPOSURE CALCULATOR**

Use dBA Exposure Calculator and the Noise With/Without PPE list at right to help trainees solve Problem #5 on the trainee worksheet. Help trainees to find tools/equipment on the Noise With/Without PPE and record the dBs. Then help them use dBA Exposure Calculator to find each dB value in the left column, move to the applicable hours column, and record the applicable number. Help trainees answer the remaining questions in Problem #5.
S-16: Does Ear Protection Work?

If you’re not wearing protection now, try these experiments.

Experiments with your car radio

• Going to job, set audio so you barely hear it
• After work, turn it on without adjusting volume – see if you hear it as well
• Try the opposite – set your radio so you can hear it after work.

Leave the radio on when you shut off your vehicle. See how loud it comes on in the AM.

• Workers trying both experiments say they are amazed at the difference. Just don’t do the morning experiment with a full cup of coffee in your hand, unless the cup is capped.

In either experiment, you’ll be surprised at the impact of noise over just one day.

S-17: How Are Muffs Used?

Muffs can provide good protection.

To use

• Inspect them to make sure they are clean, in good condition
• Place them over your ears
• Make sure they fit snugly and completely cover your ears

Hard to wear with hard hat

• Some newer muffs are designed for wear with hard hats

Muffs must be regularly cleaned and inspected – and discarded when they’re old.

S-18: How Are Foam Plugs Used?

Foam plugs are inexpensive and very effective.

To use

• Reach around behind your head with hand opposite your ear
• Grab ear between your thumb and forefinger
• Pull ear out and back to straighten ear canal
• Roll one end of plug to compress it
• Insert plug into ear canal
• Use light pressure to seat it

It’s best to use foam plus for only one day. Use a new pair each day.

S-19: How Are Pliable Plugs Used?

Pliable plugs are very effective but must be cleaned regularly.

To use

• Make sure plugs are clean and in good condition
• Reach around behind your head with hand opposite your ear
• Grab ear between your thumb and forefinger
• Pull ear out and back to straighten ear canal
• Roll one end of plug to compress it
• Insert plug into ear canal
• Use light pressure to seat it

Reusable plugs must be cleaned regularly. Follow the manufacturer’s directions.
**S-20: What Is a Hearing Conservation Program?**

A program required by OSHA when workplace noise is above 85 dBA 8-hour TWA (50% dose). [1910.95(c)(1)].

Minimum program requirements:
- Noise Monitoring – required for noise above 85 dBA 8-hour TWA (50% dose)
- Audiometric Testing – for employees exposed at or above the action level
- Provide Hearing Protection Devices (HPDs) – at no cost to employees at or above the action level
- Conduct Employee Training – must train employees exposed at or above the action level
- Recordkeeping – to assist in recognizing and correcting workplace hazards

Purpose is to prevent hearing loss, improve employee morale, increase quality of production, and reduce the incidence of stress-related disease.

**S-21: How Do We File an OSHA Complaint?**

This screen tells trainees that they have a right to file a complaint with OSHA. It explains that the worker should present the hazard to the management and file a complaint only if it is ignored. The screen describes written complaints and discrimination complaints. Workers are advised to give the company time to resolve the problem before filing an OSHA complaint, unless there is an imminent danger.

Interactive Quiz
Jeop-EAR-dy Game

Jeop-EAR-dy is played exactly like the TV Jeopardy game except the Answers and Questions are all about noise and hearing protection in land care. The game serves as an entertaining reinforcer of the learning during the module.

Double click the application file PLANET Jeop-EAR-dy.exe. The module opens to the START screen, shown at right. Click Click to Start button to move the screen below.

To play in Spanish, click English button and select Espanol.

The game generates random ‘answers’ and keeps score for up to 4 teams. The game includes Single Jeopardy, Double Jeopardy and Final Jeopardy.

Divide trainees into up to 4 teams.

Ask Team 1 to choose a category and dollar amount. Click the dollars and read the “Answer.” All trainees* can give “Question” and you click the Team number of the first responding team at screen bottom. The correct ‘Question’ then appears on screen and you click a + (plus) for correct or a - (minus) for incorrect in the lower screen area. This adds or subtracts points for the responding team and returns you to the game.

Repeat the process until you have finished Single Jeopardy. The game moves to Double Jeopardy. At the end of Double Jeopardy, the game moves to Final Jeopardy.

* You may want to have trainees raise hands before responding to avoid having everyone speaking at once.
**Tips For Use**

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The module screen titles appear in the large list box. Use the vertical scroll bar to show the first screen. Click a screen title to move to the screen. Then use **Next** to move through screens.

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Course Length One 2-hour session or two 1-hour sessions.

Course Materials
- Web download or DVD or USB program application, computer with projector
- Instructor Guide
- Trainee Worksheets — download PDFs
- Assortment of safety glasses, goggles, faceshields
- Assortment of gloves — leather, cut-resistant stainless steel mesh, puncture-resistant, heat resistant, vibration dampening, chemical resistant, etc. (Screen 12 shows images)
- Chaps for protection when operating chain saws
- Pens or pencils for all trainees to use in completing worksheets
- Wall poster (optional)

English and Spanish. With the web download or DVD or USB application, the presenter can switch instantly between English and Spanish. All of the above training products come in English and Spanish.

Special Considerations. This program is designed for a maximum of 20 to 25 trainees. The trainees need work tables/desks at which to complete the worksheet exercises. You also need a separate table for display/demonstration of hearing protection.

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Notes
Successful presentation of this module requires safety knowledge and experience. It also requires careful preparation. In addition to detailed review of the module with this guide, you may decide which screens to include or not include in your training.

Also see www.osha.gov for additional training resources that may enhance your training.
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A PLANET Safety Training Program for Land Care Employees

Learning Objectives

Trainees who complete this program should attain specific, measurable changes in knowledge, beliefs, attitudes, and skills:

KNOWLEDGE
- Name at least 3 types of gloves that serve specialized land care purposes (vibration damage, cut, puncture, abrasive resistant, electric, grip).
- Identify the safe location for work with tools and equipment (perpendicular or right angle to line of force, out of line of force).
- Name at least 3 types of eye protection (glasses, goggles, face shield).
- Know the impact forces from falls of various heights.

BELIEFS
- Falls on the same level are not harmful. (FALSE)
- Protective gloves are optional. (FALSE)
- Land care work does not require eye protection. (FALSE)
- Land care equipment does not require guards. (FALSE)

ATTITUDES
- I have my favorite gloves that work for all possible tasks. (FALSE)
- Eye protection restricts my vision so I don’t like to wear it. (VALID ISSUE TO RESOLVE)
- It is not my job to check for guards on equipment and tools. (TRUE and FALSE)
- Land care work is relatively safe, so we don’t need to worry much about being struck or crushed or about slipping, tripping, or falling. (FALSE)

SKILLS
- Proper donning and doffing and care of eye protection.
- Proper donning and doffing and care of gloves.
- Proper body positioning in relation to tools and equipment. (FALSE)
How Do We Protect Our Bodies?

Module Structure

20 main screens - some with interactive demos and/or diversions
1 interactive quiz

Module Outline

S-1: Where Does It Hurt?

Zeroing in can help us change how we work.

Hurts
- Hands
- Feet
- Head
- Torso
- Legs
- Eyes

Point to the parts of the body map where you hurt.

S-2: What Hurts Workers in Land Care?

Four types of impact injuries are common.

Impact events
- Struck
- Caught In
- Falls to lower level
- Slips, trips, falls on same level

S-3: Do Land Care Workers Have More Injuries?

Yes. We miss twice as many work days due to injuries.

Comparisons
- Struck - 3 X More
- Caught In - 2 X More
- Slips, trips, falls on same level - Same
- Falls to lower level - 2.5 X More

Notes

If you use the recommended Questioning Method by asking trainees to answer the question before showing the next lines, you will generate interaction.

Strike the down arrow key to move through the lines on screen. Strike right arrow or click Next to move to next screen. (If arrow key ever fails, use mouse to click.)

S-1 As each line appears, ask trainees to respond to the question. Then insert your cursor in the gray box at left of checkbox and count those saying ‘yes’ by clicking once for each trainee. In most groups, significant numbers of trainees will raise their hands.

S-2 Allow discussion of question before showing the types. This screen introduces the hazards. Screen 3 presents the risks.

S-3 Allow discussion of question before showing red line. The chart displays Bureau of Labor Statistics (U.S. Department of Labor) for land care workers vs all private sector workers. The bottom line in gray is the work days lost because of injuries.
S-4: How Serious Are Struck/Crushed Injuries?

It mostly depends on the impact force.

Examples
- Weed wackers spin at 12,000 rpm
- Mowers spin at 3,400 rpm
- Skid loaders weigh 8,000 pounds
- Chain saw kickback
- Pinch point may apply 4,000+ pounds of force

Notes

S-4 Allow discussion of question before showing red line.

Click or strike red 1 or 2 to show Flying Particle Demo (below). Follow screen instructions. Click BACK to return.

Click or strike red 3 to show the case study of an “OSHA Fatality.” Have trainees analyze what went wrong in this situation. Click the scenario to hide.

Click or strike red 4 to show definition of chain saw kickback.

Flying Particle Demo

- Use sliders to set disk diameter and speed.
- Click “Show” to see particle velocities in feet per second and miles per hour.
- “Results” shows how many pounds of force impact eye if struck by a one-gram particle at this speed.
- Click “Damage?” to see the damage.
- Click “HOW?” to see mathematical formulas.

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DEMO Ask trainees to say how fast they think the particle is flying.

Ask trainees if they wear safety glasses. If not, ask if they can close their eyes fast enough to avoid injury. Then, show the damaged eye ... that worker did close his eyes fast enough but the particle flew right through his eyelid.

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Breakout Exercise

The Trainee Worksheets download PDF contains worksheets on 9 tools/equipment used in land care (sample shown at right). The worksheets cover chain saws, wood chippers, leaf blowers, leaf vacuums, push mowers, mulchers, ride-on mowers, stand-on mowers, and weed wackers. Distribute the 9 items among your trainees. For example, if you have 18 trainees, assign 2 trainees to a worksheet for one tool/equipment. Or if you have 6 trainees, choose 6 worksheets to assign, and so on.

INSTRUCTIONS: Ask trainees to think of and write down as many struck/crush/caught-in hazards as they can come up with for their tool/equipment. The purpose is to get trainees to analyze the hazards and start thinking about the risks.
S-5: How Serious Are Falls to Lower Levels?

Once again, it depends on the impact forces. Examples:
- Falls from equipment
  + Ride-on mowers
  + Tractors
- Falls from elevated surfaces
  + Embankments
  + Retaining walls

Tell us if you have fallen to a lower level. How did it happen? How were you hurt?

Fall Demo

- Follow screen instructions.
  - A. Select height. B. Select worker’s weight. C. Select stopping distance.
  - Click “Let ‘Em Go” button to show Fall Distance, Fall Time, and Impact Force.
  - Click “Reset” button to start over.

S-6: How Serious Are Falls on the Same Level?

Again, it depends on the impact forces. Examples for 200 lbs worker fall on same level:
- Fall 4 feet onto hard surface = 9,600 ft-lbs force
- Fall 4 feet onto soft surface = 1,600 ft-lbs force
- Energy transmitted to body is increased or reduced, depending on impact area

Tell us if you have fallen on the same level. How did it happen? How were you hurt?

S-7: How Do We Protect Our Bodies?

Protection is part of professional land care. Methods:
- Housekeeping
- Work flow, staging
- Worker Positioning
- Equipment, tool maintenance
- Personal Protective Equipment (PPE)
- Training

Let’s look at each method on the next screens.

Notes

S-5 Allow discussion of question before showing red line.
OSHA requires fall protection for work 6 feet or more above a lower level.
Strike or click 1 to use FALLS DEMO (below.) Follow screen instructions. Click Back to return.
After selecting height, weight, and stopping distance, ask trainees to guess what the fall impact force will be. Most trainees will underestimate the force.
After showing the impact force, ask trainees to compare the force with a physical object of the same weight and ask if they think the impact force would be harmful.
As the demo shows, tremendous fall impact forces are generated in falls.

S-6 This screen compares falls on the same level: hard vs soft surfaces and areas of impact.

S-7 This screen introduces the methods of controlling these hazards and protecting our bodies.
S-8: What Is Housekeeping?

Organization, control of materials, equipment, waste.
Housekeeping
- Control, remove debris
- Keep area clear of tripping hazards
- Place cones, warning tape around tripping or fall hazards

S-9: What Is Worker Positioning?

Action taken by workers to stay out of the direction of force.
Know the path of force for tools, machines, materials
- Work is FORCE applied over DISTANCE
- If your body is in the path of any uncontrolled FORCE the FORCE is now applied to you

Examples
- Path of a wood chipper
- Path of a chain saw
- Path of materials while unloading a truck bed

Stay alert to path of any physical force
- Do not place your body in the path of forces
- Keep PERPENDICULAR (right angle) to the direction of force

WORKSHEET The Trainee Worksheets download PDF contains 2 worksheets for body positioning exercises: one on wood chippers (shown at right) and one on chain saws. You can also show these on screen using the Instructor Presentation download PDF. In each exercise, ask trainees to select the position they would use and why. Then talk about staying out of the path of force.

S-10: What Is Tool, Equipment Maintenance?

Set up system of care and repair.
Inspections
- Inspect power tools to ensure good condition of protective guards 1910.243
- Inspect hand tools
- Inspect equipment

Repair/replace
- Tag defective tools, equipment
- Remove from service
- Repair or replace

Clean, well-maintained tools and equipment reduce risk of injury.
**S-11: What Is PPE?**

Personal protective equipment protects our bodies.

- **Fall prevention**
  - Equipment seatbelts
  - Fall restraint
  - Personal Fall Arrest System (PFAS)

- **Protective gear**
  - Hands
  - Head
  - Feet
  - Arms, legs, torso
  - Eyes

**S-12: How Do We Protect Our Hands?**

Wear the right gloves for the hazards.

- Leather gloves protection from
  - Cuts, abrasions
  - Burns from hot tools, friction

Special gloves required for

- Cut resistance
- Puncture resistance
- Vibration damping
- Heat resistance
- Chemical resistance

Some chemicals are easily absorbed through the skin as with a nicotine patch.

**S-13: How Do We Protect Our Feet?**

Select leather work boots.

- High-top leather boots
  - Protect from crushing, cuts, punctures, abrasions
  - Keep out splashes, particles
  - Provide support, cut down on fatigue

Hiking boots and running shoes are not appropriate.

**S-14: How Do We Protect Our Heads?**

Hard hats, caps with neck flaps, and hats.

- Caps, hats protect from
  - Heat and sun
  - Dust, dirt, chemicals

Hard hats protect from

- Flying, falling objects
- Sun

Caps/hard hats with neck flaps also protect against skin cancer. Skin cancer tends to originate on ears and necks of outdoor workers.
S-15: How Do We Protect Our Arms/Legs/Torsos?

Wear protective clothing.

General Protection
- Long sleeves
- Long pants

Special Protection
- Kevlar Vests
- Kevlar chaps
- Kevlar arm and wrist covers

In hot weather, wear breathable fabrics but keep long sleeves, long pants.

S-16: How Do We Protect Our Eyes?

Select eye protection for the tasks you do.

Select
- Safety sunglasses with side shields – protect from UV and cut down glares you – can get prescription safety glasses
- Goggles – fit closely around eyes – goggles with vents protect from dusty, flying particles
- Face shield – protects whole face – best protection for sawing, cutting, wood chipper, powder-actuated tools

Eye protection must meet standards for NIOSH and ANSI.

Approved glasses and goggles have Z87 stamped on their frames.

Interactive Quiz

S-15 Allow discussion of question before showing red line.

Ask trainees if any of them operate chain saws and, if so, do they wear the Kevlar protections. Ideally, you have some for trainees to see and try.

S-16 It is very important to have an array of safety glasses, goggles, and face shields, as listed in Course Materials, for trainees to see and try after the module is presented. When trainees handle these, have them look for the Z87 stamp.

S-16 Click QUIZ to use the interactive quiz. Click Start Quiz and read first question and answer choices. Ask trainees to answer. Click answer. If correct, applause is heard. If incorrect, a Homer Simpson “d’oh!” is heard. The Quiz keeps running score in upper right corner.